Volume III
(2 of 2)
DRAFT ENVIRONMENTAL IMPACT REPORT
TECHNICAL APPENDIX
State Clearinghouse No. 2009061113

LYTLE CREEK RANCH SPECIFIC PLAN

Lead Agency:
City of Rialto
Development Services Department
150 South Palm Avenue
Rialto, California 92376

March 2010

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(2 of 2)
DRAFT ENVIRONMENTAL IMPACT REPORT
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LYTLE CREEK RANCH SPECIFIC PLAN

Annexation No. 170
General Plan Amendment No. 29
Specific Plan No. 12
Development Agreement
Vesting Tentative Tract Map No. 18767
Environmental Assessment Review No. 90-19

Lead Agency:
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Development Services Department - Planning Division
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March 2010

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JURISDICTIONAL DELINEATION REPORT

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GLENN LUKOS ASSOCIATES

Regulatory Services

February 8, 2008
[Revised October 9, 2008]
[Revised March 25, 2009]
[Revised April 20, 2009]

Andrew K. Hartzell
Hewitt & O'Neil
19900 MacArthur Boulevard
Suite 1050
Irvine, California 92612

SUBJECT: Jurisdictional Delineation for the Lytle Creek Ranch Property, a 2,447.30-Acre Property Located in the City of Rialto and Unincorporated Portions of San Bernardino County, California

Dear Mr. Hartzell:

This letter report summarizes our preliminary findings of U.S. Army Corps of Engineers (Corps), California Department of Fish and Game (CDFG), and California Regional Water Quality Control Board (Regional Board) jurisdiction for the above-referenced property.[1]

The Lytle Creek Ranch Property (Project) is located within Sections 4, 5, 6, 7, 8, 17, 21, 22, 26, 27, and Unsectioned Areas of Township 1 North, Range 5 West in the City of Rialto and unincorporated portions of San Bernardino County, California [Exhibit 1]. The Project comprises 2,447.30 acres and supports ten blue-line drainages (as depicted on the U.S. Geological Survey (USGS) topographic maps Devore, California [dated 1966 and photorevised in 1988] and San Bernardino North, California [dated 1967 and photorevised in 1988]) [Exhibit 2]. The Lytle Creek Ranch Study Area (Study Area) includes the Project as well as an additional 19.20 acres of offsite area for purposes of implementation of the Project; therefore, the total Study Area consists of 2,466.50 acres.

For purposes of this report, the delineation does not address the 137.8-acre portion of the Project that was previously permitted [See Exhibit 3] by the Corps, CDFG, and Regional Board. Additionally for purposes of this report, the Project has been divided into four areas known as Neighborhoods I, II, III, and IV and assumes the worst-case scenario for temporary and/or

[1] This report presents our best effort at estimating the subject jurisdictional boundaries using the most up-to-date regulations and written policy and guidance from the regulatory agencies. Only the regulatory agencies can make a final determination of jurisdictional boundaries. If a final jurisdictional determination is required, GLA can assist in getting written confirmation of jurisdictional boundaries from the agencies.

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permanent impacts necessary to construct the proposed levee adjacent to Neighborhoods II, III, and IV. The levee design is assumed at an elevation of ten feet with a 2:1 slope. Enclosed are four 850-scale maps depicting the locations of Neighborhood I and an offsite parcel owned by the County of San Bernardino (County) [Exhibit 3A], Neighborhood II (Exhibit 3B), Neighborhood III (Exhibit 3C), and Neighborhood IV (Exhibit 3D). These maps also depict the potential off site impacts and/or uses as described in each Neighborhood below.

Neighborhood I

Neighborhood I is the northernmost of all Neighborhoods and is located on both the east and west sides of the Interstate 15 Freeway (I-15 Freeway) generally adjacent to Glen Helen Parkway. Neighborhood I contains 417.20 acres of land. Also located within the proposed open space parcel of Neighborhood I is an existing 100-foot wide gas line utility easement, which includes a 16-foot wide existing dirt road, that extends north off-site into an offsite parcel owned by the County. Although any disturbance to the gas line utility easement is not part of the proposed Project, this delineation report defines the total jurisdictional area within both the on site gas line utility easement located within the proposed open space parcel of Neighborhood I and the off site gas line utility easement located within the adjacent County parcel [Exhibit 3A].

Although the proposed Project does not propose any improvements to the existing gas line roadway, it is anticipated that at a future date and independent of the Lytle Creek Ranch Project, the gas line roadway improvement may be implemented. The existing jurisdictional acreages for the off-site County parcel are restricted to the existing 100-foot easement area. Therefore, also included in the impact section of this report are the potential impacts of the gas line road improvements as defined in Section IV B, Impact Analysis of this report.

Neighborhood II

Neighborhood II includes an off-site levee improvement area and an existing 2.60-acre offsite utility roadway that originates from Highland Avenue and will provide an interim secondary point of access to Neighborhood II during construction. Neighborhood II also includes proposed improvements to the existing CEMEX flood control levee off-site, which connects the proposed levee between Neighborhoods II and III. Neighborhood II is the easternmost of the four Neighborhoods and is generally bounded by Lytle Creek to the north and east, Riverside Avenue to the south, and the CEMEX Mining Facility to the west. Neighborhood II contains 801.8 acres of land, which includes 104.54 acres of proposed open space within Lytle Creek. The off-site levee improvement area is bounded by Lytle Creek to the north, the CEMEX Mining Facility to

the south, Neighborhood II to the east, Neighborhood III to the west and contains 10.10 acres of land [Exhibit 3B].

Neighborhood III
Neighborhood III is located along the southern boundary of the Project area and is bounded by Lytle Creek to the north, Riverside and Sierra Avenues to the south, the CEMEX Mining Facility to the east, and the I-15 Freeway to the west. Neighborhood III contains 968.80 acres of land, which includes 86.28 acres of proposed open space within Lytle Creek and 107.18 acres of open space recently conserved for the benefit of the San Bernardino kangaroo rat (SBKR). Additionally, Neighborhood III contains a proposed 2.30-acre off-site roadway easement on top of the proposed levee that begins in Neighborhood III, passes through an offsite area under the I-15 Freeway, and continues into Neighborhood IV [Exhibit 3C].

Neighborhood IV
Neighborhood IV is located along the southwestern and western boundaries of the Project area and is bounded by Lytle Creek to the north, Lytle Creek Road and Sierra Avenue to the south, the I-15 Freeway to the east, and Lytle Creek and Lytle Creek Road to the west. Neighborhood IV contains 259.50 acres of land, which includes 75.67 acres of proposed open space within Lytle Creek and 1.90 acres of recently conserved open space for the benefit of the SBKR [Exhibit 3D]. Neighborhood IV also includes an off site 0.35-acre temporary impact area resulting from the proposed levee construction at the western end of Neighborhood IV.

On December 1, 2, 5, 6, 9, 14, 15, 21, 28, 29, 2005, January 24, February 6, 23, and March 8 and 15, 2006, regulatory specialists of Glenn Lukos Associates, Inc. (GLA) examined the Study Area to determine the limits of (1) Corps jurisdiction pursuant to Section 404 of the Clean Water Act, (2) CDFG jurisdiction pursuant to Division 2, Chapter 6, Section 1602 of the Fish and Game Code, and (3) Regional Board jurisdiction pursuant to Section 401 of the Clean Water Act. GLA also conducted an additional site review of the Study Area on May 14 and 17, 2007 to verify and update the original results of the jurisdictional delineation. Additionally, on June 25, 2007, GLA re-evaluated the site in accordance with the 2006 Interim Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Supplement (Arid West Supplement)[2] as well as the May 30, 2007 Corps jurisdictional guidance document titled *U.S. Army Corps of Engineers*

[2] U.S. Army Corps of Engineers. 2006. Interim Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Supplement. Ed. J.S. Wakeley, R.W. Lichevar, and C.V. Noble. ERDC/EL TR-06-16. Vicksburg, MS: U.S. Army Engineer Research and Development Center.

Jurisdictional Determination Form Instruction Guidebook and the June 5, 2007 Corps and EPA Rapanos guidance. Also on June 25, 2007, GLA conducted a site review of the gas line easement within Neighborhood 1 that continues north to an offsite parcel owned by the County [see Exhibit 3A].

Exhibit 3A depicts jurisdiction and the limits of Neighborhood I and the on- and off-site gas line utility easement within the County-owned parcel. Exhibit 3B depicts jurisdiction and the limits of Neighborhood II, as well as the off site levee improvement proposed as a part of Neighborhood II, and the existing offsite roadway that will provide a temporary secondary access construction road. Exhibit 3C depicts the jurisdiction and the limits of Neighborhood III, and its off site 2.30-acre proposed roadway easement on top of the proposed levee under the I-15 Freeway connecting Neighborhood III and IV. Exhibit 3D depicts jurisdiction and the limits of Neighborhood IV including the 0.35-acre of off-site temporary impact area due to levee construction at the western end of Neighborhood IV. Photographs to document the topography, vegetative communities, and jurisdictional waters are provided as Exhibit 4. Jurisdictional Determination forms are attached as Appendix A. Wetland Delineation data sheets are attached as Appendix B.

Project Description

The proposed Project consists of a total of 2,447.3 acres of land located partially within the City of Rialto (City) [including the adopted El Rancho Verde Specific Plan], although most portions of the Project are located within the City's sphere of influence in unincorporated San Bernardino County. Portions of the Project located within the jurisdiction of San Bernardino County have been included in the Glen Helen Specific Plan and the Lytle Creek North Planned Community. The project proposes to establish a specific plan that will direct the overall development and build-out of the entire 2,447.3 acres, and will integrate this currently unincorporated area into the City and provide a new northern gateway to the City consistent with the City's General Plan goals for this area. The Project is bisected partially by both the I-15 Freeway and Lytle Creek Wash, an intermittent stream. The Project is designed as a master planned residential and mixed-use community consisting of various land uses in four distinct geographic areas and each geographical area has been defined as a neighborhood (i.e., Neighborhoods I, II, III, and IV). The community is planned for a maximum of 8,407 single family detached, attached, and multi-family units, and a maximum of 849,420 square feet of mixed-use non-residential development, and rerouting of Sycamore Creek within Neighborhood I on the west side of the I-15 Freeway. The Project contains extensive areas of proposed open space in the forms of parks, paseos, recreation centers, greenbelts, and natural open space [Exhibit 5, Land Use Plan].

Corps jurisdiction associated with the Study Area totals 464.98 acres, of which 1.65 acres consist of jurisdictional wetlands. Of the 464.98 acres of Corps jurisdiction within the Study Area, 461.91 acres, of which 1.65 acres consists of jurisdictional wetlands, is within the Project area. The remaining 3.07 acres of Corps jurisdiction, none of which consists of jurisdictional wetlands, is off site. Of the 3.07 acres of off site Corps jurisdiction, a total of 0.06 acre, none of which consists of jurisdictional wetlands, is associated with the off site gas line utility easement area; a total of 2.66 acres, none of which consists of jurisdictional wetlands, is associated with the levee repair between Neighborhood II and CEMEX; no Corps jurisdiction exists within the 2.60-acre utility roadway off-site between Neighborhood II and Highland Avenue, no Corps jurisdiction exists within the 2.30-acre roadway easement on top of the proposed levee under the I-15 Freeway connecting Neighborhoods III and IV, and a total of 0.35 acre, none of which consists of jurisdictional wetlands, is associated with the levee construction at the western end of Neighborhood IV. The total linear-footage of Corps jurisdiction within the Study Area is 80,717 linear feet. Of this total, 78,567 linear feet is within the Project area and the remaining 2,150 linear feet are off site.

CDFG jurisdiction associated with the Study Area totals 527.90 acres, of which 25.26 acres consist of vegetated riparian habitat. Of the 527.90 acres of CDFG jurisdiction within the Study Area, 520.64 acres, of which 23.60 acres consist of vegetated riparian habitat, is within the Project area. The remaining 7.26 acres of CDFG jurisdiction, of which 1.66 acres consist of vegetated riparian habitat, is off site. Of the 7.26 acres of CDFG jurisdiction, of which 1.66 acres consist of vegetated riparian habitat off site, a total of 1.66 acres, all of which consist of vegetated riparian habitat, is within the off site gas line utility easement area; a total of 5.25 acres, none of which consists of vegetated riparian habitat, is within the levee repair between Neighborhood II and CEMEX; no CDFG jurisdiction exists within the 2.60-acre utility roadway off-site between Neighborhood II and Highland Avenue, no CDFG jurisdiction exists within the 2.30-acre roadway easement on top of the proposed levee under the I-15 Freeway connecting Neighborhoods III and IV, and a total of 0.35 acre, none of which consists of vegetated riparian habitat, is within the levee construction at the western end of Neighborhood IV. The total linear-footage of CDFG jurisdiction within the Study Area is 100,034 linear feet. Of this total, 96,905 linear feet are within the Project area and the remaining 3,129 linear feet are off site.

Project Impacts

Permanent impacts to Corps jurisdiction within the Study Area total 58.02 acres, none of which consist of jurisdictional wetlands[3]. Of the 58.02 acres of permanent impacts to Corps jurisdiction, 57.42 acres, none of which consist of jurisdictional wetlands, is within the Project area and 0.60 acre, none of which consists of jurisdictional wetlands, is off site. Temporary impacts to Corps jurisdiction within the Study Area total 26.73 acres, none of which consist of jurisdictional wetlands. Of the 26.73 acres of temporary impacts to Corps jurisdiction, 24.33 acres, none of which consist of jurisdictional wetlands, are within the Project area and 2.40 acres, none of which consists of jurisdictional wetlands, are off site. Permanent impacts to Corps streambed within the Study Area total 43,741 feet. Of the 43,741 linear feet of permanent impact to Corps streambed, 42,709 linear feet are within the Project area and the remaining 1,032 linear feet are off site. Temporary impacts to Corps streambed total 8,852 feet. Of the 8,852 linear feet of temporary impact to Corps streambed, 8,577 linear feet are within the Project area and the remaining 275 linear feet are off site.

Lytle Creek, the ephemeral drainage and tributaries to the east of the I-15 Freeway, and the blue-line ephemeral drainage and tributaries to the west of the I-15 Freeway would be considered non-Relatively Permanent Waters (non-RPWs) that exhibit a "significant nexus" to a Traditionally Navigable Water (TNW) [the Pacific Ocean] [Section IV.A., Significant Nexus Analysis and Appendix A, Jurisdictional Determination Forms]. As such, all areas on-site exhibiting an Ordinary High Water Mark (OHWM) would be subject to Corps jurisdiction in accordance with the guidance provided by the Corps relative to Rapanos[4] [Exhibits 3A-3D].

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[3] Corps jurisdiction has been determined to be present within Lytle Creek, along with its associated tributaries and remnant basin features, the ephemeral drainage and tributaries to the east of the I-15 Freeway, and the blue-line ephemeral drainage and tributaries to the west of the I-15 Freeway. These features are Corps jurisdictional waters because they exhibit an OHWM with one or more of the following indicators of stream flow: destruction of terrestrial vegetation, shelving, change in soil characteristics, debris racks, and/or visible water marks. However, there were also several areas which are not subject to Corps jurisdiction because these areas lack the presence of an OHWM under normal circumstances. These non-jurisdictional areas consist of high terraces, elevated islands, and/or elevated berms located within, and adjacent to, Lytle Creek. The boundaries of Corps jurisdictional waters are depicted on Exhibits 3A-3D. Corps jurisdiction is summarized in Table 1.

[4] Rapanos v. United States and Carabell v. U.S. Army Corps of Engineers, 547 U.S. – (2006). In the guidance, the agencies offer three categories: (1) certain types of waters over which they "will assert jurisdiction" (traditional navigable waters, wetlands adjacent to such waters, relatively permanent non-navigable tributaries of such waters, and wetlands directly abutting such tributaries), (2) other types of waters for which they will consider on case-by-case whether they have a "significant nexus" with a traditional navigable water, and (3) isolated waters, which may have an interstate commerce connection other than migratory birds. The Corps also noted that other "features" over

Permanent impacts to CDFG jurisdiction within the Study Area total 93.98 acres, of which 2.38 acres consist of vegetated riparian habitat. Of the 93.98 acres of permanent impacts to CDFG jurisdiction, 92.76 acres, of which 2.38 acres consist of vegetated riparian habitat, is within the Project area and 1.22 acres, none of which consist of vegetated riparian habitat, is off site. Temporary impacts to CDFG jurisdiction within the Study Area total 32.00 acres, none of which consist of vegetated riparian habitat. Of the 32.00 acres of temporary impacts to CDFG jurisdiction, 27.73 acres, none of which consist of vegetated riparian habitat, are within the Project area and 4.27 acres, none of which consists of vegetated riparian habitat, are off site. Permanent impacts to CDFG streambed within the Study Area total 60,894 linear feet. Of the 60,894 linear feet of permanent impact to CDFG streambed, 59,086 linear feet are within the Project area and the remaining 1,808 linear feet are off site. Temporary impacts to CDFG streambed total 9,981 linear feet. Of the 9,981 linear feet of temporary impact to CDFG streambed, 9,706 linear feet are within the Project area and the remaining 275 linear feet are off site. Permanent impacts to CDFG jurisdiction are summarized in Tables 13 and 13A below. Temporary impacts to CDFG jurisdiction are summarized in Tables 14 and 14A below. Permanent and temporary impacts to CDFG jurisdiction are depicted on Exhibits 3A-3D.

Santa Ana Regional Water Quality Control Board (RWQCB) jurisdiction within the Study Area includes all areas within Corps jurisdiction as described above. Additionally, an infiltration pond system and one small drainage associated with this infiltration pond system, totaling 7.19 acres adjacent to Lytle Creek in Neighborhood II, are isolated and are not subject to regulation pursuant to Section 401 or 404 of the Clean Water Act, however, the RWQCB may attempt to exert its jurisdiction, pursuant to Section 13260 of the California Water Code (the Porter-Cologne Act), over isolated waters and require a waste discharge report (WDR) for the Project [Exhibit 3B].

I. METHODOLOGY

GLA utilized two methodologies while conducting this jurisdictional delineation. The first methodology was utilized in the open space areas located within Lytle Creek in Neighborhoods II, III, and IV outside of the Project development footprint and beyond the temporary impact limit, which extends for 100 linear feet into Lytle Creek from the toe of the existing slope. This

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which they "generally will not assert jurisdiction," include areas such as gullies, erosional features, and ditches excavated in and draining uplands.

methodology consisted of an aerial photographic review of the open space area outside of the development footprint. The second methodology consisted of the Development Footprint Methodology. This methodology consisted of an aerial photographic review and formal delineation of the Project development footprint, including the temporary impact zone, which extends 80 linear feet into the creek from the toe of slope of the proposed levee. Each methodology is further described below.

A. Open Space Area Methodology

Lytle Creek Wash is a dynamic, alluvial fan drainage system. During any given storm season, the total number of braided stream channels within the creek fluctuate and are dependent upon the total precipitation received during an individual storm event as well as an entire storm season. As a result, the total number of braided channels within Lytle Creek varies on an annual basis. During abnormally low rainfall years, a stream braid that is typically active may not exhibit signs of function and appear to be a remnant. Additionally, during an abnormally high rainfall year, a remnant stream braid that does not typically exhibit function may actually become temporarily active. Since Lytle Creek is a dynamic, braided stream system, the jurisdictional boundaries of this creek are difficult to determine as they fluctuate on an annual basis.

Based upon the Lytle Creek Ranch land use plan, a majority of Lytle Creek is proposed as open space; therefore, the proposed open space portions of Lytle Creek have been assessed by review of recent 200-scale aerial photography to determine the locations of potential areas of Corps, CDFG, and Regional Board jurisdiction within the creek up to the existing slopes. Once the aerial photographic review was complete, a field review of the creek was completed, as necessary, to verify whether or not portions of the creek would qualify as Corps, CDFG, or Regional Board jurisdiction. Since this portion of Lytle Creek is proposed as open space, no linear foot totals were calculated for Lytle Creek itself outside of the temporary and permanent impact areas.

B. Development Footprint Methodology

GLA conducted a formal delineation of the temporary and permanent impact areas within the Study Area, including Lytle Creek, its tributaries, and remnant basin features, based upon and within the overall Project Development footprint, including the toe of slope of the proposed levee adjacent to Lytle Creek, which extends into the creek for 100 feet to calculate the permanent (20 feet) and temporary impacts (80 feet) for the proposed Project and its associated flood control protection. GLA utilized the recent aerial photographs described in the open space delineation methodology above as well as the previously cited USGS topographic maps to determine the locations of potential areas of Corps, CDFG, and Regional Board jurisdiction. Suspected

jurisdictional areas were field checked for the presence of definable channels and/or wetland vegetation, soils and hydrology. Suspected wetland habitats on the site were evaluated using the methodology set forth in the U.S. Army Corps of Engineers 1987 Wetland Delineation Manual[5] (Wetland Manual) and updated using the recently published Arid West Supplement. While in the field the jurisdictional areas were recorded onto a 200-scale topographic/aerial base map of the property using visible landmarks.

Corps jurisdictional waters were determined using a 10-year flood event as the OHWM. A 10-year flood event was estimated to result in a five-foot elevation rise within Lytle Creek and its associated tributaries and remnant basin features. Therefore, for the purposes of this delineation, the boundaries of Corps jurisdiction within the development footprint have been determined to be the lower elevations and active portions of the tributaries and braided channels within the Lytle Creek alluvial fan system, whereas the upper terraces of this system have been considered to be outside of the OHWM.

The Soil Conservation Service (SCS)[6] has mapped the following soil types as occurring in the general vicinity of the project site:

Cieneba Sandy Loam, 9 to 15 Percent Slopes (CnD) and Cieneba-Rock Outcrop Complex (Cr)
The Cieneba series consists of somewhat excessively drained, strongly sloping to steep soils. These soils formed on uplands in material weathered from granitic rock. Slopes are 9 to 50 percent. Vegetation typically associated with the Cieneba Soil Series includes chaparral, chamise, annual grasses and forbes.

The Cieneba Sandy Loam (CnD) is a strongly sloping soil in small areas on foothills throughout the uplands. Included with it in mapping are a few rock outcrops and small patches of soils that have moderate sheet and rill erosion. Runoff is medium and the hazard of erosion is moderate if the soil is protected or not overgrazed. This soil is used mainly for dry farmed grains and pasture. Some areas are used for homesites and other community uses.

The Cieneba-Rock-Complex (Cr) occupies areas on uplands. It is about 60 percent Cieneba sandy loam, 30 to 50 percent slopes, and 30 percent granitic outcrops. Runoff is rapid, and the

[5] Environmental Laboratory. 1987. Corps of Engineers Wetlands Delineation Manual, Technical Report Y-87-1, U.S. Army Engineer Waterways Experimental Station, Vicksburg, Mississippi.

[6] SCS is now known as the National Resource Conservation Service or NRCS.

hazard of erosion is moderate if the soils are burned over or overgrazed. This complex is used chiefly for grazing during spring and for watershed.

The Cieneba series at the 8-inch level is brown (10YR 5/3) sandy loam, dark brown (10YR 3/3) when moist. At the 14-inch level it is a pale-brown (10YR 6/3) sandy loam, a brown (10YR 5/3) when moist.

Hanford Coarse Sandy Loam, 2 to 9 Percent Slopes (HaC)
The Hanford series consists of well-drained, nearly level to strongly sloping soils that formed in recent granitic alluvium on valley floors and alluvial fans. Slopes are 0 to 15 percent. Vegetation typically associated with the Hanford series includes annual grasses and forbs. This gently sloping to moderately sloping soil occupies alluvial fans. From 0 to 10 inches depth, it is light brownish-gray (10YR 6/3) coarse sandy loam, brown (10 YR 4/3), when moist. From 10 to 32 inches depth, it is pale brown (10YR 6/3) sandy loam, brown (10YR 4/3) when moist. Runoff is slow to medium, and the hazard of erosion is slight to moderate where the soil is left unprotected. This Hanford soil is used for irrigated crops such as citrus and alfalfa. It also is used for dry farmed small grains and pasture plants. Homesites and other related uses are also important.

Psamments and Fluvents, Frequently Flooded (Ps)
These soils consist of sandy and gravelly material in intermittent streambeds of the Santa Ana River, Mill Creek, Warm Creek, Cajon Creek, and other large creeks and their major tributaries. Some areas consist of cobbles, stones, and boulders. During each flood, alluvium from streambeds is freshly deposited and partly reworked. Areas of this mapping unit have no value for farming. Their main use is as a source of sand and gravel for construction material. Vegetation typically associated with the Psamments and Fluvents are limited, consisting mainly of a scanty growth of annual grasses, forbs, and a few willows and cottonwood trees.

Soboba Stony Loamy Sand, 2 to 9 Percent Slopes (SpC)
The Soboba series consists of excessively drained, nearly level to moderately sloping soils. These soils formed on alluvial fans in granitic alluvium. Slopes are 0 to 9 percent. Vegetation typically associated with the Soboba Soil Series includes chamise, annual grasses, and forbes. Soboba stony loamy sand is a gently sloping to moderately sloping soil that is found on long, broad, smooth alluvial fans. From 0 to 10 inches depth, it is grayish-brown (10YR 5/2) stony loamy sand, dark grayish brown (10YR 4/2) when moist. From 10 to 24 inches depth, it is brown (10YR 5/3) very stony loamy sand, dark brown (10YR 4/3) when moist. Runoff is slow, and the

hazard of erosion is slight. This Soboba soil is used mainly for dry farmed seeded pasture, while some areas are used for citrus.

Tujunga Gravelly Loamy Sand, 0 to 9 Percent Slopes (TvC)
The Tujunga series consists of somewhat excessively drained, nearly level to moderately sloping soils that formed on alluvial fans in granitic alluvium. Slopes are 0 to 9 percent. Vegetation typically associated with the Tujunga Soil Series includes thin strands of chamise, some big sagebrush, annual grasses, and forbs.

Tujunga gravelly loamy sand is a nearly level to moderately sloping soil that occurs on long, broad, smooth alluvial fans. From 0 to 6 inches depth, it is brown (10YR 5/3) gravelly loamy sand, dark brown (10YR 4/3) when moist. From 6 inches to 18 inches depth, it is pale-brown (10YR 6/3) coarse sand, brown (10YR 5/3) when moist. Runoff is very slow to slow. The hazard of erosion is slight because of the gravelly surface layer. This soil is used for irrigated small grains and pasture plants. Small areas of this soil type are favorable for growing lemons. These soil units were not identified as hydric in the SCS's publication, Hydric Soils of the United States[7]. However, according to the local "Soil Survey for San Bernardino County, Southwester Part, California" the Psamments and Fluvents, Frequently Flooded (Ps) is considered hydric by the local hydric soil list for San Bernardino County when a frequently occurring water table at less than 1.5 feet from the surface for a significant period (usually more than two weeks) during the growing season if permeability is less than 6.0inch/hour in any layer within 20 inches; and soils that are frequently ponded for long duration or very long duration during the growing season. Also, the Tujunga Gravelly Loamy Sand, 0 to 9 Percent Slopes (TvC) is considered hydric by the local hydric soil list for San Bernardino County when a frequently occurring water table at less than 1.5 feet from the surface for a significant period (usually more than two weeks) during the growing season if permeability is less than 6.0inch/hour in any layer within 20 inches; soils that are frequently ponded for long duration or very long duration during the growing season; and soils that are frequently flooded for long duration or very long duration during the growing season.

It is important to note that the 2006 Arid West Supplement to the 1987 Manual does not include mapped hydric soils as a positive indicator for the presence of hydric soils. Rather the presence

[7] United States Department of Agriculture, Soil Conservation Service. 1991. Hydric Soils of the United States, 3rd Edition, Miscellaneous Publication Number 1491. (In cooperation with the National Technical Committee for Hydric Soils.)

of hydric soils must be confirmed in the field. We include this information, as it can be useful in evaluating the site.

II. JURISDICTION

A. <u>Army Corps of Engineers</u>

Pursuant to Section 404 of the Clean Water Act, the Corps regulates the discharge of dredged and/or fill material into waters of the United States. The term "waters of the United States" is defined in Corps regulations at 33 CFR Part 328.3(a) as:

> *(1) All waters which are currently used, or were used in the past, or may be susceptible to use in interstate or foreign commerce, including all waters, which are subject to the ebb and flow of the tide;*
> *(2) All interstate waters including interstate wetlands;*
> *(3) All other waters such as intrastate lakes, rivers, streams (including intermittent streams), mudflats, sandflats, wetlands, sloughs, prairie potholes, wet meadows, playa lakes, or natural ponds, the use, degradation or destruction of which could affect foreign commerce including any such waters:*
> > *(i) Which are or could be used by interstate or foreign travelers for recreational or other purposes; or*
> > *(ii) From which fish or shell fish are or could be taken and sold in interstate or foreign commerce; or*
> > *(iii) Which are used or could be used for industrial purpose by industries in interstate commerce...*
> *(4) All impoundments of waters otherwise defined as waters of the United States under the definition;*
> *(5) Tributaries of waters identified in paragraphs (a) (1)-(4) of this section;*
> *(6) The territorial seas;*
> *(7) Wetlands adjacent to waters (other than waters that are themselves wetlands) identified in paragraphs (a) (1)-(6) of this section.*

> Waste treatment systems, including treatment ponds or lagoons designed to meet the requirements of CWA (other than cooling ponds as defined in 40 CFR 123.11(m) which also meet the criteria of this definition) are not waters of the United States.
>
> *(8) Waters of the United States do not include prior converted cropland.*[8]
>
> Notwithstanding the determination of an area's status as prior converted cropland by any other federal agency, for the purposes of the Clean Water Act, the final authority regarding Clean Water Act jurisdiction remains with the EPA.

In the absence of wetlands, the limits of Corps jurisdiction in non-tidal waters, such as intermittent streams, extend to the ordinary high water mark (OHWM) which is defined at 33 CFR 328.3(e) as:

> *...that line on the shore established by the fluctuation of water and indicated by physical characteristics such as clear, natural line impressed on the bank, shelving, changes in the character of soil, destruction of terrestrial vegetation, the presence of litter and debris, or other appropriate means that consider the characteristics of the surrounding areas.*

1. Solid Waste Agency of Northern Cook County v. United States Army Corps of Engineers, et al.

Pursuant to Article I, Section 8 of the U.S. Constitution, federal regulatory authority extends only to activities that affect interstate commerce. In the early 1980s the Corps interpreted the interstate commerce requirement in a manner that restricted Corps jurisdiction on isolated (intrastate) waters. On September 12, 1985, EPA asserted that Corps jurisdiction extended to isolated waters that are used or could be used by migratory birds or endangered species, and the definition of "waters of the United States" in Corps regulations was modified as quoted above from 33 CFR 328.3(a).

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[8] The term "prior converted cropland" is defined in the Corps' Regulatory Guidance Letter 90-7 (dated September 26, 1990) as "wetlands which were both manipulated (drained or otherwise physically altered to remove excess water from the land) and cropped before 23 December 1985, to the extent that they no longer exhibit important wetland values. Specifically, prior converted cropland is <u>inundated for no more than 14 consecutive days</u> during the growing season…." [Emphasis added.]

On January 9, 2001, the Supreme Court of the United States issued a ruling on *Solid Waste Agency of Northern Cook County v. United States Army Corps of Engineers, et al.* (SWANCC). In this case the Court was asked whether use of an isolated, intrastate pond by migratory birds is a sufficient interstate commerce connection to bring the pond into federal jurisdiction of Section 404 of the Clean Water Act.

The written opinion notes that the court's previous support of the Corps' expansion of jurisdiction beyond navigable waters (*United States v. Riverside Bayview Homes, Inc*.) was for a wetland that abutted a navigable water and that the court did not express any opinion on the question of the authority of the Corps to regulate wetlands that are not adjacent to bodies of open water. The current opinion goes on to state:

> *In order to rule for the respondents here, we would have to hold that the jurisdiction of the Corps extends to ponds that are not adjacent to open water. We conclude that the text of the statute will not allow this.*

Therefore, we believe that the court's opinion goes beyond the migratory bird issue and says that no isolated, intrastate water is subject to the provisions of Section 404(a) of the Clean Water Act (regardless of any interstate commerce connection). However, the Corps and EPA have issued a joint memorandum, which states that they are interpreting the ruling to address only the migratory bird issue and leaving the other interstate commerce clause nexuses intact.

2. Rapanos v. United States and Carabell v. United States

On June 5, 2007, the U.S. Environmental Protection Agency (EPA) and Corps issued joint guidance that addresses the scope of jurisdiction pursuant to the Clean Water Act in light of the Supreme Court's decision in the consolidated cases *Rapanos v. United States* and *Carabell v. United States* ("Rapanos"). The chart below was provided in the joint EPA/Corps guidance.

For project sites that include waters other than Traditional Navigable Waters (TNWs) and/or their adjacent wetlands or Relatively Permanent Waters (RPWs) tributary to TNWs and/or their adjacent wetlands as set forth in the chart below, the Corps must apply the significant nexus standard, that includes the data set forth in the *Approved Jurisdictional Determination Form* included as Appendix A.

For "isolated" waters or wetlands, the joint guidance also requires an evaluation by the Corps and EPA to determine whether other interstate commerce clause nexuses, not addressed in the

SWANCC decision are associated with isolated features on project sites for which a jurisdictional determination is being sought from the Corps.

The agencies will assert jurisdiction over the following waters:

- Traditional navigable waters
- Wetlands adjacent to traditional navigable waters
- Non-navigable tributaries of traditional navigable waters that are relatively permanent where the tributaries typically flow year-round or have continuous flow at least seasonally (e.g., typically three months)
- Wetlands that directly abut such tributaries

The agencies will decide jurisdiction over the following waters based on a fact-specific analysis to determine whether they have a significant nexus with a traditional navigable water:

- Non-navigable tributaries that are not relatively permanent
- Wetlands adjacent to non-navigable tributaries that are not relatively permanent
- Wetlands adjacent to but that do not directly abut a relatively permanent non-navigable tributary

The agencies generally will not assert jurisdiction over the following features:

- Swales or erosional features (e.g., gullies, small washes characterized by low volume, infrequent or short duration flow)
- Ditches (including roadside ditches) excavated wholly in and draining only uplands and that do not carry a relatively permanent flow of water

The agencies will apply the significant nexus standard as follows:

- A significant nexus analysis will assess the flow characteristics and functions of the tributary itself and the functions performed by all wetlands adjacent to the tributary to determine if they significantly affect the chemical, physical and biological integrity of downstream traditional navigable waters

Significant nexus includes consideration of hydrologic and ecologic factors

3. Wetland Definition Pursuant to Section 404 of the Clean Water Act

The term “wetlands” (a subset of “waters of the United States”) is defined at 33 CFR 328.3(b) as "those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support...a prevalence of vegetation typically adapted for life in saturated soil conditions." In 1987 the Corps published a manual to guide its field personnel in

determining jurisdictional wetland boundaries followed by the Arid West Supplement in 2006. The methodology set forth in the 1987 Wetland Delineation Manual and Arid West Supplement generally requires that, in order to be considered a wetland, the vegetation, soils, and hydrology of an area exhibit at least minimal hydric characteristics. While the manual provides great detail in methodology and allows for varying special conditions, a wetland should normally meet each of the following three criteria:

- The plant community must be determined to by hydrophytic based on: (1) the dominance test applied using the 50/20 rule, or (2) where the vegetation fails the dominance test and wetland hydrology and hydric soils are present vegetation is determined to be hydrophytic using the Prevalence Index test based upon the indicator status (i.e., rated as facultative or wetter) in the National List of Plant Species that Occur in Wetlands[9]);
- soils must exhibit physical and/or chemical characteristics indicative of permanent or periodic saturation (e.g., redoximorphic features with a matrix of low chroma indicating a relatively consistent fluctuation between aerobic and anaerobic conditions); and

- hydrologic characteristics must indicate that the ground is saturated to within 12 inches of the surface for a sufficient period to cause (1) the formation of hydric soils and (2) establishment of a hydrophytic plant community. A positive test for wetland hydrology is based on the presence of one primary or two secondary indicators.

4. Corps Jurisdiction on Agricultural Lands

Section 404 of the Clean Water Act requires a landowner to obtain a permit from the Corps prior to beginning any <u>non-exempt</u> activity involving the placement of dredged or fill material in waters of the United States. Certain ongoing, normal farming practices in wetlands (and other waters of the United States) are exempt and do not require a permit. These practices include plowing, harvesting, seeding, minor drainage, and cultivation. Farmed waters of the United States fall into one of two categories:

> The first of these is "prior converted cropland". *Prior converted croplands are wetlands that were drained, dredged, filled, leveled, or otherwise manipulated, including the removal of woody vegetation, before December 23, 1985, to make production of an*

[9] Reed, P.B., Jr. 1988. <u>National List of Plant Species that Occur in Wetlands</u>. U.S. Fish and Wildlife Service Biological Report 88(26.10).

agricultural commodity possible, and that (1) do not meet specific hydrologic criteria, (2) have had an agricultural commodity planted or produced at least once prior to December 23, 1985, and (3) have not since been abandoned. Activities in prior converted cropland are not regulated under Section 404.

The second is "farmed wetlands". *Farmed wetlands are similar to prior converted cropland in that they were drained, dredged, filled, leveled, or otherwise manipulated before December 23, 1985, to make production of an agricultural commodity possible, but are often wet enough to still be valuable wetland habitat subject to ... Section 404.* Non-exempt activities in farmed wetlands are regulated under Section 404.

B. <u>Regional Water Quality Control Board</u>

Subsequent to the SWANCC decision, the Chief Counsel for the State Water Resources Control Board issued a memorandum that addressed the effects of the SWANCC decision on the Section 401 Water Quality Certification Program.[10] The memorandum states:

California's right and duty to evaluate certification requests under section 401 is pendant to (or dependent upon) a valid application for a section 404 permit from the Corps, or another application for a federal license or permit. Thus if the Corps determines that the water body in question is not subject to regulation under the COE's 404 program, for instance, no application for 401 certification will be required…

The SWANCC decision does not affect the Porter Cologne authorities to regulate discharges to isolated, non-navigable waters of the states….

Water Code section 13260 requires "any person discharging waste, or proposing to discharge waste, within any region that could affect the waters of the state to file a report of discharge (an application for waste discharge requirements)." (Water Code § 13260(a)(1) (emphasis added).) The term "waters of the state" is defined as "any surface water or groundwater, including saline waters, within the boundaries of the state." (Water Code § 13050(e).) The U.S. Supreme Court's ruling in SWANCC has no bearing on the Porter-Cologne definition. While all

[10] Wilson, Craig M. January 25, 2001. Memorandum addressed to State Board Members and Regional Board Executive Officers.

> *waters of the United States that are within the borders of California are also waters of the state, the converse is not true—waters of the United States is a subset of waters of the state. Thus, since Porter-Cologne was enacted California always had and retains authority to regulate discharges of waste into any waters of the state, regardless of whether the COE has concurrent jurisdiction under section 404. The fact that often Regional Boards opted to regulate discharges to, e.g., vernal pools, through the 401 program in lieu of or in addition to issuing waste discharge requirements (or waivers thereof) does not preclude the regions from issuing WDRs (or waivers of WDRs) in the absence of a request for 401 certification….*

In this memorandum the SWRCB's Chief Counsel has made the clear assumption that fill material to be discharged into isolated waters of the United States is to be considered equivalent to "waste" and therefore subject to the authority of the Porter Cologne Water Quality Act. However, while providing a recounting of the Act's definition of waters of the United States, this memorandum fails to also reference the Act's own definition of waste:

> *"Waste" includes sewage and any and all other waste substances, liquid, solid, gaseous, or radioactive, associated with human habitation, or of human or animal origin, or from any producing, manufacturing, or processing operation, including waste placed within containers of whatever nature prior to, and for purposes of, disposal.*

The lack of inclusion of a reference to "fill material," "dirt," "earth" or other similar terms in the Act's definition of "waste," or elsewhere in the Act, suggests that no such association was intended. Thus, the Chief Counsel's memorandum signals that the SWRCB is attempting to retain jurisdiction over discharge of fill material into isolated waters of the United States by administratively expanding the definition of "waste" to include "fill material" without actually seeking amendment of the Act's definition of waste (an amendment would require action by the state legislature). Consequently, discharge of fill material into waters of the State not subject to the jurisdiction of the Corps pursuant to Section 404 of the Clean Water Act <u>may</u> require authorization pursuant to the Porter Cologne Act through application for waste discharge requirements (WDRs) or through waiver of WDRs, despite the lack of a clear regulatory imperative.

C. California Department of Fish and Game

Pursuant to Division 2, Chapter 6, Sections 1600-1603 of the California Fish and Game Code, the CDFG regulates all diversions, obstructions, or changes to the natural flow or bed, channel, or bank of any river, stream, or lake, which supports fish or wildlife.

CDFG defines a "stream" (including creeks and rivers) as "a body of water that flows at least periodically or intermittently through a bed or channel having banks and supports fish or other aquatic life. This includes watercourses having surface or subsurface flow that supports or has supported riparian vegetation." (14 California Code of Regulations section 1.72). CDFG's definition of "lake" includes "natural lakes or man-made reservoirs." (14 California Code of Regulations, Section 1.56).
CDFG jurisdiction within altered or artificial waterways is based upon the value of those waterways to fish and wildlife. CDFG Legal Advisor has prepared the following opinion:

- Natural waterways that have been subsequently modified and which have the potential to contain fish, aquatic insects and riparian vegetation will be treated like natural waterways...

- Artificial waterways that have acquired the physical attributes of natural stream courses and which have been viewed by the community as natural stream courses, should be treated by [CDFG] as natural waterways...

- Artificial waterways without the attributes of natural waterways should generally not be subject to Fish and Game Code provisions...

Thus, CDFG jurisdictional limits closely mirror those of the Corps. Exceptions are CDFG's exclusion of isolated wetlands (those not associated with a river, stream, or lake), the addition of artificial stock ponds and irrigation ditches constructed on uplands, and the addition of riparian habitat supported by a river, stream, or lake regardless of the riparian area's federal wetland status. Also, under the new Rapanos guidance, the Corps will not regulate all ephemeral drainages whereas CDFG will regulate such features that support aquatic resources regardless of their flow regime (e.g., non-RPWs discussed above).

III. RESULTS

A. Corps Jurisdiction

Corps jurisdiction within the Study Area totals 464.98 acres, of which 1.65 acres consist of jurisdictional wetlands. Of the 464.98 acres of Corps jurisdiction within the Study Area, 461.91 acres, of which 1.65 acres consists of jurisdictional wetlands, is within the Project area. The remaining 3.07 acres of Corps jurisdiction, none of which consists of jurisdictional wetlands, is off site. Of the 461.91 acres within the Project area, 266.49 acres are within the proposed open space portion of Lytle Creek outside of the temporary impact zone associated with the construction of the levee, and 109.08 acres are within the open space associated with the recently established SBKR conservation area with Lytle Creek. Of the 3.07 acres of off site Corps jurisdiction, a total of 0.06 acre, none of which consists of jurisdictional wetlands, is associated with the off site gas line utility easement area, a total of 2.66 acres, none of which consists of jurisdictional wetlands, is associated with the levee repair between Neighborhood II and CEMEX, and a total of 0.35 acre, none of which consists of jurisdictional wetlands, is associated with the levee construction at the western end of Neighborhood IV. Corps jurisdiction per neighborhood is further discussed below.

Neighborhood I: On-Site

Corps jurisdiction associated with ephemeral drainages and tributaries within Neighborhood I totals 7.48 acres, of which 1.65 acres consist of jurisdictional wetlands. Corps jurisdiction associated with unnamed ephemeral drainages and tributaries within the on-site gas line utility easement area within Neighborhood I totals 0.06 acre, none of which consists of jurisdictional wetlands. There are no jurisdictional areas associated with the existing 16-foot road. Linear-foot totals associated with Neighborhood I are 42,039 feet, of which 2,120 feet is within the on site gas line utility easement.

Neighborhood I: Off-Site

Corps jurisdiction associated with unnamed ephemeral drainages and tributaries within the off-site gas line utility easement area within the County-owned parcel just north of Neighborhood I totals 0.06 acre, none of which consists of jurisdictional wetlands. There are no jurisdictional areas associated with the existing 16-foot road. Linear-foot totals associated with the off site gas line utility easement area within the County-owned parcel just north of Neighborhood I are 843 feet.

Neighborhood II: On-Site
Corps jurisdiction within Neighborhood II totals 123.67 acres, none of which consist of jurisdictional wetlands. Of the 123.67 acres within Neighborhood II, a total of 104.54 acres is within the proposed open space portion of Lytle Creek. Neighborhood II supports 5,856 feet linear feet of streambed.

Neighborhood II: Off-Site
Corps jurisdiction within Lytle Creek in the offsite levee improvement area adjacent to Neighborhood II connecting to the CEMEX property totals 2.66 acres, none of which consist of jurisdictional wetlands. Additionally, there are no Corps jurisdictional areas within the 2.60-acre interim construction utility road. The off site proposed levee improvement area adjacent to Neighborhood II connecting to the existing CEMEX levee supports 1,032 linear feet of streambed.

Neighborhood III On-site
Corps jurisdiction within Neighborhood III totals 228.59 acres, none of which consist of jurisdictional wetlands. Of the 228.59 acres within Neighborhood III, a total of 86.28 acres is within the proposed open space portion of Lytle Creek and 107.18 acres is within the recently established SBKR conservation easement area of Lytle Creek. Neighborhood III supports 17,868 linear feet of streambed.

Neighborhood III Off-Site
There are no Corps jurisdictional waters within the 2.30 acre roadway easement on top of the proposed levee from Neighborhood III under the I-15 Freeway into Neighborhood IV.

Neighborhood IV: On-Site
Corps jurisdiction with Neighborhood IV totals 102.11 acres, none of which consists of jurisdictional wetlands. Of the 102.11 acres within Neighborhood IV, a total of 75.67 acres is within the proposed open space portion of Lytle Creek and 1.90 acres is within the recently established SBKR conservation area of Lytle Creek. Neighborhood IV supports 12,804 linear feet of streambed.

Neighborhood IV: Off-Site
Corps jurisdiction associated with Lytle Creek within the offsite temporary impact zone west of, and adjacent to, Neighborhood IV totals 0.35 acre, none of which consist of jurisdictional

wetlands. The off site temporary impact area adjacent to Neighborhood IV supports 275 linear feet of streambed.

Table 1 below summarizes on site Corps jurisdiction and linear-foot totals by neighborhood and Table 1A summarizes off site Corps jurisdiction and linear-foot totals by neighborhood.

Table 1 – Neighborhoods I-IV: Corps On-Site Jurisdiction Totals

Neighborhood	Corps Jurisdictional Waters (acres)	Corps Jurisdictional Wetlands (acres)	Corps Remnant Basin Features (acres)	Total Corps Jurisdiction (acres)	Corps Linear Feet
I	5.83	1.65	0	7.48	39,919
I – On Site Gas Line Utility Easement Area	0.06	0	0	0.06	2,120
II	123.67	0	0	123.67	5,856
III	224.88	0	3.71	228.59	17,868
IV	102.11	0	0	102.11	12,804
Total	**456.55**	**1.65**	**3.71**	**461.91**	**78,567**

Table 1A – Neighborhoods I-IV: Corps Off-Site Jurisdictional Totals

Neighborhood	Corps Jurisdictional Waters (acres)	Corps Jurisdictional Wetlands (acres)	Total Corps Jurisdiction (acres)	Corps Linear Feet
I – Off Site Gas Line Utility Easement Area	**0.06**	**0**	**0.06**	843
II – Levee Connection	2.66	0	2.66	1,032
II –Utility Road	**0**	**0**	**0**	0
III-Off Site 2.30-Acre Roadway Easement and Proposed Levee Under I-15 Freeway	**0**	**0**	**0**	0
IV-Off Site Temporary Impact Area	0.35	0	0.35	275
Total	**3.07**	**0**	**3.07**	**2,150**

1. Neighborhood I

Corps jurisdiction associated with Neighborhood I totals 7.48 acres, of which 1.65 acres consist of jurisdictional wetlands. Two ephemeral drainage systems with several tributaries are associated with Neighborhood I, which is in the northern portion of the Project boundary. An off-site County parcel area is associated with Neighborhood I, as well as a gas line utility easement area, that extends both on- and off-site. Each is further discussed below.

The drainage system to the west of the I-15 Freeway flows east for 21,959 linear feet through an existing soil-cement lined channel, which flows beneath Glen Helen Parkway and then through existing culverts located underneath the I-15 Freeway into the Sycamore Flats area. Sycamore Canyon, the main stream within the western drainage system, flows in a general west to east direction before changing direction to the north and flowing adjacent to an existing berm with flow dissipaters next to Glen Helen Parkway. Sycamore Canyon eventually enters an existing culvert located near the I-15 Freeway off ramp and flows beneath Glen Helen Parkway and into the eastern portion of the Neighborhood I area. The OHWM in this drainage system varies in width from one to 93 feet. This drainage system supports an OHWM consisting of shelving, debris wrack, and/or destruction of terrestrial vegetation. The main drainage in this system consists of sand cobbles, while the tributaries consist of upland vegetation. One jurisdictional wetland area is located within a tributary to the main drainage. Wetland Data Sheets are attached as Appendix B.

The western drainage complex is generally unvegetated within the main drainage and vegetated with sage scrub/chaparral species within the tributaries. Native plant species include California sagebrush (*Artemisia californica*, UPL), Mexican elderberry (*Sambucus mexicana*, FAC), deerweed (*Lotus scoparius*, UPL), California buckwheat (*Eriogonum fasciculatum*, UPL), boxthorn (*Lycium* sp., UPL), chamise (*Adenostoma fasciculatum*, UPL), and goldenbush (*Isocoma menziesii*, UPL). Non-native plant species include red-stemmed filaree (*Erodium cicutarium*, UPL) and summer mustard (*Hirschfeldia incana*, UPL). Hydrophytic vegetation associated with the wetland area includes: arroyo willow (*Salix lasiolepis*, FACW), black willow (*Salix goodingii*, OBL), mulefat (*Baccharis salicifolia*, FACW), mugwort (*Artemisia douglasiana*, FACW), and California blackberry (*Rubus ursinus*, FACW).

The drainage system to the east of the I-15 Freeway flows southerly for 17,760 linear feet to the Project boundary where it connects to Sycamore Creek. The OHWM in this drainage system varies in width from one to nine feet. The eastern drainage system supports an OHWM consisting of shelving, debris wrack, and/or destruction of terrestrial vegetation. Four

jurisdictional wetland areas are located within the lowland area of the main drainage. Wetland Data Sheets are attached as Appendix B.

The eastern drainage complex is generally unvegetated within the higher elevation areas and vegetated with mulefat and willow species within the lowland areas. Native plant species include California sagebrush (*Artemisia californica*, UPL), Mexican elderberry (*Sambucus mexicana*, FAC), deerweed (*Lotus scoparius*, UPL), California buckwheat (*Eriogonum fasciculatum*, UPL), black sage (*Salvia mellifera*, UPL), poison oak (*Toxicodendron diversilobum*, UPL), cudweed (*Gnaphalium* sp., UPL), Douglas's nightshade (*Solanum douglasii*, FAC), and chamise (*Adenostoma fasciculatum*, UPL). Non-native plant species include red-stemmed filaree (*Erodium cicutarium*, UPL) and summer mustard (*Hirschfeldia incana*, UPL). Hydrophytic vegetation associated with the wetland areas includes: mulefat (*Baccharis salicifolia*, FACW), Mexican rush (*Juncus mexicanus*, FACW), black willow (*Salix goodingii*, OBL), yerba mansa (*Anemopsis californica*, OBL), slender cat-tail (*Typha domingensis*, OBL), western sycamore (*Platanus racemosa*, FACW), fireweed (*Epilobium ciliatum*, FACW), nutsedge (*Cyperus* sp.), red willow (*Salix laevigata*, FACW), creek monkey flower (*Mimulus guttatus*, OBL), and stinging nettle (*Urtica dioica*, FACW).
A disturbed area in the eastern portion of the Project is a previously permitted action that is part of the Lytle Creek North Development and bisects several drainage features in that area.

2. Neighborhood I – On-Site Gas Line Utility Easement Area

The on site gas line utility easement area is a 3.90-acre, 100-foot wide easement supporting a 16-foot wide existing road associated with the open space parcel east of the I-15 Freeway. Corps jurisdiction within the on site gas line utility easement totals 0.06 acre, none of which consists of jurisdictional wetlands. The on site gas line utility easement supports 2,120 linear feet of streambed. Vegetation typically associated with the gas line easement repair area includes mulefat (*Baccharis salicifolia*, FACW), black willow (*Salix goodingii*, OBL), arroyo willow (*Salix lasiolepis*, FACW), and red willow (*Salix laevigata*, FACW).

3. Neighborhood I - Off-Site Gas Line Utility Easement Area

The off-site gas line utility easement area is a 3.60-acre, 100-foot wide easement supporting a 16-foot wide existing road associated with the County-owned parcel the east of the I-15 Freeway and North of Neighborhood I. Corps jurisdiction within the off site gas line utility easement totals 0.06 acre, none of which consists of jurisdictional wetlands. The off site gas line utility easement supports 843 linear feet of streambed.

Vegetation typically associated with the off-site County parcel includes mulefat (*Baccharis salicifolia*, FACW), black willow (*Salix goodingii*, OBL), arroyo willow (*Salix lasiolepis*, FACW), and red willow (*Salix laevigata*, FACW).

Table 2 below summarizes on site Corps jurisdiction within Neighborhood I and Table 2A summarizes off site Corps jurisdiction within Neighborhood I. Exhibit 3A depicts the boundaries of Corps jurisdiction associated with Neighborhood I.

Table 2 – Neighborhood I: Total On Site Corps Jurisdiction

Location	Corps Jurisdictional Waters (acres)	Corps Jurisdictional Wetlands (acres)	Total Corps Jurisdiction (acres)	Linear Feet
Neighborhood I	5.83	1.65	7.48	39,919
Neighborhood I – Gas Line Utility Easement Area (on-site)	0.06	0	0.06	2,120
Total	**5.89**	**1.65**	**7.54**	**42,039**

Table 2A – Neighborhood I Total Off Site Corps Jurisdiction

Location	Corps Jurisdictional Waters (acres)	Corps Jurisdictional Wetlands (acres)	Total Corps Jurisdiction (acres)	Linear Feet
Neighborhood I – Off-site Gas Line Utility Easement Area	0.06	0	0.06	843
Total	**0.06**	**0**	**0.06**	**843**

4. Neighborhood II-Development Footprint Area

Corps jurisdiction associated with Neighborhood II outside of the proposed open space area totals 19.13 acres, none of which consists of jurisdictional wetlands. This intermittent drainage enters Neighborhood II from the northwestern boundary and flows in a southeasterly direction for 5,856 linear feet. Lytle Creek supports an OHWM ranging from one to 1,800 feet in width.

There are several braided channels associated with Lytle Creek that become incised and meander within the low-flow areas. The channel bottom consists of sand and cobbles.

Intermittent patches of vegetation associated with the channel bottom include mulefat (*Baccharis salicifolia*, FACW) and western sycamores (*Platanus racemosa*, FACW). Vegetation usually associated with the adjacent slopes and terraces, but which also occurs within drainages, includes sage thistle (*Salvia carduacea*, UPL), croton (*Croton californicus*, UPL), scalebroom (*Lepidospartum squamatum*, UPL), wreath plant (*Stephanomaria virgata*, UPL), ripgut brome (*Bromus diandrus, UPL*), deerweed (*Lotus scoparius*, UPL), California sagebrush (*Artemisia californica*, UPL), yerba santa (*Eriodictyon crassifolium*, UPL), and mountain-mahogany (*Cercocarpus betuloides*, UPL).

5. Neighborhood II-Lytle Creek Proposed Open Space Area

Corps jurisdiction in Lytle Creek within the Neighborhood II portion of the Lytle Creek Proposed Open Space Area totals 104.54 acres, none of which consists of jurisdictional wetlands. This intermittent drainage enters Neighborhood II from the northwestern boundary and flows in a southeasterly direction before leaving the site. Lytle Creek supports an OHWM ranging from one to 1,800 feet in width. There are several braided channels associated with Lytle Creek that become incised and meander within the low-flow areas. The channel bottom consists of sand and cobbles.

Vegetation typically associated with the adjacent slopes and terraces within Lytle Creek includes sage thistle (*Salvia carduacea*, UPL), croton (*Croton californicus*, UPL), scalebroom (*Lepidospartum squamatum*, UPL), wreath plant (*Stephanomaria virgata*, UPL), ripgut brome (*Bromus diandrus, UPL*), deerweed (*Lotus scoparius*, UPL), California sagebrush (*Artemisia californica*, UPL), yerba santa (*Eriodictyon crassifolium*, UPL), and mountain-mahogany (*Cercocarpus betuloides*, UPL).

6. Neighborhood II – Off-Site Proposed Levee Improvement Area

Corps jurisdiction associated with Lytle Creek within the off-site area adjacent to Neighborhood II totals 2.66 acres, none of which consists of jurisdictional wetlands. This intermittent drainage exits Neighborhood III and flows for 1,032 linear feet through the CEMEX Mining Facility, which is the proposed location for this off-site improvement. Once exiting the CEMEX Mining Facility, the drainage enters Neighborhood II from the northwestern boundary. Lytle Creek supports an OHWM ranging from one to 1,800 feet in width. There are several braided channels

associated with Lytle Creek that become incised and meander within the low-flow areas. The channel bottom consists of sand and cobbles.

Vegetation usually associated with the adjacent slopes and terraces, but which also occurs within drainages, includes sage thistle (*Salvia carduacea*, UPL), croton (*Croton californicus*, UPL), scalebroom (*Lepidospartum squamatum*, UPL), wreath plant (*Stephanomaria virgata*, UPL), ripgut brome (*Bromus diandrus, UPL*), deerweed (*Lotus scoparius*, UPL), California sagebrush (*Artemisia californica*, UPL), yerba santa (*Eriodictyon crassifolium*, UPL), and mountain-mahogany (*Cercocarpus betuloides*, UPL).

7. Neighborhood II-2.60-Acre Off Site Interim Construction Roadway

There is no Corps jurisdiction within the existing 2.60-acre off-site interim construction roadway connecting Neighborhood II to Highland Avenue.

Table 3 below summarizes total Corps jurisdiction within the on site portion of Neighborhood II and Table 3A below summarizes total Corps jurisdiction within the off site portion of Neighborhood II. Exhibit 3B depicts the boundaries of Corps jurisdiction associated with Neighborhood II.

Table 3 – Neighborhood II: Total On Site Corps Jurisdiction

Location	Corps Jurisdictional Waters (acres)	Corps Jurisdictional Wetlands (acres)	Total Corps Jurisdiction (acres)	Corps Linear Feet
Neighborhood II-Development Footprint Area	19.13	0	19.13	5,856
Neighborhood II-Lytle Creek Proposed Open Space Area	104.54	0	104.54	N/A
Total	**123.67**	**0**	**123.67**	**5,856**

Table 3A – Neighborhood II: Total Off Site Corps Jurisdiction

Location	Corps Jurisdictional Waters (acres)	Corps Jurisdictional Wetlands (acres)	Total Corps Jurisdiction (acres)	Corps Linear Feet
Neighborhood II-Proposed Levee Improvement Area	2.66	0	2.66	1,032
Neighborhood II Interim Construction Roadway	0	0	0	0
Total	**2.66**	**0**	**2.66**	**1,032**

8. Neighborhood III- Development Footprint Area

Corps jurisdiction in Neighborhood III outside of the Lytle Creek Proposed Open Space Area and/or SBKR conservation area totals 31.42 acres, none of which consists of jurisdictional wetlands. This intermittent drainage enters Neighborhood III from the northwestern boundary and flows in a southeasterly direction for 17,868 linear feet. Lytle Creek supports an OHWM ranging from one to 1,800 feet in width, which include remnants of some basins that were historically used as groundwater recharge basins. There are several braided channels associated with Lytle Creek that become incised and meander within the low-flow areas. The channel bottom consists of sand and cobbles.

Vegetation usually associated with the adjacent slopes and terraces, but which also occurs within drainages, includes sage thistle (*Salvia carduacea*, UPL), croton (*Croton californicus*, UPL), scalebroom (*Lepidospartum squamatum*, UPL), wreath plant (*Stephanomaria virgata*, UPL), ripgut brome (*Bromus diandrus, UPL*), deerweed (*Lotus scoparius*, UPL), California sagebrush (*Artemisia californica*, UPL), yerba santa (*Eriodictyon crassifolium*, UPL), and mountain-mahogany (*Cercocarpus betuloides*, UPL).

9. Neighborhood III-Lytle Creek Proposed Open Space Area

Corps jurisdiction in Lytle Creek within the Neighborhood III portion of the Lytle Creek Proposed Open Space Area totals 86.28 acres, none of which consists of jurisdictional wetlands. This intermittent drainage enters Neighborhood III from the northwestern boundary and flows in

a southeasterly direction before leaving the site. Lytle Creek supports an OHWM ranging from one to 1,800 feet in width. There are several braided channels associated with Lytle Creek that become incised and meander within the low-flow areas. The channel bottom consists of sand and cobbles.

Vegetation typically associated with the adjacent slopes and terraces within Lytle Creek includes sage thistle (*Salvia carduacea*, UPL), croton (*Croton californicus*, UPL), scalebroom (*Lepidospartum squamatum*, UPL), wreath plant (*Stephanomaria virgata*, UPL), ripgut brome (*Bromus diandrus, UPL*), deerweed (*Lotus scoparius*, UPL), California sagebrush (*Artemisia californica*, UPL), yerba santa (*Eriodictyon crassifolium*, UPL), and mountain-mahogany (*Cercocarpus betuloides*, UPL).

10. Neighborhood III-San Bernardino Kangaroo Rat Conservation Area

Corps jurisdiction in Lytle Creek within the Neighborhood III portion of the SBKR Conservation Area totals 107.18 acres, none of which consists of jurisdictional wetlands. This intermittent drainage enters Neighborhood III from the northwestern boundary and flows in a southeasterly direction before leaving the site. Lytle Creek supports an OHWM ranging from one to 1,800 feet in width. There are several braided channels associated with Lytle Creek that become incised and meander within the low-flow areas. The channel bottom consists of sand and cobbles.

Vegetation typically associated with the adjacent slopes and terraces within Lytle Creek includes sage thistle (*Salvia carduacea*, UPL), croton (*Croton californicus*, UPL), scalebroom (*Lepidospartum squamatum*, UPL), wreath plant (*Stephanomaria virgata*, UPL), ripgut brome (*Bromus diandrus, UPL*), deerweed (*Lotus scoparius*, UPL), California sagebrush (*Artemisia californica*, UPL), yerba santa (*Eriodictyon crassifolium*, UPL), and mountain-mahogany (*Cercocarpus betuloides*, UPL).

11. Neighborhood III-Remnant Basin Features

Five remnant basin features, located immediately adjacent to Lytle Creek, were evaluated and determined to be within the boundaries of Corps jurisdiction. Corps jurisdiction associated with these remnant features totals 3.71 acres, none of which consists of jurisdictional wetlands. Vegetation associated with these remnant features includes fennel-leaf pondweed (*Potamogeton pectinatus*, OBL), mulefat (*Baccharis salicifolia*, FACW), rabbitfoot grass (*Polypogon monspeliensis*, FACW+), arroyo willow (*Salix lasiolepis*, FACW), Fremont's cottonwood (*Populus fremontii*, FACW), white alder (*Alnus rhombifolia*, FACW), stonewort (*Chara* sp.,

OBL), tree tobacco (*Nicotiana glauca*, FAC)), summer mustard (*Hirschfeldia incana*, UPL), lamb's quarters (*Chenopodium album*, FAC), and castor bean (*Ricinus communis*, FACU).

12. Neighborhood III-Off Site Roadway Easement and Proposed Levee Under I-15 Freeway

There is no Corps jurisdiction within the roadway easement on top of the proposed levee that passes under the I-15 Freeway from Neighborhood III into Neighborhood IV.

Table 4 below summarizes on site Corps jurisdiction within Neighborhood III and Table 4A summarizes off site Corps jurisdiction within Neighborhood III. Exhibit 3C depicts the boundaries of Corps jurisdiction within Neighborhood III.

Table 4 – Neighborhood III: Total On Site Corps Jurisdiction

Location	Corps Jurisdictional Waters/Remnant Basin Features (acres)	Corps Jurisdictional Wetlands (acres)	Corps Total Jurisdiction (acres)	Corps Linear Feet
Neighborhood III-Development Footprint Area	31.42	0	31.42	17,868
Neighborhood III-Lytle Creek Proposed Open Space Area	86.28	0	86.28	N/A
Neighborhood III-SBKR Conservation Area	107.18	0	107.18	N/A
Neighborhood III-Remnant Basin Features	3.71	0	3.71	N/A
Total	**228.59**	**0**	**228.59**	**17,868**

Table 4A – Neighborhood III: Total Off Site Corps Jurisdiction

Location	Corps Jurisdictional Waters (acres)	Corps Jurisdictional Wetlands (acres)	Corps Total Jurisdiction (acres)	Corps Linear Feet
Neighborhood III-Off Site Roadway Easement and Proposed Levee Under I-15 Freeway	0	0	0	0
Total	**0**	**0**	**0**	**0**

13. Neighborhood IV-Development Footprint Area

Corps jurisdiction within Neighborhood IV outside of the Lytle Creek Proposed Open Space Area and/or SBKR Conservation Area totals 24.54 acres, none of which consists of jurisdictional wetlands. This intermittent drainage enters Neighborhood IV from the northwestern boundary and flows in a southeasterly direction for 12,804 linear feet. Lytle Creek supports an OHWM ranging from one to 1,800 feet in width. There are several braided channels associated with Lytle Creek that become incised and meander within the low-flow areas. The channel bottom consists of sand and cobbles.

Vegetation usually associated with the adjacent slopes and terraces, but which also occurs within drainages, includes sage thistle (*Salvia carduacea*, UPL), croton (*Croton californicus*, UPL), scalebroom (*Lepidospartum squamatum*, UPL), wreath plant (*Stephanomaria virgata*, UPL), ripgut brome (*Bromus diandrus, UPL*), deerweed (*Lotus scoparius*, UPL), California sagebrush (*Artemisia californica*, UPL), yerba santa (*Eriodictyon crassifolium*, UPL), and mountain-mahogany (*Cercocarpus betuloides*, UPL).

14. Neighborhood IV-Lytle Creek Proposed Open Space Area

Corps jurisdiction in Lytle Creek within the Neighborhood IV portion of the Lytle Creek Proposed Open Space Area totals 75.67 acres, none of which consists of jurisdictional wetlands. This intermittent drainage enters Neighborhood IV from the northwestern boundary and flows in a southeasterly direction before entering Neighborhood III. Lytle Creek supports an OHWM ranging from one to 1,800 feet in width. There are several braided channels associated with

Lytle Creek that become incised and meander within the low-flow areas. The channel bottom consists of sand and cobbles.

Vegetation typically associated with the adjacent slopes and terraces within Lytle Creek includes sage thistle (*Salvia carduacea*, UPL), croton (*Croton californicus*, UPL), scalebroom (*Lepidospartum squamatum*, UPL), wreath plant (*Stephanomaria virgata*, UPL), ripgut brome (*Bromus diandrus, UPL*), deerweed (*Lotus scoparius*, UPL), California sagebrush (*Artemisia californica*, UPL), yerba santa (*Eriodictyon crassifolium*, UPL), and mountain-mahogany (*Cercocarpus betuloides*, UPL).

15. Neighborhood IV-San Bernardino Kangaroo Rat Conservation Area

Corps jurisdiction in Lytle Creek within the Neighborhood IV portion of the SBKR conservation totals 1.90 acres, none of which consists of jurisdictional wetlands. This intermittent drainage enters Neighborhood IV from the northwestern boundary and flows in a southeasterly direction before entering Neighborhood III. Lytle Creek supports an OHWM ranging from one to 1,800 feet in width. There are several braided channels associated with Lytle Creek that become incised and meander within the low-flow areas. The channel bottom consists of sand and cobbles.

Vegetation typically associated with the adjacent slopes and terraces within Lytle Creek includes sage thistle (*Salvia carduacea*, UPL), croton (*Croton californicus*, UPL), scalebroom (*Lepidospartum squamatum*, UPL), wreath plant (*Stephanomaria virgata*, UPL), ripgut brome (*Bromus diandrus, UPL*), deerweed (*Lotus scoparius*, UPL), California sagebrush (*Artemisia californica*, UPL), yerba santa (*Eriodictyon crassifolium*, UPL), and mountain-mahogany (*Cercocarpus betuloides*, UPL).

16. Neighborhood IV-Temporary Off-Site Impact Area

Corps jurisdiction in Lytle Creek within the Neighborhood IV Temporary Off-Site Impact Area totals 0.35 acre, none of which consists of jurisdictional wetlands. This temporary impact area is located west of, and adjacent to, the Neighborhood IV boundary in Lytle Creek. Lytle Creek passes through this area from the northwest and flows in a southeasterly direction for 275 linear feet before entering Neighborhood IV. Lytle Creek supports an OHWM ranging from one to 1,800 feet in width. There are several braided channels associated with Lytle Creek that become incised and meander within the low-flow areas. The channel bottom consists of sand and cobbles.

Vegetation typically associated with the adjacent slopes and terraces within Lytle Creek includes sage thistle (*Salvia carduacea*, UPL), croton (*Croton californicus*, UPL), scalebroom (*Lepidospartum squamatum*, UPL), wreath plant (*Stephanomaria virgata*, UPL), ripgut brome (*Bromus diandrus, UPL*), deerweed (*Lotus scoparius*, UPL), California sagebrush (*Artemisia californica*, UPL), yerba santa (*Eriodictyon crassifolium*, UPL), and mountain-mahogany (*Cercocarpus betuloides*, UPL).

Table 5 below summarizes Corps jurisdiction within Neighborhood IV and Table 5A summarizes total Corps jurisdiction within the off site portion of Neighborhood IV. Exhibit 3D depicts the boundaries of Corps jurisdiction associated with Neighborhood IV.

Table 5-Neighborhood IV-Total On Site Corps Jurisdiction

Location	Corps Jurisdictional Waters (acres)	Corps Jurisdictional Wetlands (acres)	Corps Total Jurisdiction (acres)	Corps Linear Feet
Neighborhood IV-Development Footprint Area	24.54	0	24.54	12,804
Neighborhood IV-Lytle Creek Proposed Open Space Area	75.67	0	75.67	N/A
Neighborhood IV-San Bernardino Kangaroo Rat Conservation Area	1.90	0	1.90	N/A
Total	**102.11**	**0**	**102.11**	**12,804**

Table 5A-Neighborhood IV: Total Off Site Corps Jurisdiction

Location	Corps Jurisdictional Waters (acres)	Corps Jurisdictional Wetlands (acres)	Corps Total Jurisdiction (acres)	Corps Linear Feet
Neighborhood IV-Off Site Temporary Impact Area	0.35	0	0.35	275
Total	**0.35**	**0**	**0.35**	**275**

B. Regional Water Quality Control Board Jurisdiction

RWQCB jurisdiction associated with the Study Area includes all areas within Corps jurisdiction as described above. Additionally, an infiltration pond system and one small drainage associated with the infiltration pond system totaling 7.19 acres adjacent to Lytle Creek are isolated Corps waters and are not subject to regulation pursuant to Section 401 or 404 of the Clean Water Act; however, the Santa Ana Regional Water Quality Control Board may attempt to exert its jurisdiction, pursuant to Section 13260 of the California Water Code (the Porter-Cologne Act) over isolated waters and require a waste discharge order (WDR) for the Project.

C. CDFG Jurisdiction

CDFG jurisdiction within the Study Area totals 527.90 acres, of which 25.26 acres consist of vegetated riparian habitat. Of the 527.90 acres of CDFG jurisdiction within the Study Area, 520.64 acres, of which 23.60 acres consist of vegetated riparian habitat, is within the Project area. The remaining 7.26 acres of CDFG jurisdiction, of which 1.66 acres consist of vegetated riparian habitat, is off site. Of the 520.64 acres of CDFG jurisdiction within the Project area, 266.49 acres are within the proposed open space portion of Lytle Creek outside of the temporary impact zone associated with the construction of the levee and 109.08 acres are within the open space associated with the recently established SBKR conservation area with Lytle Creek.

Of the 7.26 acres of CDFG jurisdiction, of which 1.66 acres consist of vegetated riparian habitat off site, a total of 1.66 acres, all of which consist of vegetated riparian habitat, is within the off site gas line utility easement area; a total of 5.25 acres, none of which consists of vegetated riparian habitat, is within the levee repair between Neighborhood II and CEMEX; no CDFG jurisdiction exists within the 2.60-acre utility roadway off-site between Neighborhood II and Highland Avenue, no CDFG jurisdiction exists within the 2.30-acre roadway easement on top of the proposed levee under the I-15 Freeway connecting Neighborhoods III and IV, and a total of 0.35 acre, none of which consists of vegetated riparian habitat, is within the levee construction at the western end of Neighborhood IV.

CDFG jurisdiction has been determined to be present within Lytle Creek, along with its associated tributaries and impoundments, and unnamed ephemeral drainages within Neighborhood I, including the gas line utility easement area. All of these drainage features support CDFG jurisdiction and exhibit a high water mark (HWM) with several jurisdictional characteristics such as bed, bank, channel, destruction of terrestrial vegetation, debris wrack, and/or water marks. However, several areas were removed from CDFG jurisdiction due to lack of HWMs under an ordinary storm event. These non-jurisdictional areas consist of high terraces,

elevated islands, and/or elevated berms located within and adjacent to Lytle Creek. The boundaries of CDFG jurisdiction are depicted in Exhibits 3A-3D. Total CDFG jurisdiction associated with each Neighborhood is summarized in Table 6 below.

Neighborhood I On-Site
CDFG jurisdiction associated with unnamed ephemeral drainages and tributaries within Neighborhood I totals 26.51 acres, of which 20.33 acres consist of vegetated riparian habitat. CDFG jurisdiction associated with unnamed ephemeral drainages and tributaries within the on-site gas line utility easement area within Neighborhood I totals 2.63 acres, of which 2.62 acres consists of vegetated riparian habitat. Therefore, the total for Neighborhood I is 29.14 acres, of which 22.95 acres consists of vegetated riparian habitat. Neighborhood I, excluding the on site gas line utility easement, supports 40,274 linear feet of streambed and the on site gas line utility easement supports 2,120 linear feet of streambed. Together, the on site portion of Neighborhood I supports 42,394 linear feet of streambed.

Neighborhood I Off-Site
CDFG jurisdiction within the unnamed ephemeral drainages and tributaries in the off site gas line utility easement area immediately north of Neighborhood I within the County parcel totals 1.66 acres, all of which consist of vegetated riparian habitat. The off site gas line utility easement supports 1,046 linear feet of streambed.

Neighborhood II On-Site
CDFG jurisdiction within Neighborhood II totals 134.61 acres, of which 0.32 acre consists of vegetated riparian habitat. Of the 134.61 acres within Neighborhood II, a total of 104.54 acres is within the proposed open space portion of Lytle Creek. Neighborhood II supports 10,757 linear feet of streambed.

Neighborhood II Off-Site
CDFG jurisdiction within Lytle Creek in the off-site area adjacent to Neighborhood II associated with the levee improvement adjacent to the CEMEX property totals 5.25 acres, none of which consist of vegetated riparian habitat. The proposed off site levee improvement adjacent to Neighborhood II supports 1,808 linear feet of streambed. There is no CDFG jurisdiction associated with the existing interim construction roadway offsite, which is east of Neighborhood II and connects Neighborhood II with Highland Avenue.

Neighborhood III On-Site
CDFG jurisdiction associated within Neighborhood III totals 237.16 acres, of which 0.33 acre consists of vegetated riparian habitat. Of the 237.16 acres within Neighborhood III, a total of 86.28 acres is within the proposed open space portion of Lytle Creek and 107.18 acres is within the SBKR conservation area of Lytle Creek. Neighborhood III supports 23,795 linear feet of streambed.

Neighborhood III Off-Site
There is no CDFG jurisdiction within the 2.30-acre roadway easement on top of the proposed levee that runs off-site under the I-15 Freeway from Neighborhood III to Neighborhood IV.

Neighborhood IV On-Site
CDFG jurisdiction within Neighborhood IV totals 119.73 acres, none of which consist of vegetated riparian habitat. Of the 119.73 acres within Neighborhood IV, a total of 75.67 acres is within the proposed open space portion of Lytle Creek and 1.90 acres is within the SBKR portion of Lytle Creek. Neighborhood IV supports 19,959 linear feet of streambed.

Neighborhood IV Off-Site
CDFG jurisdiction within the offsite temporary impact area west of, and adjacent to, Neighborhood IV in Lytle Creek totals 0.35 acre, none of which consists of vegetated riparian habitat. Linear-foot totals associated with the off site temporary impact area adjacent to Neighborhood IV is 275 feet.

Table 6 below summarizes total on site CDFG jurisdiction and linear-foot totals by neighborhood and Table 6A summarizes total off site CDFG jurisdiction and linear-foot totals by neighborhood.

Table 6 – Neighborhoods I-IV: Total On Site CDFG Jurisdiction

Location	CDFG Streambed (acres)	CDFG Vegetated Riparian Habitat (acres)	CDFG Unvegetated Infiltration Pond and/or Remnant Basin Features (acres)	CDFG Infiltration Pond and/or Remnant Basin Feature Riparian Habitat (acres)	Total CDFG Jurisdiction (acres)	CDFG Linear Feet
Neighborhood I	6.18	20.33	0	0	26.51	40,274
Neighborhood I-On Site Gas Line Utility Easement Area	0.01	2.62	0	0	2.63	2,120
Neighborhood II	127.10	0	7.19	0.32	134.61	10,757
Neighborhood III	233.12	0	3.71	0.33	237.16	23,795
Neighborhood IV	119.73	0	0	0	119.73	19,959
Total	**486.14**	**22.95**	**10.90**	**0.65**	**520.64**	**96.905**

Table 6A – Neighborhoods I-IV: Total Off-Site CDFG Jurisdiction

Location	CDFG Streambed (acres)	CDFG Vegetated Riparian Habitat (acres)	CDFG Unvegetated Infiltration Pond and/or Recharge Basin (acres)	CDFG Infiltration Pond and/or Recharge Basin Riparian (acres)	Total CDFG Jurisdiction (acres)	CDFG Linear Feet
Neighborhood I-Off Site Gas Line Utility Easement	0	1.66	0	0	1.66	1,046
Neighborhood II Levee Repair to CEMEX	5.25	0	0	0	5.25	1,808
Neighborhood II 2.60-Acre Existing Utility Roadway	0	0	0	0	0	0
Neighborhood III 2.30-Acre Roadway Easement and Proposed Levee Under I-15 Freeway	0	0	0	0	0	0
Neighborhood IV Temporary Impact Area	0.35	0	0	0	0.35	275
Total	**5.60**	**1.66**	**0**	**0**	**7.26**	**3,129**

1. Neighborhood I

CDFG jurisdiction associated with Neighborhood I totals 26.51 acres, of which 20.33 acres consist of vegetated riparian habitat. Two ephemeral drainage systems are associated with Neighborhood I, which is in the northern portion of the overall Project boundary. An on and off-site gas line utility easement area is associated with Neighborhood I.

The drainage system to the west of the I-15 Freeway flows east for 21,959 linear feet through an existing soil-cement lined channel, which flows beneath Glen Helen Parkway and then through existing culverts located underneath the I-15 Freeway into the Sycamore Flats area. Sycamore Canyon, the main stream within the western drainage system, flows in a general west to east direction before changing direction to the north and flowing adjacent to an existing berm with flow dissipaters next to Glen Helen Parkway. Sycamore Canyon eventually enters an existing culvert located near the I-15 Freeway off ramp and flows beneath Glen Helen Parkway and into the eastern portion of the Neighborhood I area. The HWM in this drainage system varies in width from one to 93 feet. This drainage system supports a HWM consisting of shelving, debris wrack, and/or destruction of terrestrial vegetation. The main drainage in this system consists of sand cobbles, while the tributaries consist of upland vegetation.

Riparian vegetation associated with the western drainage system includes arroyo willow (*Salix lasiolepis*, FACW), black willow (*Salix goodingii*, OBL), mulefat (*Baccharis salicifolia*, FACW), and western sycamore (*Platanus racemosa*, FACW). The main drainage is generally unvegetated with the following native sage scrub/chaparral species associated with the tributaries: California sagebrush (*Artemisia californica*, UPL), Mexican elderberry (*Sambucus mexicana*, FAC), deerweed (*Lotus scoparius*, UPL), California buckwheat (*Eriogonum fasciculatum*, UPL), boxthorn (*Lycium* sp., UPL), chamise (*Adenostoma fasciculatum*, UPL), and goldenbush (*Isocoma menziesii*, UPL). Non-native plant species associated with the tributaries include red-stemmed filaree (*Erodium cicutarium*, UPL) and summer mustard (*Hirschfeldia incana*, UPL).

The drainage system to the east of the I-15 Freeway flows southerly for 18,315 linear feet to the Project boundary where it connects to Sycamore Creek. The HWM in this drainage system varies in width from one to 45 feet. The eastern drainage system supports a HWM consisting of shelving, debris wrack, and/or destruction of terrestrial vegetation.

The eastern drainage complex is generally unvegetated within the higher elevation areas and vegetated with mulefat and willow species within the lowland areas. Riparian vegetation

associated with the eastern drainage system includes mulefat (*Baccharis salicifolia*), black willow (*Salix goodingii*), western sycamore (*Platanus racemosa*), and red willow (*Salix laevigata*, FACW). Native plant species include California sagebrush (*Artemisia californica*, UPL), Mexican elderberry (*Sambucus mexicana*, FAC), deerweed (*Lotus scoparius*, UPL), California buckwheat (*Eriogonum fasciculatum*, UPL), black sage (*Salvua mellifera*, UPL), poison oak (*Toxicodendron diversilobum*, UPL), cudweed (*Gnaphalium* sp, UPL.), Douglas's nightshade (*Solanum douglasii*, FAC), and chamise (*Adenostoma fasciculatum*, UPL). Non-native plant species include red-stemmed filaree (*Erodium cicutarium*, UPL) and summer mustard (*Hirschfeldia incana*, UPL).

A disturbed area in the eastern portion of the Project is a previously permitted action that is part of the Lytle Creek North Development and bisects several drainage features in that area.

2. Neighborhood I - Gas line Utility Easement Area On-Site

The on site gas line utility easement area is a 3.90-acre, 100-foot wide easement supporting a 16-foot wide existing road within the proposed open space area east of the I-15 Freeway. CDFG jurisdiction associated with the on site gas line utility easement area consists of 2.63 acres, of which 2.62 acres consists of vegetated riparian habitat. The total linear footage within the on site gas line utility easement is 2,120 feet.

Vegetation typically associated with the gas line easement repair area includes mulefat (*Baccharis salicifolia*, FACW), black willow (*Salix goodingii*, OBL), arroyo willow (*Salix lasiolepis*, FACW), and red willow (*Salix laevigata*, FACW).

3. Neighborhood I -Off-Site Gas Line Easement Repair Area

The off site gas line utility easement area is a 3.60-acre, 100-foot wide easement supporting a 16-foot wide existing road and is in the County-owned parcel east of the I-15 Freeway and north of Neighborhood I. CDFG jurisdiction associated with this area consists of 1.66 acres, all of which consist of vegetated riparian habitat. The total linear-footage within the off site gas line utility easement area is 1,046 feet.

Vegetation typically associated with the off-site gas line utility easement area includes mulefat (*Baccharis salicifolia*, FACW), black willow (*Salix goodingii*, OBL), arroyo willow (*Salix lasiolepis*, FACW), and red willow (*Salix laevigata*, FACW).

Table 7 below summarizes total on site CDFG jurisdiction within Neighborhood I and Table 7A summarizes total off site CDFG jurisdiction within Neighborhood I. Exhibit 3A depicts the boundaries of CDFG jurisdiction associated with Neighborhood I.

Table 7: Neighborhood I: Total On Site CDFG Jurisdiction

Location	CDFG Streambed (Acres)	CDFG Vegetated Riparian Habitat (Acres)	Total CDFG Jurisdiction (Acres)	CDFG Linear Feet
Neighborhood I	6.18	20.33	26.51	40,274
Neighborhood I-On Site Gas Line Utility Easement Area	0.01	2.62	2.63	2,120
Total	**6.19**	**22.95**	**29.14**	**42,394**

Table 7A: Neighborhood I: Total Off Site CDFG Jurisdiction

Location	CDFG Streambed (Acres)	CDFG Vegetated Riparian Habitat (Acres)	Total CDFG Jurisdiction (Acres)	CDFG Linear Feet
Neighborhood I-Off Site Gas Line Utility Easement Area	0	1.66	1.66	1,046
Total	**0**	**1.66**	**1.66**	**1,046**

4. Neighborhood II-Development Footprint Area

CDFG jurisdiction associated within Neighborhood II outside of the Lytle Creek Proposed Open Space totals 22.56 acres, none of which consists of vegetated riparian habitat. This intermittent drainage enters Neighborhood II from the northwestern boundary and flows in a southeasterly direction for 10,757 linear feet. In this area, Lytle Creek displays evidence that the flows from the low-flow channel periodically overtop the banks and flood across the adjacent terraces and in some areas across the entire terrace based on the presence of litter and debris and sediment deposits. These indicators were used to locate the lateral extent of the HWM. Lytle Creek supports a HWM ranging from one to 1,800 feet in width. There are several braided channels associated with Lytle Creek that become incised and meander within the low-flow areas. The channel bottom consists of sand and cobbles.

Vegetation usually associated with the adjacent slopes and terraces, but which also occurs within drainages, includes sage thistle (*Salvia carduacea*, UPL), croton (*Croton californicus*, UPL), scalebroom (*Lepidospartum squamatum*, UPL), wreath plant (*Stephanomaria virgata*, UPL), ripgut brome (*Bromus diandrus*, UPL), deerweed (*Lotus scoparius*, UPL), California sagebrush (*Artemisia californica*, UPL), yerba santa (*Eriodictyon crassifolium*, UPL), and mountain-mahogany (*Cercocarpus betuloides*, UPL).

5. Neighborhood II-Lytle Creek Proposed Open Space Area

CDFG jurisdiction in Lytle Creek within the Neighborhood II portion of the Lytle Creek Proposed Open Space Area totals 104.54 acres, none of which consists of vegetated riparian habitat. This intermittent drainage enters Neighborhood II from the northwestern boundary and flows in a southeasterly direction before leaving the site. Lytle Creek supports a HWM ranging from one to 1,800 feet in width. There are several braided channels associated with Lytle Creek that become incised and meander within the low-flow areas. The channel bottom consists of sand and cobbles.

Vegetation typically associated with the adjacent slopes and terraces within Lytle Creek includes sage thistle (*Salvia carduacea*, UPL), croton (*Croton californicus*, UPL), scalebroom (*Lepidospartum squamatum*, UPL), wreath plant (*Stephanomaria virgata*, UPL), ripgut brome (*Bromus diandrus, UPL*), deerweed (*Lotus scoparius*, UPL), California sagebrush (*Artemisia californica*, UPL), yerba santa (*Eriodictyon crassifolium*, UPL), and mountain-mahogany (*Cercocarpus betuloides*, UPL).

6. Neighborhood II - On-Site Infiltration Ponds

Four isolated infiltration ponds within the 100-year floodplain of Lytle Creek, used by Fontana Water District, were evaluated and determined to be within CDFG jurisdiction. CDFG jurisdiction associated with the infiltration ponds totals 7.51 acres, of which 0.32 acre is vegetated riparian habitat. Riparian vegetation detected within these infiltration ponds included fennel-leaf pondweed (*Potamogeton pectinatus*, OBL), mulefat (*Baccharis salicifolia*, FACW), rabbitfoot grass (*Polypogon monspeliensis*, FACW+), arroyo willow (*Salix lasiolepis*, FACW), Fremont's cottonwood (*Populus fremontii*, FACW), white alder (*Alnus rhombifolia*, FACW), and stonewort (*Chara* sp., OBL). Areas determined not to be riparian were excluded due to upland vegetation such as tree tobacco (*Nicotiana glauca*, FAC)), summer mustard (*Hirschfeldia incana*, UPL), lamb's quarters (*Chenopodium album*, FAC), and castor bean (*Ricinus communis*, FACU).

7. Neighborhood II-Off-Site Proposed Levee Improvement Area

CDFG jurisdiction associated with the Lytle Creek streambed within the off-site area adjacent to Neighborhood II totals 5.25 acres, none of which consists of vegetated riparian habitat. This intermittent drainage exits within Neighborhood III and flows for 1,808 linear feet through the CEMEX Mining Facility, which is the proposed location for this off-site improvement. Once exiting the CEMEX Mining Facility, the drainage enters Neighborhood II from the northwestern boundary. In this area, Lytle Creek displays evidence that the flows from the low-flow channel periodically overtop the banks and flood across the adjacent terraces and in some areas across the entire terrace based on the presence of litter and debris and sediment deposits. These indicators were used to locate the lateral extent of the HWM. Lytle Creek supports a HWM ranging from one to 1,800 feet in width, which includes several impoundments that were historically used as groundwater recharge basins and infiltration ponds. There are several open water channels located within Lytle Creek that become incised and meander within the low-flow areas. The channel bottom consists of sand and cobbles.

Intermittent patches of riparian vegetation associated with the channel bottom include mulefat (*Baccharis salicifolia*, FACW) and western sycamores (*Platanus racemosa*, FACW). Vegetation usually associated with the adjacent slopes and terraces, but which also occurs within drainages, includes sage thistle (*Salvia carduacea*, UPL), croton (*Croton californicus*, UPL), scalebroom (*Lepidospartum squamatum*, UPL), wreath plant (*Stephanomaria virgata*, UPL), ripgut brome (*Bromus diandrus*, UPL), deerweed (*Lotus scoparius*, UPL), California sagebrush (*Artemisia californica*, UPL), yerba santa (*Eriodictyon crassifolium*, UPL), and mountain-mahogany (*Cercocarpus betuloides*, UPL).

8. Neighborhood II-2.60-Acre Off Site Interim Construction Roadway

There is no CDFG jurisdiction associated with the existing 2.60-acre off-site interim construction roadway connecting Neighborhood II to Highland Avenue.

Table 8 below summarizes total on site CDFG jurisdiction within Neighborhood II and Table 8A summarizes total off site CDFG jurisdiction within Neighborhood II. Exhibit 3B depicts the boundaries of CDFG jurisdiction associated with Neighborhood II.

Table 8 – Neighborhood II: On-Site CDFG Jurisdiction

Location	CDFG Streambed/ Infiltration Ponds (acres)	CDFG Riparian (acres)	CDFG Total Jurisdiction (acres)	CDFG Linear Feet (feet)
Neighborhood II- Development Footprint Area	22.56	0	22.56	10,757
Neighborhood II- Lytle Creek Proposed Open Space Area	104.54	0	104.54	N/A
Neighborhood Infiltration Ponds	7.19	0.32	7.51	N/A
Total	**134.29**	**0.32**	**134.61**	**10,757**

Table 8A – Neighborhood II: Off Site CDFG Jurisdiction

Location	CDFG Streambed/ Infiltration Ponds (acres)	CDFG Riparian (acres)	CDFG Total Jurisdiction (acres)	CDFG Linear Feet (feet)
Neighborhood II- Off Site Proposed Levee Improvement Area	5.25	0	5.25	1,808
Neighborhood II- Existing Interim Construction Roadway	0	0	0	0
Total	**5.25**	**0**	**5.25**	**1,808**

9. Neighborhood III- Development Footprint Area

CDFG jurisdiction within Neighborhood III outside of the Lytle Creek Proposed Open Space Area and the existing SBKR Conservation Area totals 39.66 acres, none of which consists of vegetated riparian habitat. This intermittent drainage enters Neighborhood III from the northwestern boundary and flows in a southeasterly direction for 23,795 linear feet. In this area, Lytle Creek displays evidence that the flows from the low-flow channel periodically overtop the banks and flood across the adjacent terraces, and in some areas across the entire terrace based on the presence of litter and debris and sediment deposits. These indicators were used to locate the lateral extent of the HWM. Lytle Creek supports a HWM ranging from one to 1,800 feet in

width, which includes several impoundments that were historically used as groundwater recharge basins and infiltration ponds. There are several braided channels associated with Lytle Creek that become incised and meander within the low-flow areas. The channel bottom consists of sand and cobbles.

Vegetation usually associated with the adjacent slopes and terraces, but which also occurs within drainages, includes sage thistle (*Salvia carduacea*, UPL), croton (*Croton californicus*, UPL), scalebroom (*Lepidospartum squamatum*, UPL), wreath plant (*Stephanomaria virgata*, UPL), ripgut brome (*Bromus diandrus*, UPL), deerweed (*Lotus scoparius*, UPL), California sagebrush (*Artemisia californica*, UPL), yerba santa (*Eriodictyon crassifolium*, UPL), and mountain-mahogany (*Cercocarpus betuloides*, UPL).

10. Neighborhood III-Lytle Creek Proposed Open Space Area

CDFG jurisdiction in Lytle Creek within the Neighborhood III portion of the Lytle Creek Proposed Open Space Area totals 86.28 acres, none of which consists of vegetated riparian habitat. This intermittent drainage enters Neighborhood III from the northwestern boundary and flows in a southeasterly direction before leaving the site. Lytle Creek supports a HWM ranging from one to 1,800 feet in width. There are several braided channels associated with Lytle Creek that become incised and meander within the low-flow areas. The channel bottom consists of sand and cobbles.

Vegetation typically associated with the adjacent slopes and terraces within Lytle Creek includes sage thistle (*Salvia carduacea*, UPL), croton (*Croton californicus*, UPL), scalebroom (*Lepidospartum squamatum*, UPL), wreath plant (*Stephanomaria virgata*, UPL), ripgut brome (*Bromus diandrus, UPL*), deerweed (*Lotus scoparius*, UPL), California sagebrush (*Artemisia californica*, UPL), yerba santa (*Eriodictyon crassifolium*, UPL), and mountain-mahogany (*Cercocarpus betuloides*, UPL).

11. Neighborhood III- San Bernardino Kangaroo Rat Conservation Area

CDFG jurisdiction in Lytle Creek within the Neighborhood III portion of the SBKR Conservation Area totals 107.18 acres, none of which consists of vegetated riparian habitat. This intermittent drainage enters Neighborhood III from the northwestern boundary and flows in a southeasterly direction before leaving the site. Lytle Creek supports a HWM ranging from one to 1,800 feet in width. There are several braided channels associated with Lytle Creek that become incised and meander within the low-flow areas. The channel bottom consists of sand and cobbles.

Vegetation typically associated with the adjacent slopes and terraces within Lytle Creek includes sage thistle (*Salvia carduacea*, UPL), croton (*Croton californicus*, UPL), scalebroom (*Lepidospartum squamatum*, UPL), wreath plant (*Stephanomaria virgata*, UPL), ripgut brome (*Bromus diandrus, UPL*), deerweed (*Lotus scoparius*, UPL), California sagebrush (*Artemisia californica*, UPL), yerba santa (*Eriodictyon crassifolium*, UPL), and mountain-mahogany (*Cercocarpus betuloides*, UPL).

12. Neighborhood III – Remnant Basin Features

Five remnant basin features, located immediately adjacent to Lytle Creek, were evaluated and determined to be within the boundaries of CDFG jurisdiction. CDFG jurisdiction associated with these remnant basin features totals 4.04 acres, of which 0.33 acre consists of vegetated riparian habitat.

Riparian vegetation detected within these remnant features includes fennel-leaf pondweed (*Potamogeton pectinatus*, OBL), mulefat (*Baccharis salicifolia*, FACW), rabbitfoot grass (*Polypogon monspeliensis*, FACW+), arroyo willow (*Salix lasiolepis*, FACW), Fremont's cottonwood (*Populus fremontii*, FACW), white alder (*Alnus rhombifolia*, FACW), and stonewort (*Chara* sp., OBL). Areas determined not to be riparian were excluded due to upland vegetation such as tree tobacco (*Nicotiana glauca*, FAC)), summer mustard (*Hirschfeldia incana*, NI), lamb's quarters (*Chenopodium album*, FAC), and castor bean (*Ricinus communis*, FACU).

13. Neighborhood III-Off Site Roadway Easement and Proposed Levee Under I-15 Freeway

There is no CDFG jurisdiction within the roadway easement on top of the proposed levee that passes under the I-15 Freeway from Neighborhood III into Neighborhood IV.
Table 9 below summarizes total on site CDFG jurisdiction within Neighborhood III and Table 9A summarizes total off site CDFG jurisdiction within Neighborhood III. Exhibit 3C depicts the boundaries associated with Neighborhood III.

Table 9 – Neighborhood III: Total On-Site CDFG Jurisdiction

Location	CDFG Streambed/ Recharge Basins (acres)	CDFG Riparian (acres)	CDFG Total Jurisdiction (acres)	CDFG Linear Feet
Neighborhood III- Development Footprint Area	39.66	0	39.66	23,795
Neighborhood III- Lytle Creek Proposed Open Space Area	86.28	0	86.28	N/A
Neighborhood III- San Bernardino Kangaroo Rat Conservation Area	107.18	0	107.18	N/A
Neighborhood III- Remnant Basin Features	3.71	0.33	4.04	N/A
Total	**236.83**	**0.33**	**237.16**	**23,795**

Table 9A – Neighborhood III: Total Off Site CDFG Jurisdiction

Location	CDFG Streambed (acres)	CDFG Riparian Habitat (acres)	Total CDFG Jurisdiction (acres)	CDFG Linear Feet
Neighborhood III- Off Site Roadway Easement and Proposed Levee Under I-15 Freeway	0	0	0	0
Total	**0**	**0**	**0**	**0**

14. Neighborhood IV- Development Footprint Area

CDFG jurisdiction within Neighborhood IV outside of the Lytle Creek Proposed Open Space Area and the SBKR Conservation Area totals 42.16 acres, none of which consists of vegetated riparian habitat. This intermittent drainage enters Neighborhood IV from the northwestern boundary and flows in a southeasterly direction for 19,959 linear feet. In this area, Lytle Creek

displays evidence that flows within the low-flow channel periodically overtop the banks and flood across the adjacent terraces, and in some areas across the entire terrace based on the presence of litter and debris and sediment deposits. These indicators were used to locate the lateral extent of the HWM. Lytle Creek supports a HWM ranging from one to 1,800 feet in width, which includes several impoundments that were historically used as groundwater recharge basins and infiltration ponds. There are several braided channels associated with Lytle Creek that become incised and meander within the low-flow areas. The channel bottom consists of sand and cobbles.

Vegetation usually associated with the adjacent slopes and terraces, but which also occurs within drainages, includes sage thistle (*Salvia carduacea*, UPL), croton (*Croton californicus*, UPL), scalebroom (*Lepidospartum squamatum*, UPL), wreath plant (*Stephanomaria virgata*, UPL), ripgut brome (*Bromus diandrus*, UPL), deerweed (*Lotus scoparius*, UPL), California sagebrush (*Artemisia californica*, UPL), yerba santa (*Eriodictyon crassifolium*, UPL), and mountain-mahogany (*Cercocarpus betuloides*, UPL).

15. Neighborhood IV: Lytle Creek Proposed Open Space Area

CDFG jurisdiction in Lytle Creek within the Neighborhood IV portion of the Lytle Creek Proposed Open Space Area totals 75.67 acres, none of which consists of vegetated riparian habitat. This intermittent drainage enters Neighborhood IV from the northwestern boundary and flows in a southeasterly direction before entering Neighborhood III. Lytle Creek supports a HWM ranging from one to 1,800 feet in width. There are several braided channels associated with Lytle Creek that become incised and meander within the low-flow areas. The channel bottom consists of sand and cobbles.

Vegetation typically associated with the adjacent slopes and terraces within Lytle Creek includes sage thistle (*Salvia carduacea*, UPL), croton (*Croton californicus*, UPL), scalebroom (*Lepidospartum squamatum*, UPL), wreath plant (*Stephanomaria virgata*, UPL), ripgut brome (*Bromus diandrus, UPL*), deerweed (*Lotus scoparius*, UPL), California sagebrush (*Artemisia californica*, UPL), yerba santa (*Eriodictyon crassifolium*, UPL), and mountain-mahogany (*Cercocarpus betuloides*, UPL).

16. Neighborhood IV: San Bernardino Kangaroo Rat Conservation Area

CDFG jurisdiction in Lytle Creek within the Neighborhood IV portion of the SBKR Conservation Area totals 1.90 acres, none of which consists of vegetated riparian habitat. This intermittent drainage enters Neighborhood IV from the northwestern boundary and flows in a

southeasterly direction before entering Neighborhood III. Lytle Creek supports a HWM ranging from one to 1,800 feet in width. There are several braided channels associated with Lytle Creek that become incised and meander within the low-flow areas. The channel bottom consists of sand and cobbles.
Vegetation typically associated with the adjacent slopes and terraces within Lytle Creek includes sage thistle (*Salvia carduacea*, UPL), croton (*Croton californicus*, UPL), scalebroom (*Lepidospartum squamatum*, UPL), wreath plant (*Stephanomaria virgata*, UPL), ripgut brome (*Bromus diandrus, UPL*), deerweed (*Lotus scoparius*, UPL), California sagebrush (*Artemisia californica*, UPL), yerba santa (*Eriodictyon crassifolium*, UPL), and mountain-mahogany (*Cercocarpus betuloides*, UPL).

17. Neighborhood IV: Off-Site Temporary Impact Area

CDFG jurisdiction in Lytle Creek within the Neighborhood IV off-site Temporary Impact Area totals 0.35 acre, none of which consists of vegetated riparian habitat. This temporary impact area is located west of, and adjacent to, the Neighborhood IV boundary in Lytle Creek. Lytle Creek passes through this area from the northwest and flows in a southeasterly direction for 275 linear feet before entering Neighborhood IV. Lytle Creek supports a HWM ranging from one to 1,800 feet in width. There are several braided channels associated with Lytle Creek that become incised and meander within the low-flow areas. The channel bottom consists of sand and cobbles.

Vegetation typically associated with the adjacent slopes and terraces within Lytle Creek includes sage thistle (*Salvia carduacea*, UPL), croton (*Croton californicus*, UPL), scalebroom (*Lepidospartum squamatum*, UPL), wreath plant (*Stephanomaria virgata*, UPL), ripgut brome (*Bromus diandrus, UPL*), deerweed (*Lotus scoparius*, UPL), California sagebrush (*Artemisia californica*, UPL), yerba santa (*Eriodictyon crassifolium*, UPL), and mountain-mahogany (*Cercocarpus betuloides*, UPL).

Table 10 below summarizes total on site CDFG jurisdiction within Neighborhood IV and Table 10A summarizes total off site CDFG jurisdiction within Neighborhood IV. Exhibit 3D depicts the boundaries associated with Neighborhood IV.

Table 10 – Neighborhood IV: Total On-Site CDFG Jurisdiction

Location	CDFG Streambed (acres)	CDFG Riparian (acres)	CDFG Total Jurisdiction (acres)	CDFG Linear Feet
Neighborhood IV-Development Footprint Area	42.16	0	42.16	19,959
Neighborhood IV-Lytle Creek Proposed Open Space Area	75.67	0	75.67	N/A
Neighborhood IV-San Bernardino Kangaroo Rat Conservation Area	1.90	0	1.90	N/A
Total	**119.73**	**0**	**119.73**	**19,959**

Table 10A – Neighborhood IV: Total Off-Site CDFG Jurisdiction

Location	CDFG Streambed (acres)	CDFG Riparian (acres)	CDFG Total Jurisdiction (acres)	CDFG Linear Feet
Neighborhood IV-Off Site Temporary Impact Area	0.35	0	0.35	**275**
Total	**0.35**	**0**	**0.35**	**275**

IV. DISCUSSION

A. Significant Nexus Analysis

1. Neighborhood I: Blue-line Drainage -West

a. Does the tributary, in combination with its adjacent wetlands (if any), have the capacity to carry pollutants or flood waters to TNWs, or to reduce the amount of pollutants or flood waters reaching a TNW?

The extent of the western blue-line drainage that is being evaluated for a significant nexus is a 1st order Non-RPW that has the capability of transporting pollutants and flood waters

to the Pacific Ocean because the OHWM is very wide (up to 93'), and therefore contributes significant volumes of flood waters to the Pacific Ocean. The western blue-line drainage and adjacent wetland is tributary to Lytle Creek, which is tributary to Cajon Creek, which is tributary to the Santa Ana River, which is tributary to the Pacific Ocean.

b. *Does the tributary, in combination with its adjacent wetlands (if any), provide habitat and lifecycle support functions for fish and other species, such as feeding, nesting, spawning, or rearing young for species that are present in the TNW?*

The western blue-line drainage and adjacent wetland have the potential to provide habitat for aquatic species during years with average or above-average rainfall. Biological surveys were not conducted for species in the TNW (Pacific Ocean) that could be using the site for feeding, nesting, or rearing young. However, because the connection to the TNW is so remote, there is no potential effect on the TNW.

c. *Does the tributary, in combination with its adjacent wetlands (if any), have the capacity to transfer nutrients and organic carbon that support downstream foodwebs?*

The western blue-line drainage and adjacent wetland support a low to moderate amount of riparian vegetation that could potentially contribute a significant amount of nutrients and organic carbon to downstream food webs.

d. *Does the tributary, in combination with its adjacent wetlands (if any), have other relationships to the physical, chemical, or biological integrity of the TNW?*

The western blue-line drainage and adjacent wetland do not have other relationships to the physical, chemical, or biological integrity of the TNW other than as described above.

e. *Significant nexus findings for non-RPW and its adjacent wetlands, where the non-RPW flows directly or indirectly into TNWs:*

The western blue-line drainage and adjacent wetland potentially contributes to the biological, hydrological, or chemical integrity of the Pacific Ocean and therefore, a significant nexus has the potential to exist.

2. Neighborhood I: Main Drainage – East Main Drainage – East (off-site)

a. *Does the tributary, in combination with its adjacent wetlands (if any), have the capacity to carry pollutants or flood waters to TNWs, or to reduce the amount of pollutants or flood waters reaching a TNW?*

The extent of the eastern main drainage that is being evaluated for a significant nexus is a 1st order Non-RPW that has the capability of transporting pollutants and flood waters to the Pacific Ocean because the OHWM is wide (up to 9'), and therefore contributes significant volumes of flood waters to the Pacific Ocean. The eastern main drainage and four adjacent wetlands are tributary to Lytle Creek, which is tributary to Cajon Creek, which is tributary to the Santa Ana River, which is tributary to the Pacific Ocean.

b. *Does the tributary, in combination with its adjacent wetlands (if any), provide habitat and lifecycle support functions for fish and other species, such as feeding, nesting, spawning, or rearing young for species that are present in the TNW?*

The eastern main drainage and adjacent wetlands have the potential to provide habitat for aquatic species during years with average or above-average rainfall. Biological surveys were not conducted for species in the TNW (Pacific Ocean) that could be using the site for feeding, nesting, or rearing young. However, because the connection to the TNW is so remote, there is no potential effect on the TNW.

c. *Does the tributary, in combination with its adjacent wetlands (if any), have the capacity to transfer nutrients and organic carbon that support downstream foodwebs?*

The eastern main drainage and adjacent wetlands support a moderate to extensive amount of riparian vegetation that could potentially contribute a significant amount of nutrients and organic carbon to downstream food webs.

d. *Does the tributary, in combination with its adjacent wetlands (if any), have other relationships to the physical, chemical, or biological integrity of the TNW?*

The eastern main drainage and adjacent wetlands do not have other relationships to the physical, chemical, or biological integrity of the TNW other than as described above.

e. Significant nexus findings for non-RPW and its adjacent wetlands, where the non-RPW flows directly or indirectly into TNWs:

The eastern main drainage and adjacent wetlands potentially contributes to the biological, hydrological, or chemical integrity of the Pacific Ocean and therefore, a significant nexus has the potential to exist.

3. Neighborhood I: Main Drainage – East Gas-line Easement Main Drainage – East Gas-line Easement (off-site)

a. Does the tributary, in combination with its adjacent wetlands (if any), have the capacity to carry pollutants or flood waters to TNWs, or to reduce the amount of pollutants or flood waters reaching a TNW?

The extent of the eastern main drainage associated with the gas-line easement area that is being evaluated for a significant nexus is a 1st order Non-RPW that has the capability of transporting pollutants and flood waters to the Pacific Ocean because the OHWM is wide (up to 9'), and therefore contributes significant volumes of flood waters to the Pacific Ocean. The eastern main drainage is tributary to Lytle Creek, which is tributary to Cajon Creek, which is tributary to the Santa Ana River, which is tributary to the Pacific Ocean.

b. Does the tributary, in combination with its adjacent wetlands (if any), provide habitat and lifecycle support functions for fish and other species, such as feeding, nesting, spawning, or rearing young for species that are present in the TNW?

The eastern main drainage associated with the gas-line easement area has the potential to provide habitat for aquatic species during years with average or above-average rainfall. Biological surveys were not conducted for species in the TNW (Pacific Ocean) that could be using the site for feeding, nesting, or rearing young. However, because the connection to the TNW is so remote, there is no potential effect on the TNW.

c. Does the tributary, in combination with its adjacent wetlands (if any), have the capacity to transfer nutrients and organic carbon that support downstream foodwebs?

The eastern main drainage associated with the gas-line easement area supports a moderate to extensive amount of riparian vegetation that could potentially contribute a significant amount of nutrients and organic carbon to downstream food webs.

d. *Does the tributary, in combination with its adjacent wetlands (if any), have other relationships to the physical, chemical, or biological integrity of the TNW?*
The eastern main drainage associated with the gas-line easement area does not have other relationships to the physical, chemical, or biological integrity of the TNW other than as described above.

e. *Significant nexus findings for non-RPW and its adjacent wetlands, where the non-RPW flows directly or indirectly into TNWs:*

The eastern main drainage associated with the gas-line easement repair potentially contributes to the biological, hydrological, or chemical integrity of the Pacific Ocean and therefore, a significant nexus has the potential to exist.

4. Neighborhood I: Unnamed Tributaries to Western and Eastern Drainages

a. *Does the tributary, in combination with its adjacent wetlands (if any), have the capacity to carry pollutants or flood waters to TNWs, or to reduce the amount of pollutants or flood waters reaching a TNW?*

The extent of the unnamed tributaries to the western and eastern drainages that are being evaluated for a significant nexus are 1st order Non-RPWs that have the capability of transporting pollutants and flood waters to the Pacific Ocean because the OHWM is wide (up to 20'), and therefore contributes significant volumes of flood waters to the Pacific Ocean. The unnamed tributaries to the western and eastern drainages are tributary to Lytle Creek, which is tributary to Cajon Creek, which is tributary to the Santa Ana River, which is tributary to the Pacific Ocean.

b. *Does the tributary, in combination with its adjacent wetlands (if any), provide habitat and lifecycle support functions for fish and other species, such as feeding, nesting, spawning, or rearing young for species that are present in the TNW?*

The unnamed tributaries to the western and eastern drainages have the potential to provide habitat for aquatic species during years with average or above-average rainfall. Biological surveys were not conducted for species in the TNW (Pacific Ocean) that could be using the site for feeding, nesting, or rearing young. However, because the connection to the TNW is so remote, there is no potential effect on the TNW.

c. *Does the tributary, in combination with its adjacent wetlands (if any), have the capacity to transfer nutrients and organic carbon that support downstream foodwebs?*

The unnamed tributaries to the western and eastern drainages support a low to moderate amount of riparian vegetation that could potentially contribute a significant amount of nutrients and organic carbon to downstream food webs.

d. *Does the tributary, in combination with its adjacent wetlands (if any), have other relationships to the physical, chemical, or biological integrity of the TNW?*
The unnamed tributaries to the western and eastern drainages do not have other relationships to the physical, chemical, or biological integrity of the TNW other than as described above.

e. *Significant nexus findings for non-RPW and its adjacent wetlands, where the non-RPW flows directly or indirectly into TNWs:*

The unnamed tributaries to the western and eastern drainages potentially contribute to the biological, hydrological, or chemical integrity of the Pacific Ocean and therefore, a significant nexus has the potential to exist.

5. Neighborhoods II-IV: Lytle Creek

a. Does the tributary, in combination with its adjacent wetlands (if any), have the capacity to carry pollutants or flood waters to TNWs, or to reduce the amount of pollutants or flood waters reaching a TNW?

The extent of Lytle Creek that is being evaluated is a 3rd order Non-RPW that has the capability of transporting pollutants and flood waters to the Pacific Ocean because the OHWM is very wide (up to 1,800'), and therefore contributes significant volumes of flood waters to the Pacific Ocean. Lytle Creek is tributary to Cajon Creek, which is tributary to the Santa Ana River, which is tributary to the Pacific Ocean.

b. *Does the tributary, in combination with its adjacent wetlands (if any), provide habitat and lifecycle support functions for fish and other species, such as feeding, nesting, spawning, or rearing young for species that are present in the TNW?*

Lytle Creek has the potential to provide habitat for aquatic species during years with average or above-average rainfall. Biological surveys were not conducted for species in the TNW (Pacific Ocean) that could be using the site for feeding, nesting, or rearing young. However, because the connection to the TNW is so remote, there is no potential effect on the TNW.

c. *Does the tributary, in combination with its adjacent wetlands (if any), have the capacity to transfer nutrients and organic carbon that support downstream foodwebs?*
Lytle Creek is a non-relatively permanent water that supports a low to moderate amount of riparian vegetation that could potentially contribute a low to moderate amount of nutrients and organic carbon to downstream food webs based on its large size.

d. *Does the tributary, in combination with its adjacent wetlands (if any), have other relationships to the physical, chemical, or biological integrity of the TNW?*

Lytle Creek does not have other relationships to the physical, chemical, or biological integrity of the TNW other than as described above.

e. *Significant nexus findings for non-RPW and its adjacent wetlands, where the non-RPW flows directly or indirectly into TNWs:*

Lytle Creek is non-relatively permanent water that potentially contributes to the biological, hydrological, or chemical integrity of the Pacific Ocean and therefore, a significant nexus has the potential to exist.

B. <u>Impact Analysis</u>

Impacts to Corps Jurisdiction
Corps jurisdiction associated with the Study Area totals 464.98 acres, of which 1.65 acres consist of jurisdictional wetlands. Of the 464.98 acres of Corps jurisdiction within the Study Area, 461.91 acres, of which 1.65 acres consists of jurisdictional wetlands, is within the Project area. The remaining 3.07 acres of Corps jurisdiction, none of which consists of jurisdictional wetlands, is off site. Of the 3.07 acres of off site Corps jurisdiction, a total of 0.06 acre, none of which consists of jurisdictional wetlands, is within the off site gas line utility easement area; a total of 2.66 acres, none of which consists of jurisdictional wetlands, is within the proposed levee

improvement area between Neighborhood II and CEMEX, and a total of 0.35 acre, none of which consists of jurisdictional wetlands, is associated with the levee construction at the western end of Neighborhood IV.

The total linear-footage of Corps jurisdiction within the Study Area is 80,717 linear feet. Of this total, 78,567 linear feet is within the Project area and the remaining 2,150 linear feet is off site in the off site gas line utility easement area (843 linear feet), the proposed levee improvement area between Neighborhood II and CEMEX (1,032 linear feet), and the levee construction area at the western end of Neighborhood IV (275 linear feet).

Permanent impacts to Corps jurisdiction within the Study Area total 58.02 acres, none of which consist of jurisdictional wetlands. Of the 58.02 acres of permanent impacts to Corps jurisdiction, 57.42 acres, none of which consist of jurisdictional wetlands, is within the Project area and 0.60 acre, none of which consists of jurisdictional wetlands, is off site. Temporary impacts to Corps jurisdiction within the Study Area total 26.73 acres, none of which consist of jurisdictional wetlands. Of the 26.73 acres of temporary impacts to Corps jurisdiction, 24.33 acres, none of which consist of jurisdictional wetlands, are within the Project area and 2.40 acres, none of which consists of jurisdictional wetlands, are off site.

Permanent impacts to Corps streambed within the Study Area total 43,741 feet. Of the 43,741 linear feet of permanent impact to Corps streambed, 42,709 linear feet are within the Project area and the remaining 1,032 linear feet are off site. Temporary impacts to Corps streambed total 8,852 feet. Of the 8,852 linear feet of temporary impact to Corps streambed, 8,577 linear feet are within the Project area and the remaining 275 linear feet are off site. Permanent impacts to Corps jurisdiction are summarized in Tables 11 and 11A below. Temporary impacts to Corps jurisdiction are summarized in Tables 12 and 12A below. Permanent and temporary impacts to Corps jurisdiction are depicted on Exhibits 3A-3D.

a. Neighborhood I

Permanent impacts to Corps jurisdiction within the development footprint of Neighborhood I total 0.99 acre, none of which consist of jurisdictional wetlands. Temporary impacts to Corps jurisdiction within Neighborhood I total 1.97 acres, none of which include jurisdictional wetlands. Permanent impacts to Corps streambed total 13,630 linear feet. Temporary impacts to Corps jurisdiction total 1,755 linear feet.

Although no impacts are associated with the on- or off-site gas line road improvements within the gas line 100-foot easement, it would be anticipated that the gas company at a future date and independent of the proposed Project may construct roadway improvements including drainage facilities. The potential stabilization and road improvements to the existing dirt maintenance road may include the installation of riprap and construction of a V-ditch to address drainage and erosion issues. The permanent impacts to Corps jurisdiction within the existing 100-foot easement on- and off-site are 0.02 for a length of 257 linear feet, and temporary impacts to Corps jurisdiction total 0.01 for a length of 231 linear feet.

b. Neighborhood II-On Site

Permanent impacts to Corps jurisdiction within the development footprint of Neighborhood II total 10.30 acres, none of which consist of jurisdictional wetlands. Temporary impacts to Corps jurisdiction within Neighborhood II in the proposed open space portion of Lytle Creek beyond the toe of the proposed levee total 8.80 acres, none of which consist of jurisdictional wetlands. Permanent impacts to Corps streambed total 4,490 linear feet. Temporary impacts to Corps streambed total 1,360 linear feet.

c. Neighborhood II-Off Site

Permanent impacts to Corps jurisdiction within the off site portion of Neighborhood II due to proposed improvements to the levee between Neighborhood II and the CEMEX property total 0.60 acre, none of which consist of jurisdictional wetlands. Temporary impacts to Corps jurisdiction within the off site portion of Neighborhood II due to proposed improvements to the levee between Neighborhood II and the CEMEX property total 2.05 acres, none of which consist of jurisdictional wetlands. Permanent impacts to Corps streambed total 1,032 linear feet.

There are no permanent or temporary impacts associated with the proposed use of the existing 2.60-acre interim construction roadway connecting Neighborhood II with Highland Avenue.

d. Neighborhood III-On Site

Permanent impacts to Corps jurisdiction associated with the development footprint of Neighborhood III total 25.12 acres, none of which consist of jurisdictional wetlands. Of the 25.12 acres of permanent impacts within Neighborhood III, 21.41 acres is within existing streambed and 3.71 acres is within the remnant basins. Temporary impacts to

Corps jurisdiction within Neighborhood III totals 10.02 acres, none of which consist of jurisdictional wetlands. Permanent impacts to Corps streambed total 13,363 linear feet. Temporary impacts to Corps streambed total 3,890 linear feet.

e. Neighborhood III-Off Site

There are no impacts to Corps jurisdiction within the 2.30-acre proposed roadway easement beginning in Neighborhood III, passing offsite under the I-15 and terminating at Neighborhood IV.

f. Neighborhood IV-On Site

Permanent impacts to Corps jurisdiction within the development footprint of Neighborhood IV total 21.01 acres, none of which consist of jurisdictional wetlands. Temporary impacts to Corps jurisdiction within Neighborhood IV totals 3.54 acres, none of which consist of jurisdictional wetlands. Permanent impacts to Corps streambed total 11,226 linear feet. Temporary impacts to Corps streambed total 1,572 linear feet.

g. Neighborhood IV-Off Site

Temporary impacts to Corps jurisdiction within the off-site portion of Neighborhood IV total 0.35 acre, none of which consists of jurisdictional wetlands. Temporary impacts to Corps streambed total 275 linear feet.

Table 11 – Permanent Impacts to On Site Corps Jurisdiction

Location	Waters (acres)	Wetlands (acres)	Remnant Basin Features (acres)	Total (acres)	Total Linear Feet
Neighborhood I	0.99	0	0	0.99	13,630
Neighborhood I-On Site Gas Line Utility Easement Area	0	0	0	0	0
Neighborhood II	10.30	0	0	10.30	4,490
Neighborhood III	21.41	0	3.71	25.12	13,363
Neighborhood IV	21.01	0	0	21.01	11,226
Total	**53.71**	**0**	**3.71**	**57.42**	**42,709**

Table 11A-Permanent Impacts to Off Site Corps Jurisdiction

Location	Waters (acres)	Wetlands (acres)	Remnant Basin Features (acres)	Total (acres)	Total Linear Feet
Neighborhood I-Off Site Gas Line Utility Easement Area	0	0	0	0	0
Neighborhood II-Off Site Levee Improvement Area	0.60	0	0	0.60	1,032
Neighborhood II-Off Site Existing 2.60-Acre Utility Road	0	0	0	0	0
Neighborhood III-Off Site 2.30-Acre Roadway Easement and Proposed Levee Under I-15 Freeway	0	0	0	0	0
Total	**0.60**	**0**	**0**	**0.60**	**1,032**

Table 12 – Temporary Impacts to On Site Corps Jurisdiction

Location	Waters (acres)	Wetlands (acres)	Remnant Basin Features (acres)	Total (acres)	Total Linear Feet
Neighborhood I	1.97	0	0	1.97	1,755
Neighborhood I-On Site Gas Line Utility Easement Area	0	0	0	0	0
Neighborhood II	8.80	0	0	8.80	1,360
Neighborhood III	10.02	0	0	10.02	3,890
Neighborhood IV	3.54	0	0	3.54	1,572
Total	**24.33**	**0**	**0**	**24.33**	**8,577**

Table 12A-Temporary Impacts to Off Site Corps Jurisdiction

Location	Waters (acres)	Wetlands (acres)	Remnant Basin Features (acres)	Total (acres)	Total Linear Feet
Neighborhood I-Off Site Gas Line Utility Easement Area	0	0	0	0	0
Neighborhood II-Off Site Levee Improvement Area	2.05	0	0	2.05	*
Neighborhood II-Off Site Existing 2.60-Acre Utility Road	0	0	0	0	0
Neighborhood III-Off Site 2.30-Acre Roadway Easement and Proposed Levee Under I-15 Freeway	0	0	0	0	0
Neighborhood IV-Off Site Temporary Impact Area Within Lytle Creek	0.35	0	0	0.35	275
Total	**2.40**	**0**	**0**	**2.40**	**275**

*The temporary impacts to Corps streambed for the off-site levee improvement area adjacent to Neighborhood II are included in the permanent total for the off-site portion of Neighborhood II.

Table 12B-Permanent Corps Impacts to Potential Gas Roadway Improvements On-Site Not a Part of Proposed Lytle Creek Ranch Project

Location	Waters (Acres)	Wetlands (Acres)	Total (Acres)	Total Linear Feet
Neighborhood I-On Site Gas Line Utility Easement Area	0.02	0	0.02	248
Neighborhood I-Off Site Gas Line Utility Easement Area	0	.0	0	9.05
Total	0.02	0	0.02	257

Table 12C-Temporary Corps Impacts To Potential Gas Roadway Improvements Off-Site County Parcel Not a Part of Proposed Lytle Creek Ranch Project

Location	Waters (Acres)	Wetlands (Acres)	Total (Acres)	Total Linear Feet
Neighborhood I-On Site Gas Line Utility Easement Area	0.01	0	0.01	111
Neighborhood I-Off Site Gas Line Utility Easement Area	0.003	0	0.003	119.7
Total	0.013	0	0.013	231

Impacts to CDFG Jurisdiction

CDFG jurisdiction associated with the Study Area totals 527.90 acres, of which 25.26 acres consist of vegetated riparian habitat. Of the 527.90 acres of CDFG jurisdiction within the Study Area, 520.64 acres, of which 23.60 acres consist of vegetated riparian habitat, is within the Project area. The remaining 7.26 acres of CDFG jurisdiction, of which 1.66 acres consist of vegetated riparian habitat, is off site. Of the 7.26 acres of CDFG jurisdiction, of which 1.66 acres consist of vegetated riparian habitat off site, a total of 1.66 acres, all of which consist of

vegetated riparian habitat, is within the off site gas line utility easement area; a total of 5.25 acres, none of which consists of vegetated riparian habitat, is within the levee improvement area between Neighborhood II and CEMEX, and 0.35 acre, none of which consists of vegetated riparian habitat, is within the levee construction at the western end of Neighborhood IV.
The total linear-footage of CDFG jurisdiction within the Study Area is 100,034 linear feet. Of this total, 96,905 linear feet are within the Project area and the remaining 3,129 linear feet are off site in the off site gas line utility easement area (1,046 linear feet), the proposed levee improvement area between Neighborhood II and CEMEX (1,808 linear feet), and the levee construction area at the western end of Neighborhood IV (275 linear feet).

Permanent impacts to CDFG jurisdiction total 93.98 acres, of which 2.38 acres consist of vegetated riparian habitat. Of the 93.98 acres of permanent impacts to CDFG jurisdiction, 92.76 acres, of which 2.38 acres consist of vegetated riparian habitat, is within the Project area and 1.22 acres, none of which consist of vegetated riparian habitat, is off site. Temporary impacts to CDFG jurisdiction within the Study Area total 32.00 acres, none of which consist of vegetated riparian habitat. Of the 32.00 acres of temporary impacts to CDFG jurisdiction, 27.73 acres, none of which consist of vegetated riparian habitat, are within the Project area and 4.27 acres, none of which consists of vegetated riparian habitat, are off site.

Permanent impacts to CDFG streambed within the Study Area total 60,894 linear feet. Of the 60,894 linear feet of permanent impact to CDFG streambed, 59,086 linear feet are within the Project area and the remaining 1,808 linear feet are off site. Temporary impacts to CDFG streambed total 9,981 linear feet. Of the 9,981 linear feet of temporary impact to CDFG streambed, 9,706 linear feet are within the Project area and the remaining 275 linear feet are off site. Permanent impacts to CDFG jurisdiction are summarized in Tables 13 and 13A below. Temporary impacts to CDFG jurisdiction are summarized in Tables 14 and 14A below. Permanent and temporary impacts to CDFG jurisdiction are depicted on Exhibits 3A-3D.

a. Neighborhood I

Permanent impacts to CDFG jurisdiction within the development footprint of Neighborhood I total 2.63 acres, of which 1.73 acres consist of vegetated riparian habitat. Temporary impacts to CDFG jurisdiction within Neighborhood I total 1.97 acres, none of which consist of vegetated riparian habitat. Permanent impacts to CDFG streambed total 13,630 linear feet. Temporary impacts to CDFG streambed total 1,755 linear feet. No impacts are proposed for the on or offsite gas line utility easement area.

Although no impacts are associated with the on- or off-site gas line road improvements within the gas line 100-foot easement, it would be anticipated that the gas company at a future date and independent of the proposed Project may construct roadway improvements including drainage facilities. The potential stabilization and road improvements to the existing dirt maintenance road may include the installation of riprap and construction of a V-ditch to address drainage and erosion issues. The permanent impacts to CDFG jurisdiction within the existing 100-foot easement on- and off-site are 0.97 acre all of which are riparian for a length of 2,353 linear feet, and temporary impacts to CDFG jurisdiction total 0.36 all of which are vegetated riparian habitat for a length of 2,576 linear feet

b. Neighborhood II-On Site

Permanent impacts to CDFG jurisdiction within the development footprint of Neighborhood II total 20.90 acres, of which 0.32 acre consists of vegetated riparian habitat. Temporary impacts to CDFG jurisdiction within Neighborhood II in the proposed open space portion of Lytle Creek beyond the toe of the proposed levee total 9.13 acres, none of which consist of vegetated riparian habitat. Permanent impacts to CDFG streambed total 9,390 linear feet. Temporary impacts to CDFG streambed total 1,360 linear feet.

c. Neighborhood II-Off Site

Permanent impacts to CDFG jurisdiction within the off site portion of Neighborhood II due to proposed improvements to the levee between Neighborhood II and the CEMEX property total 1.22 acres, none of which consist of vegetated riparian habitat. Temporary impacts to CDFG jurisdiction within the off site portion of Neighborhood II due to proposed improvements to the levee between Neighborhood II and the CEMEX property total 3.92 acres, none of which consist of vegetated riparian habitat. Permanent impacts to CDFG streambed total 1,808 linear feet. The total linear footage of CDFG temporary impacts to the off-site portion of Neighborhood II is included in the permanent total for the off-site portion of Neighborhood II.

There are no permanent or temporary impacts to CDFG jurisdiction within the existing 2.60-acre interim construction roadway connecting Neighborhood II with Highland Avenue.

d. Neighborhood III

Permanent impacts to CDFG jurisdiction within the development footprint of Neighborhood III total 32.93 acres, of which 0.33 acre consists of vegetated riparian habitat. Temporary impacts to CDFG jurisdiction within Neighborhood III in the proposed open space portion of Lytle Creek beyond the toe of the proposed levee total 10.78 acres, none of which consist of vegetated riparian habitat. Permanent impacts to CDFG streambed total 19,161 linear feet. Temporary impacts to CDFG streambed total 4,018 linear feet.

e. Neighborhood III-Off Site

There are no impacts to CDFG jurisdiction within the 2.30-acre proposed roadway easement beginning in Neighborhood III, passing offsite under the I-15 and terminating at Neighborhood IV.

f. Neighborhood IV-On Site

Permanent impacts to CDFG jurisdiction within the development footprint of Neighborhood IV total 36.30 acres, none of which consist of vegetated riparian habitat. Temporary impacts to CDFG jurisdiction within Neighborhood IV in the proposed open space portion of Lytle Creek beyond the toe of the proposed levee total 5.85 acres, none of which consist of vegetated riparian habitat. Permanent impacts to CDFG streambed total 16,905 linear feet. Temporary impacts to CDFG streambed total 2,573 linear feet.

g. Neighborhood IV-Off Site

Temporary impacts to CDFG jurisdiction within the off-site portion of Neighborhood IV total 0.35 acre, none of which consists of vegetated riparian habitat. Temporary impacts to CDFG streambed total 275 linear feet.

Table 13-Permanent Impacts to On Site CDFG Jurisdiction

Neighborhood	Unvegetated Streambed (acres)	Vegetated Riparian Habitat (acres)	Unvegetated Infiltration Pond and/or Remnant Basin Feature (acres)	Infiltration Pond and/or Remnant Basin Feature Riparian Habitat (acres)	Total (acres)	Total Linear Feet
Neighborhood I	0.90	1.73	0	0	2.63	13,630
Neighborhood I-On Site Gas Line Utility Easement Area	0	0	0	0	0	0
Neighborhood II	13.39	0	7.19	0.32	20.90	9,390
Neighborhood III	28.89	0	3.71	0.33	32.93	19,161
Neighborhood IV	36.30	0	0	0	36.30	16,905
Total	**79.48**	**1.73**	**10.90**	**0.65**	**92.76**	**59,086**

Table 13A-Permanent Impacts to Off Site CDFG Jurisdiction

Neighborhood	Unvegetated Streambed (acres)	Vegetated Riparian Habitat (acres)	Unvegetated Infiltration Pond and/or Remnant Basin Feature (acres)	Infiltration Pond and/or Remnant Basin Feature Riparian Habitat (acres)	Total (acres)	Total Linear Feet
Neighborhood I-Off Site Gas Line Utility Easement Area	0	0	0	0	0	0
Neighborhood II-Off site Levee Improvement Area	1.22	0	0	0	1.22	1,808
Neighborhood II-Off Site Existing 2.60-Acre Utility Road	0	0	0	0	0	0
Neighborhood III-Off Site 2.30-Acre Roadway Easement and Proposed Levee Under I-15 Freeway	0	0	0	0	0	0
Total	**1.22**	**0**	**0**	**0**	**1.22**	**1,808**

Table 14-Temporary Impacts to On Site CDFG Jurisdiction

Neighborhood	Unvegetated Streambed (acres)	Vegetated Riparian Habitat (acres)	Unvegetated Infiltration Pond and/or Remnant Basin Feature (acres)	Infiltration Pond and/or Remnant Basin Feature Riparian Habitat (acres)	Total (acres)	Total Linear Feet
Neighborhood I	1.97	0	0	0	1.97	1,755
Neighborhood I-On Site Gas Line Utility Easement Area	0	0	0	0	0	0
Neighborhood II	9.13	0	0	0	9.13	1,360
Neighborhood III	10.78	0	0	0	10.78	4,018
Neighborhood IV	5.85	0	0	0	5.85	2,573
Total	**27.73**	**0**	**0**	**0**	**27.73**	**9,706**

Table 14A-Temporary Impacts to Off Site CDFG Jurisdiction

Neighborhood	Unvegetated Streambed (acres)	Vegetated Riparian Habitat (acres)	Unvegetated Infiltration Pond and/or Remnant Basin Feature (acres)	Infiltration Pond and/or Remnant Basin Feature Riparian Habitat (acres)	Total (acres)	Total Linear Feet
Neighborhood I-Off Site Gas Line Utility Easement Area	0	0	0	0	0	0
Neighborhood II-Off site Levee Improvement Area	3.92	0	0	0	3.92	*
Neighborhood II-Off Site Existing 2.60-Acre Utility Road	0	0	0	0	0	0
Neighborhood III-Off Site 2.30-Acre Roadway Easement and Proposed Levee Under I-15 Freeway	0	0	0	0	0	0
Neighborhood IV-Off Site Temporary Impact Area	0.35	0	0	0	0.35	275
Total	**4.27**	**0**	**0**	**0**	**4.27**	**275**

* The temporary impacts to CDFG streambed for the off-site levee improvement area adjacent to Neighborhood II are included in the permanent total for the off-site portion of Neighborhood II.

Table 14B-Permanent Potential CDFG Impacts Gas Roadway Improvements On-Site Not a Part of Proposed Lytle Creek Ranch Project

Location	Unvegetated Streambed (Acres)	Vegetated Riparian (Acres)	Total (Acres)	Total Linear Feet
Neighborhood I-On Site Gas Line Utility Easement Area	0	0.67	0.67	1,492
Neighborhood I-Off Site Gas Line Utility Easement Area	0	0.3	0.3	861
Total	0	0.97	0.97	2,353

Table 14C-Temporary CDFG Potential Impacts To Gas Roadway Improvements Off-Site County Parcel Not a Part of Proposed Lytle Creek Ranch Project

Location	Unvegetated Streambed (Acres)	Vegetated Riparian (Acres)	Total (Acres)	Total Linear Feet
Neighborhood I-On Site Gas Line Utility Easement Area	0.0	0.32	0.32	1,703
Neighborhood I-Off Site Gas Line Utility Easement Area	0	0.04	0.04	873
Total	0.	0.36	0.36	2,576

If you have any questions about this letter report, please contact Darlene Shelley at (949) 837-0404 ext 24 or myself at (949) 837-0404 ext 20.

Sincerely,

GLENN LUKOS ASSOCIATES, INC.

Martin A. Rasnick
Regulatory Specialist

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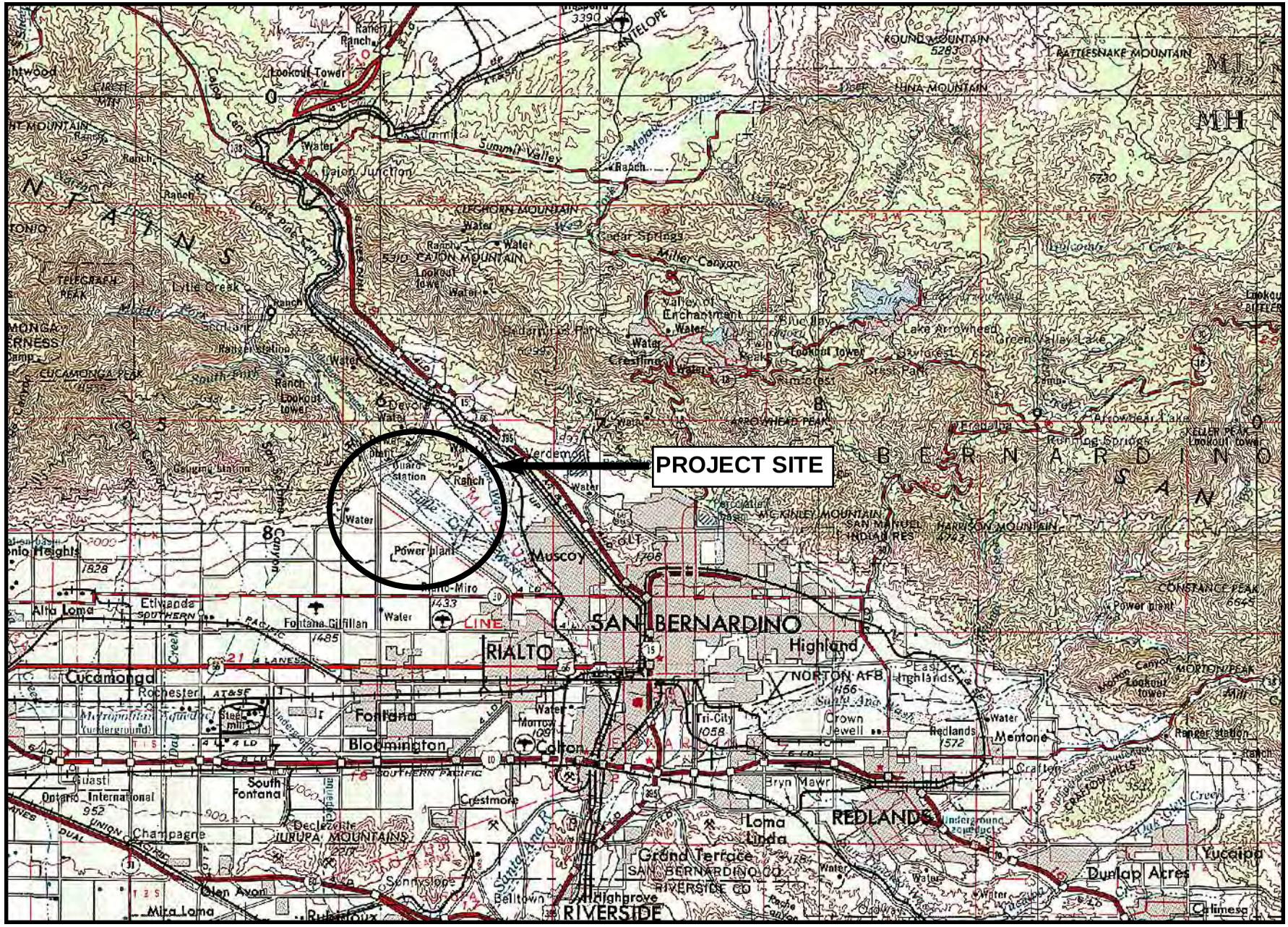
Adapted from USGS San Bernardino quadrangle



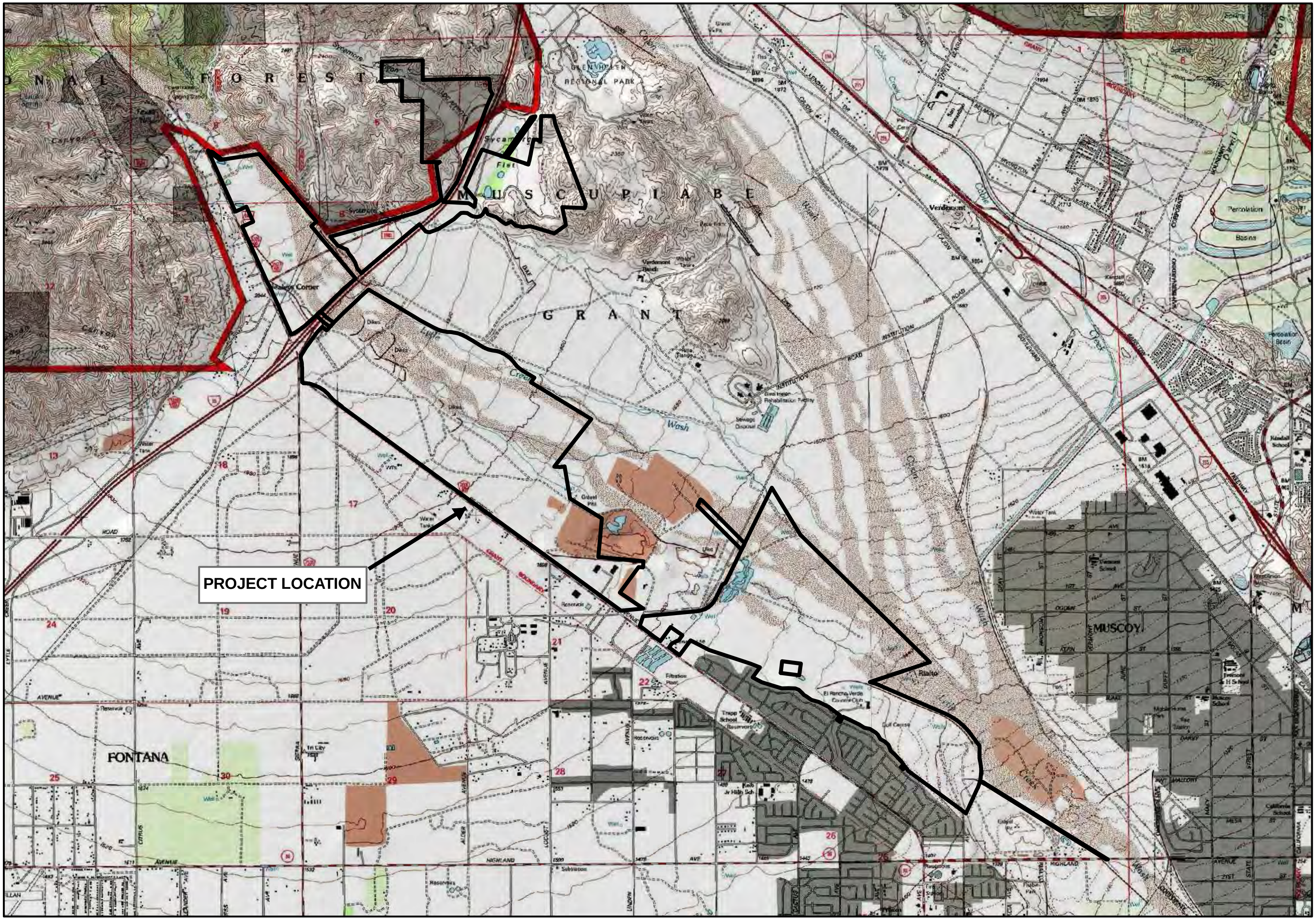
LYTLE DEVELOPMENT

Regional Map

GLENN LUKOS ASSOCIATES

EXHIBIT 1

Adapted from USGS Devore & San Bernardino North Quadrangles



NORTH

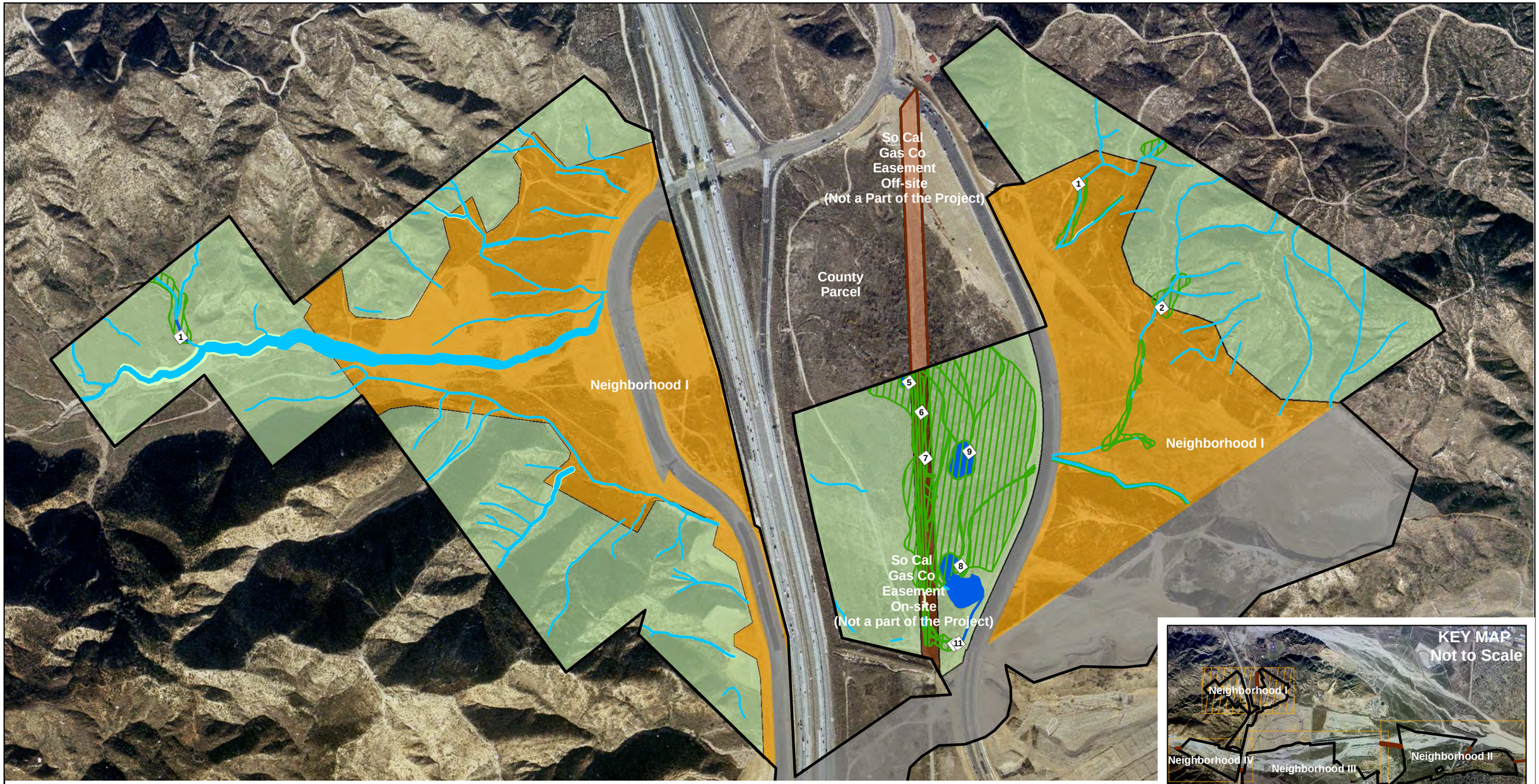
0 2,250 4,500 9,000
Feet

LYTLE DEVELOPMENT

Vicinity Map

GLENN LUKOS ASSOCIATES

Exhibit 2



Legend

- Corps Waters and CDFG Streambed
- Corps Wetlands and CDFG Riparian
- CDFG Streambed Only
- CDFG Riparian Only
- Data Pit Location

Lytle Creek Ranch Specific Plan Study Area

- On-Site
- Off-Site

Proposed Land Use

- Proposed Preservation Area
- On-site So Cal Gas Company Easement
- Off-site So Cal Gas Company Easement
- Proposed Development Area
- Lytle Creek North Development Area Previously Reviewed per CEQA and Entitled

N

0 275 550 1,100
Feet

LYTLE CREEK

Jurisdictional Delineation Map

GLENN LUKOS ASSOCIATES

Exhibit 3 Neighborhood I

X:\00 - 0362 ONLY\0163-110LYT2\163-110.GIS\JDTotalsAndImpacts_2009\163-110DelineationSheet1.mxd
March 17, 2009

Off-site Proposed Levee Improvement Area Between Neighborhoods II and III

Neighborhood II

Off-site Levee East of Neighborhood II

8

9

5

7

6

KEY MAP
Not to Scale

Neighborhood I

Neighborhood IV

Neighborhood III

Neighborhood II

Legend

- Corps Waters and CDFG Streambed
- Corps Wetlands and CDFG Riparian
- CDFG Streambed Only
- CDFG Riparian Only
- Data Pit Location
- Levee Top (Hinge Point on Lytle Creek Wash side)

Lytle Creek Ranch Specific Plan Study Area

- On-Site
- Off-Site

Proposed Land Use

- Proposed Preservation Area
- Temporary Levee Impacts
- Proposed Development Area

N

0 425 850 1,700

Feet

LYTLE CREEK

Jurisdictional Delineation Map

GLENN LUKOS ASSOCIATES

Exhibit 3 Neighborhood II and Neighborhood II Offsite

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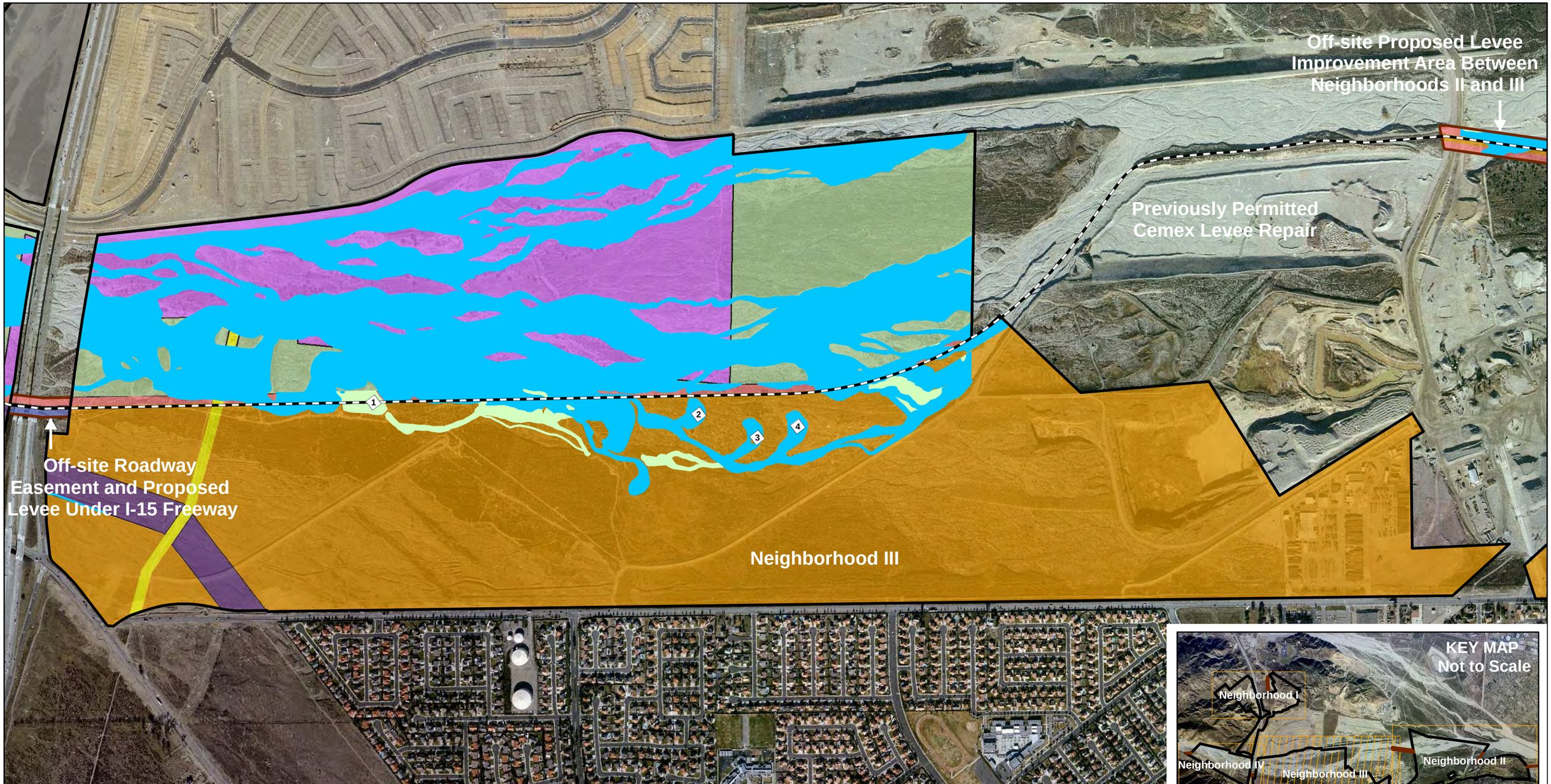
March 17, 2009



Legend

- Corps Waters and CDFG Streambed
- Corps Wetlands and CDFG Riparian
- CDFG Streambed Only
- CDFG Riparian Only
- Data Pit Location
- Levee Top (Hinge Point on Lytle Creek Wash side)

Lytle Creek Ranch Specific Plan Study Area

- On-Site
- Off-Site

Proposed Land Use

- Proposed Preservation Area
- SBKR Mitigation Area
- Easement
- Gas Co. Easement
- Temporary Levee Impacts
- Proposed Development Area
- Lytle Creek North Dvelopment Area Previously Reviewed per CEQA and Entitled
- Road Under I-15
- Existing Utility Road

N

0 450 900 1,800
Feet

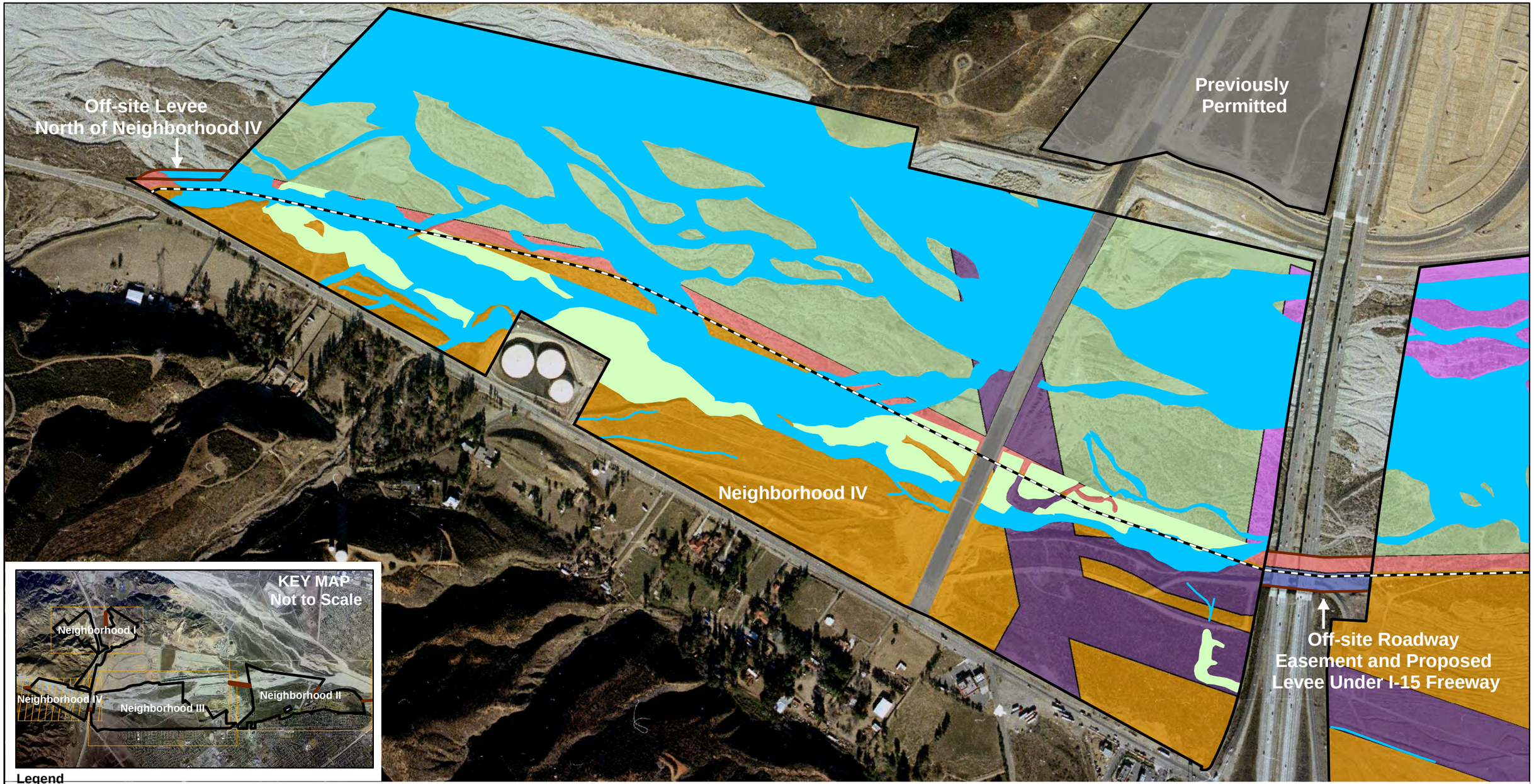
LYTLE CREEK

Jurisdictional Delineation Map

GLENN LUKOS ASSOCIATES

Exhibit 3 Neighborhood III

X:\00 - 0362 ONLY\0163-110LYT2\163-110.GIS\JDTotalsAndImpacts_2009\163-110DelineationSheet3.mxd
March 17, 2009



Legend

- Corps Waters and CDFG Streambed
- Corps Wetlands and CDFG Riparian
- CDFG Streambed Only
- CDFG Riparian Only
- Data Pit Location
- Levee Top (Hinge Point on Lytle Creek Wash side)

Lytle Creek Ranch Specific Plan Study Area

- On-Site
- Off-Site

Proposed Land Use

- Proposed Preservation Area
- SBKR Mitigation Area
- Easement
- Gas Co. Easement
- Temporary Levee Impacts
- Proposed Development Area
- Lytle Creek North Development Area Previously Reviewed per CEQA and Entitled
- Road Under I-15

N

0 250 500 1,000
Feet

LYTLE CREEK

Jurisdictional Delineation Map

GLENN LUKOS ASSOCIATES

Exhibit 3 Neighborhood IV

X:\00 - 0362 ONLY\0163-110LYT2\163-110.GIS\JDTotalsAndImpacts_2009\163-110DelineationSheet4.mxd
March 17, 2009

Photograph 1 depicts Lytle Creek. The upper terrace on the right was used to determine jurisdictional limits of Lytle Creek.

Photograph 2 depicts a wetland that was created from a ground water recharge basin.

GLENN LUKOS ASSOCIATES

EXHIBIT 4

LYTLE DEVELOPMENT

Site Photographs

Photograph 3 depicts a typical braid of Lytle Creek. The upper terrace was used to determine the limits of jurisdiction.

Photograph 4 depicts a typical braid of Lytle Creek. The upper terrace was used to determine the limits of jurisdiction.

GLENN LUKOS ASSOCIATES

EXHIBIT 4

LYTLE DEVELOPMENT

Site Photographs

Photograph 5 depicts a non-wetland area within one of the ground water recharge basins.

Photograph 6 depicts a typical non-jurisdictional swale located on the upper terrace west of the existing levees.

GLENN LUKOS ASSOCIATES

EXHIBIT 4

LYTLE DEVELOPMENT

Site Photographs

Photograph 7 depicts the typical upland area out of jurisdiction and west of Lytle Creek.

Photograph 8 depicts the typical upland area out of jurisdiction and west of Lytle Creek and the existing levees.

GLENN LUKOS ASSOCIATES

EXHIBIT 4

LYTLE DEVELOPMENT

Site Photographs

Photograph 9 depicts a typical elevated berm determined to be outside of jurisdiction.

Photograph 10 depicts the wetland area associated with the outflow of the Fontana Power Plant that connects to Lytle Creek.

GLENN LUKOS ASSOCIATES

EXHIBIT 4

LYTLE DEVELOPMENT

Site Photographs

Photograph 11 depicts one of the wetland areas of the infiltration ponds associated with the Fontana Power Plant that is located adjacent to Lytle Creek.

Photograph 12 depicts the non-wetland area of an existing mining operation located adjacent to Lytle Creek.

GLENN LUKOS ASSOCIATES

EXHIBIT 4

LYTLE DEVELOPMENT

Site Photographs

Photograph 13 depicts a drainage of the upper watershed of Sycamore West.

Photograph 14 depicts a drainage of the upper watershed of Sycamore West.

GLENN LUKOS ASSOCIATES

EXHIBIT 4

LYTLE DEVELOPMENT

Site Photographs

Photograph 15 depicts an alluvial drainage in the upper watershed of Sycamore West.

Photograph 16 depicts an alluvial drainage in the lower watershed of Sycamore West.

GLENN LUKOS ASSOCIATES

EXHIBIT 4

LYTLE DEVELOPMENT

Site Photographs

Photograph 17 depicts a deeply incised drainage from the upper watershed of Sycamore East.

Photograph 18 depicts a deeply incised drainage from the upper watershed of Sycamore East.

GLENN LUKOS ASSOCIATES

EXHIBIT 4

LYTLE DEVELOPMENT

Site Photographs

Photograph 19 depicts one of the wetland areas located within the lower elevation of Sycamore East.

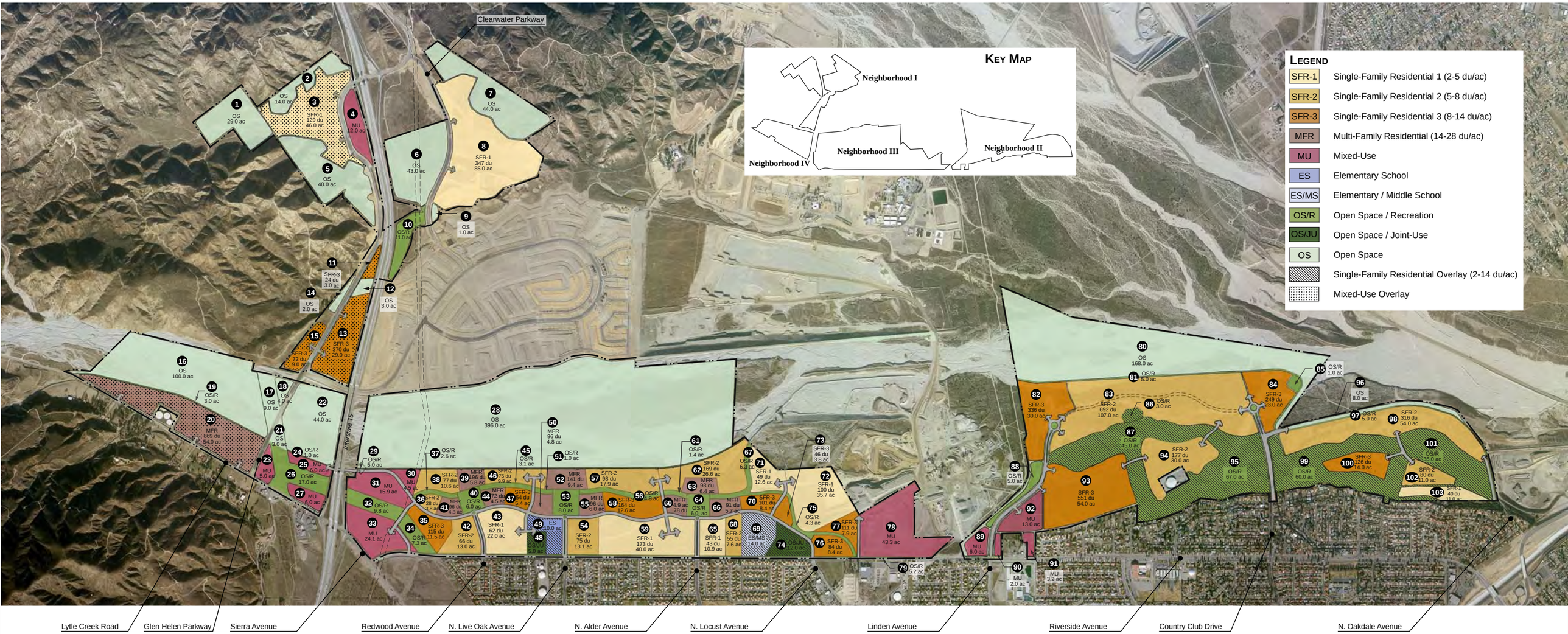
Photograph 20 depicts one of the wetland areas located within the lower elevation of Sycamore East.

GLENN LUKOS ASSOCIATES

EXHIBIT 4

LYTLE DEVELOPMENT

Site Photographs



Lytle Development Joint Venture III

Lytle Creek Ranch Land Use Plan

Rialto, California

Note: Planning Areas 82-84, 93-94, 98, 100, and 102-103 will be constructed as Active Adult Housing.

Disclaimer:
This map is conceptual only and subject to substantial change without notice. No representations or warranties of any type are made by this plan.

0' 400' 800' 1,600'

KTGY GROUP, INC. ARCHITECTURE • PLANNING

January 30, 2008

\\prod21\Vol2\CPUD\20070284 Lytle Creek Ranch\Production\Graphics\Site Plans\2008.01.30 Plan\Lytle Creek LUP 2008.1.30 400sc 40x88.ai

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APPENDIX A

Jurisdictional Delineation Forms

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APPROVED JURISDICTIONAL DETERMINATION FORM
U.S. Army Corps of Engineers

This form should be completed by following the instructions provided in Section IV of the JD Form Instructional Guidebook.

SECTION I: BACKGROUND INFORMATION

A. REPORT COMPLETION DATE FOR APPROVED JURISDICTIONAL DETERMINATION (JD):

B. DISTRICT OFFICE, FILE NAME, AND NUMBER:

C. PROJECT LOCATION AND BACKGROUND INFORMATION: Blue-line drainage - West
State: California County/parish/borough: San Bernardino City: Rialto and Unincorporated Areas
Center coordinates of site (lat/long in degree decimal format): Lat. 34.2025° N, Long. 117.4228° W.
Universal Transverse Mercator:
Name of nearest waterbody: Lytle Creek
Name of nearest Traditional Navigable Water (TNW) into which the aquatic resource flows: Pacific Ocean
Name of watershed or Hydrologic Unit Code (HUC): 18070203
- ☒ Check if map/diagram of review area and/or potential jurisdictional areas is/are available upon request.
- ☐ Check if other sites (e.g., offsite mitigation sites, disposal sites, etc…) are associated with this action and are recorded on a different JD form.

D. REVIEW PERFORMED FOR SITE EVALUATION (CHECK ALL THAT APPLY):
- ☐ Office (Desk) Determination. Date:
- ☐ Field Determination. Date(s):

SECTION II: SUMMARY OF FINDINGS

A. RHA SECTION 10 DETERMINATION OF JURISDICTION.

There **Are no** "*navigable waters of the U.S.*" within Rivers and Harbors Act (RHA) jurisdiction (as defined by 33 CFR part 329) in the review area. [*Required*]
- ☐ Waters subject to the ebb and flow of the tide.
- ☐ Waters are presently used, or have been used in the past, or may be susceptible for use to transport interstate or foreign commerce. Explain: .

B. CWA SECTION 404 DETERMINATION OF JURISDICTION.

There **Are** "*waters of the U.S.*" within Clean Water Act (CWA) jurisdiction (as defined by 33 CFR part 328) in the review area. [*Required*]

1. **Waters of the U.S.**
   a. **Indicate presence of waters of U.S. in review area (check all that apply):** [1]
   - ☐ TNWs, including territorial seas
   - ☐ Wetlands adjacent to TNWs
   - ☐ Relatively permanent waters[2] (RPWs) that flow directly or indirectly into TNWs
   - ☒ Non-RPWs that flow directly or indirectly into TNWs
   - ☐ Wetlands directly abutting RPWs that flow directly or indirectly into TNWs
   - ☐ Wetlands adjacent to but not directly abutting RPWs that flow directly or indirectly into TNWs
   - ☐ Wetlands adjacent to non-RPWs that flow directly or indirectly into TNWs
   - ☐ Impoundments of jurisdictional waters
   - ☐ Isolated (interstate or intrastate) waters, including isolated wetlands

   b. **Identify (estimate) size of waters of the U.S. in the review area:**
   Non-wetland waters: 4,728 linear feet: width (ft) and/or 3.61 acres.
   Wetlands: 0.02 acres.

   c. **Limits (boundaries) of jurisdiction** based on: **1987 Delineation Manual**
   Elevation of established OHWM (if known): 2,200.

2. **Non-regulated waters/wetlands (check if applicable):**[3]
   - ☐ Potentially jurisdictional waters and/or wetlands were assessed within the review area and determined to be not jurisdictional. Explain: .

---

[1] Boxes checked below shall be supported by completing the appropriate sections in Section III below.
[2] For purposes of this form, an RPW is defined as a tributary that is not a TNW and that typically flows year-round or has continuous flow at least "seasonally" (e.g., typically 3 months).
[3] Supporting documentation is presented in Section III.F.

SECTION III: CWA ANALYSIS

A. TNWs AND WETLANDS ADJACENT TO TNWs

The agencies will assert jurisdiction over TNWs and wetlands adjacent to TNWs. If the aquatic resource is a TNW, complete Section III.A.1 and Section III.D.1. only; if the aquatic resource is a wetland adjacent to a TNW, complete Sections III.A.1 and 2 and Section III.D.1.; otherwise, see Section III.B below.

1. TNW
Identify TNW:

Summarize rationale supporting determination:

2. Wetland adjacent to TNW
Summarize rationale supporting conclusion that wetland is "adjacent":

B. CHARACTERISTICS OF TRIBUTARY (THAT IS NOT A TNW) AND ITS ADJACENT WETLANDS (IF ANY):

This section summarizes information regarding characteristics of the tributary and its adjacent wetlands, if any, and it helps determine whether or not the standards for jurisdiction established under *Rapanos* have been met.

The agencies will assert jurisdiction over non-navigable tributaries of TNWs where the tributaries are "relatively permanent waters" (RPWs), i.e. tributaries that typically flow year-round or have continuous flow at least seasonally (e.g., typically 3 months). A wetland that directly abuts an RPW is also jurisdictional. If the aquatic resource is not a TNW, but has year-round (perennial) flow, skip to Section III.D.2. If the aquatic resource is a wetland directly abutting a tributary with perennial flow, skip to Section III.D.4.

A wetland that is adjacent to but that does not directly abut an RPW requires a significant nexus evaluation. Corps districts and EPA regions will include in the record any available information that documents the existence of a significant nexus between a relatively permanent tributary that is not perennial (and its adjacent wetlands if any) and a traditional navigable water, even though a significant nexus finding is not required as a matter of law.

If the waterbody[4] is not an RPW, or a wetland directly abutting an RPW, a JD will require additional data to determine if the waterbody has a significant nexus with a TNW. If the tributary has adjacent wetlands, the significant nexus evaluation must consider the tributary in combination with all of its adjacent wetlands. This significant nexus evaluation that combines, for analytical purposes, the tributary and all of its adjacent wetlands is used whether the review area identified in the JD request is the tributary, or its adjacent wetlands, or both. If the JD covers a tributary with adjacent wetlands, complete Section III.B.1 for the tributary, Section III.B.2 for any onsite wetlands, and Section III.B.3 for all wetlands adjacent to that tributary, both onsite and offsite. The determination whether a significant nexus exists is determined in Section III.C below.

1. Characteristics of non-TNWs that flow directly or indirectly into TNW

(i) General Area Conditions:
Watershed size: 1,681 square miles
Drainage area: 593 acres
Average annual rainfall: 16 inches
Average annual snowfall: 0 inches

(ii) Physical Characteristics:
(a) Relationship with TNW:
☐ Tributary flows directly into TNW.
☒ Tributary flows through 4 tributaries before entering TNW.

Project waters are 30 (or more) river miles from TNW.
Project waters are 10-15 river miles from RPW.
Project waters are 30 (or more) aerial (straight) miles from TNW.
Project waters are 10-15 aerial (straight) miles from RPW.
Project waters cross or serve as state boundaries. Explain:

Identify flow route to TNW[5]: Blue-line - West, Lytle Creek, Cajon Creek, Santa Ana River, Pacific Ocean.
Tributary stream order, if known: 1st.

[4] Note that the Instructional Guidebook contains additional information regarding swales, ditches, washes, and erosional features generally and in the arid West.
[5] Flow route can be described by identifying, e.g., tributary a, which flows through the review area, to flow into tributary b, which then flows into TNW.

(b) General Tributary Characteristics (check all that apply):

Tributary is: ☒ Natural
☐ Artificial (man-made). Explain:
☐ Manipulated (man-altered). Explain:

Tributary properties with respect to top of bank (estimate):
Average width: 27 feet
Average depth: feet
Average side slopes: **2:1.**

Primary tributary substrate composition (check all that apply):

☐ Silts	☒ Sands	☐ Concrete
☒ Cobbles	☐ Gravel	☐ Muck
☐ Bedrock	☐ Vegetation. Type/% cover:	
☐ Other. Explain:		

Tributary condition/stability [e.g., highly eroding, sloughing banks]. Explain: relatively stable.
Presence of run/riffle/pool complexes. Explain: N/A.
Tributary geometry: **Meandering**
Tributary gradient (approximate average slope): 4 %

(c) Flow:
Tributary provides for: **Ephemeral flow**
Estimate average number of flow events in review area/year: **2-5**
Describe flow regime: Only flows during heavy rain events.
Other information on duration and volume: Flows immediately after storm events.

Surface flow is: **Confined.** Characteristics:

Subsurface flow: **Unknown.** Explain findings:
☐ Dye (or other) test performed:

Tributary has (check all that apply):
☒ Bed and banks
☒ OHWM[6] (check all indicators that apply):

☒ clear, natural line impressed on the bank	☒ the presence of litter and debris
☐ changes in the character of soil	☒ destruction of terrestrial vegetation
☒ shelving	☒ the presence of wrack line
☐ vegetation matted down, bent, or absent	☐ sediment sorting
☐ leaf litter disturbed or washed away	☐ scour
☐ sediment deposition	☐ multiple observed or predicted flow events
☐ water staining	☐ abrupt change in plant community
☐ other (list):	

☐ Discontinuous OHWM.[7] Explain:

If factors other than the OHWM were used to determine lateral extent of CWA jurisdiction (check all that apply):

☐ High Tide Line indicated by:	☐ Mean High Water Mark indicated by:
☐ oil or scum line along shore objects	☐ survey to available datum;
☐ fine shell or debris deposits (foreshore)	☐ physical markings;
☐ physical markings/characteristics	☐ vegetation lines/changes in vegetation types.
☐ tidal gauges	
☐ other (list):	

(iii) Chemical Characteristics:
Characterize tributary (e.g., water color is clear, discolored, oily film; water quality; general watershed characteristics, etc.).
Explain: watershed is generally undisturbed.
Identify specific pollutants, if known:

---

[6]A natural or man-made discontinuity in the OHWM does not necessarily sever jurisdiction (e.g., where the stream temporarily flows underground, or where the OHWM has been removed by development or agricultural practices). Where there is a break in the OHWM that is unrelated to the waterbody's flow regime (e.g., flow over a rock outcrop or through a culvert), the agencies will look for indicators of flow above and below the break.
[7]Ibid.

(iv) **Biological Characteristics. Channel supports (check all that apply):**

☒ Riparian corridor. Characteristics (type, average width): willow riparian, avg width approx 76 ft.

☐ Wetland fringe. Characteristics:

☐ Habitat for:

- ☐ Federally Listed species. Explain findings:
- ☐ Fish/spawn areas. Explain findings:
- ☐ Other environmentally-sensitive species. Explain findings:
- ☐ Aquatic/wildlife diversity. Explain findings:

2. **Characteristics of wetlands adjacent to non-TNW that flow directly or indirectly into TNW**

(i) **Physical Characteristics:**

(a) General Wetland Characteristics:

Properties:

Wetland size: 0.02 acres

Wetland type. Explain: in-channel wetland.

Wetland quality. Explain: high quality based on hydrology, vegetative cover and soils.

Project wetlands cross or serve as state boundaries. Explain:

(b) General Flow Relationship with Non-TNW:

Flow is: **Intermittent flow.** Explain: Water is flowing in the wetlands when the adjacent drainages are dry. Ponded or saturated for more than 16 days during the growing season.

Surface flow is: **Confined**

Characteristics:

Subsurface flow: **Unknown.** Explain findings:

☐ Dye (or other) test performed:

(c) Wetland Adjacency Determination with Non-TNW:

☒ Directly abutting

☐ Not directly abutting

- ☐ Discrete wetland hydrologic connection. Explain:
- ☐ Ecological connection. Explain:
- ☐ Separated by berm/barrier. Explain:

(d) Proximity (Relationship) to TNW

Project wetlands are **30 (or more)** river miles from TNW.

Project waters are **10-15** aerial (straight) miles from TNW.

Flow is from: **Wetland to navigable waters.**

Estimate approximate location of wetland as within the **500-year or greater** floodplain.

(ii) **Chemical Characteristics:**

Characterize wetland system (e.g., water color is clear, brown, oil film on surface; water quality; general watershed characteristics; etc.). Explain: Watershed is generally undisturbed.

Identify specific pollutants, if known: n/a.

(iii) **Biological Characteristics. Wetland supports (check all that apply):**

☐ Riparian buffer. Characteristics (type, average width): willow riparian.

☒ Vegetation type/percent cover. Explain: arroyo willow (Salix lasiolepis, FACW), elderberry (Sambucus mexicana, FAC), tree tobacco (Nicotiana glauca, FAC), black willow (Salix goodingii, OBL), mugwort (Artemisia douglasiana, FACW), willowherb (Epilobium ciliatum), poison oak (Toxicodendron diversilobum, NI).

☐ Habitat for:

- ☐ Federally Listed species. Explain findings:
- ☐ Fish/spawn areas. Explain findings:
- ☐ Other environmentally-sensitive species. Explain findings:
- ☐ Aquatic/wildlife diversity. Explain findings:

3. **Characteristics of all wetlands adjacent to the tributary (if any)**

All wetland(s) being considered in the cumulative analysis: 1

Approximately (0.02) acres in total are being considered in the cumulative analysis.

For each wetland, specify the following:

Directly abuts? (Y/N)	Size (in acres)	Directly abuts? (Y/N)	Size (in acres)
Y	0.02		

Summarize overall biological, chemical and physical functions being performed: This wetland is high-functioning based on hydrology, vegetative cover, and soils. Presumably, this wetland is performing water quality functions and providing biological habitat.

C. SIGNIFICANT NEXUS DETERMINATION

A significant nexus analysis will assess the flow characteristics and functions of the tributary itself and the functions performed by any wetlands adjacent to the tributary to determine if they significantly affect the chemical, physical, and biological integrity of a TNW. For each of the following situations, a significant nexus exists if the tributary, in combination with all of its adjacent wetlands, has more than a speculative or insubstantial effect on the chemical, physical and/or biological integrity of a TNW. Considerations when evaluating significant nexus include, but are not limited to the volume, duration, and frequency of the flow of water in the tributary and its proximity to a TNW, and the functions performed by the tributary and all its adjacent wetlands. It is not appropriate to determine significant nexus based solely on any specific threshold of distance (e.g. between a tributary and its adjacent wetland or between a tributary and the TNW). Similarly, the fact an adjacent wetland lies within or outside of a floodplain is not solely determinative of significant nexus.

Draw connections between the features documented and the effects on the TNW, as identified in the *Rapanos* Guidance and discussed in the Instructional Guidebook. Factors to consider include, for example:

- Does the tributary, in combination with its adjacent wetlands (if any), have the capacity to carry pollutants or flood waters to TNWs, or to reduce the amount of pollutants or flood waters reaching a TNW?
- Does the tributary, in combination with its adjacent wetlands (if any), provide habitat and lifecycle support functions for fish and other species, such as feeding, nesting, spawning, or rearing young for species that are present in the TNW?
- Does the tributary, in combination with its adjacent wetlands (if any), have the capacity to transfer nutrients and organic carbon that support downstream foodwebs?
- Does the tributary, in combination with its adjacent wetlands (if any), have other relationships to the physical, chemical, or biological integrity of the TNW?

Note: the above list of considerations is not inclusive and other functions observed or known to occur should be documented below:

1. **Significant nexus findings for non-RPW that has no adjacent wetlands and flows directly or indirectly into TNWs.** Explain findings of presence or absence of significant nexus below, based on the tributary itself, then go to Section III.D:a.

2. **Significant nexus findings for non-RPW and its adjacent wetlands, where the non-RPW flows directly or indirectly into TNWs.** Explain findings of presence or absence of significant nexus below, based on the tributary in combination with all of its adjacent wetlands, then go to Section III.D: Please see Jurisdictional Delineation repot for significant nexus evaluation.

3. **Significant nexus findings for wetlands adjacent to an RPW but that do not directly abut the RPW.** Explain findings of presence or absence of significant nexus below, based on the tributary in combination with all of its adjacent wetlands, then go to Section III.D:

D. DETERMINATIONS OF JURISDICTIONAL FINDINGS. THE SUBJECT WATERS/WETLANDS ARE (CHECK ALL THAT APPLY):

1. **TNWs and Adjacent Wetlands.** Check all that apply and provide size estimates in review area:
   - ☐ TNWs: linear feet width (ft), Or, acres.
   - ☐ Wetlands adjacent to TNWs: acres.

2. **RPWs that flow directly or indirectly into TNWs.**
   - ☐ Tributaries of TNWs where tributaries typically flow year-round are jurisdictional. Provide data and rationale indicating that tributary is perennial:
   - ☐ Tributaries of TNW where tributaries have continuous flow "seasonally" (e.g., typically three months each year) are jurisdictional. Data supporting this conclusion is provided at Section III.B. Provide rationale indicating that tributary flows seasonally:

Provide estimates for jurisdictional waters in the review area (check all that apply):
☐ Tributary waters: linear feet width (ft).
☐ Other non-wetland waters: acres.
Identify type(s) of waters: .

3. **Non-RPWs[8] that flow directly or indirectly into TNWs.**
☒ Waterbody that is not a TNW or an RPW, but flows directly or indirectly into a TNW, and it has a significant nexus with a TNW is jurisdictional. Data supporting this conclusion is provided at Section III.C.

Provide estimates for jurisdictional waters within the review area (check all that apply):
☒ Tributary waters: 4,728 linear feet 27width (ft).
☐ Other non-wetland waters: acres.
Identify type(s) of waters: .

4. **Wetlands directly abutting an RPW that flow directly or indirectly into TNWs.**
☐ Wetlands directly abut RPW and thus are jurisdictional as adjacent wetlands.
☐ Wetlands directly abutting an RPW where tributaries typically flow year-round. Provide data and rationale indicating that tributary is perennial in Section III.D.2, above. Provide rationale indicating that wetland is directly abutting an RPW: .

☐ Wetlands directly abutting an RPW where tributaries typically flow "seasonally." Provide data indicating that tributary is seasonal in Section III.B and rationale in Section III.D.2, above. Provide rationale indicating that wetland is directly abutting an RPW: .

Provide acreage estimates for jurisdictional wetlands in the review area: acres.

5. **Wetlands adjacent to but not directly abutting an RPW that flow directly or indirectly into TNWs.**
☐ Wetlands that do not directly abut an RPW, but when considered in combination with the tributary to which they are adjacent and with similarly situated adjacent wetlands, have a significant nexus with a TNW are jurisidictional. Data supporting this conclusion is provided at Section III.C.

Provide acreage estimates for jurisdictional wetlands in the review area: acres.

6. **Wetlands adjacent to non-RPWs that flow directly or indirectly into TNWs.**
☒ Wetlands adjacent to such waters, and have when considered in combination with the tributary to which they are adjacent and with similarly situated adjacent wetlands, have a significant nexus with a TNW are jurisdictional. Data supporting this conclusion is provided at Section III.C.

Provide estimates for jurisdictional wetlands in the review area: 0.02 acres.

7. **Impoundments of jurisdictional waters.[9]**
As a general rule, the impoundment of a jurisdictional tributary remains jurisdictional.
☐ Demonstrate that impoundment was created from "waters of the U.S.," or
☐ Demonstrate that water meets the criteria for one of the categories presented above (1-6), or
☐ Demonstrate that water is isolated with a nexus to commerce (see E below).

E. **ISOLATED [INTERSTATE OR INTRA-STATE] WATERS, INCLUDING ISOLATED WETLANDS, THE USE, DEGRADATION OR DESTRUCTION OF WHICH COULD AFFECT INTERSTATE COMMERCE, INCLUDING ANY SUCH WATERS (CHECK ALL THAT APPLY):[10]**
☐ which are or could be used by interstate or foreign travelers for recreational or other purposes.
☐ from which fish or shellfish are or could be taken and sold in interstate or foreign commerce.
☐ which are or could be used for industrial purposes by industries in interstate commerce.
☐ Interstate isolated waters. Explain: .
☐ Other factors. Explain: .

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[8] See Footnote # 3.
[9] To complete the analysis refer to the key in Section III.D.6 of the Instructional Guidebook.
[10] **Prior to asserting or declining CWA jurisdiction based solely on this category, Corps Districts will elevate the action to Corps and EPA HQ for review consistent with the process described in the Corps/EPA *Memorandum Regarding CWA Act Jurisdiction Following Rapanos.***

Identify water body and summarize rationale supporting determination:

Provide estimates for jurisdictional waters in the review area (check all that apply):
- ☐ Tributary waters: linear feet width (ft).
- ☐ Other non-wetland waters: acres.
  - Identify type(s) of waters:
- ☐ Wetlands: acres.

F. NON-JURISDICTIONAL WATERS, INCLUDING WETLANDS (CHECK ALL THAT APPLY):
- ☐ If potential wetlands were assessed within the review area, these areas did not meet the criteria in the 1987 Corps of Engineers Wetland Delineation Manual and/or appropriate Regional Supplements.
- ☐ Review area included isolated waters with no substantial nexus to interstate (or foreign) commerce.
  - ☐ Prior to the Jan 2001 Supreme Court decision in "*SWANCC*," the review area would have been regulated based solely on the "Migratory Bird Rule" (MBR).
- ☐ Waters do not meet the "Significant Nexus" standard, where such a finding is required for jurisdiction. Explain:
- ☐ Other: (explain, if not covered above):

Provide acreage estimates for non-jurisdictional waters in the review area, where the sole potential basis of jurisdiction is the MBR factors (i.e., presence of migratory birds, presence of endangered species, use of water for irrigated agriculture), using best professional judgment (check all that apply):
- ☐ Non-wetland waters (i.e., rivers, streams): linear feet width (ft).
- ☐ Lakes/ponds: acres.
- ☐ Other non-wetland waters: acres. List type of aquatic resource:
- ☐ Wetlands: acres.

Provide acreage estimates for non-jurisdictional waters in the review area that do not meet the "Significant Nexus" standard, where such a finding is required for jurisdiction (check all that apply):
- ☐ Non-wetland waters (i.e., rivers, streams): linear feet, width (ft).
- ☐ Lakes/ponds: acres.
- ☐ Other non-wetland waters: acres. List type of aquatic resource:
- ☐ Wetlands: acres.

SECTION IV: DATA SOURCES.

A. SUPPORTING DATA. **Data reviewed for JD (check all that apply** - checked items shall be included in case file and, where checked and requested, appropriately reference sources below):
- ☒ Maps, plans, plots or plat submitted by or on behalf of the applicant/consultant:
- ☒ Data sheets prepared/submitted by or on behalf of the applicant/consultant.
  - ☐ Office concurs with data sheets/delineation report.
  - ☐ Office does not concur with data sheets/delineation report.
- ☐ Data sheets prepared by the Corps:
- ☐ Corps navigable waters' study:
- ☒ U.S. Geological Survey Hydrologic Atlas:
  - ☐ USGS NHD data.
  - ☒ USGS 8 and 12 digit HUC maps.
- ☒ U.S. Geological Survey map(s). Cite scale & quad name: 7.5 Minute Devore & San Bernardino North, CA.
- ☒ USDA Natural Resources Conservation Service Soil Survey. Citation:www.websoilsurvey.nrcs.usda.gov/app/WebSoilSurvey.aspx.
- ☒ National wetlands inventory map(s). Cite name:www.wetlandsfws.er.usgs.gov/NWI/index.html.
- ☐ State/Local wetland inventory map(s):
- ☒ FEMA/FIRM maps: 06071C7910F: Zone D - Areas in which floodplain is undetermined.
- ☒ 100-year Floodplain Elevation is: Approximate elevation is 2,200 feet above Mean Sea Level (National Geodectic Vertical Datum of 1929)
- ☒ Photographs: ☒ Aerial (Name & Date): Google Earth, 2007
  or ☒ Other (Name & Date): Site Photographs, 12/03/06.
- ☐ Previous determination(s). File no. and date of response letter:
- ☐ Applicable/supporting case law:
- ☐ Applicable/supporting scientific literature:
- ☐ Other information (please specify):

B. ADDITIONAL COMMENTS TO SUPPORT JD:

APPROVED JURISDICTIONAL DETERMINATION FORM
U.S. Army Corps of Engineers

This form should be completed by following the instructions provided in Section IV of the JD Form Instructional Guidebook.

SECTION I: BACKGROUND INFORMATION

A. REPORT COMPLETION DATE FOR APPROVED JURISDICTIONAL DETERMINATION (JD):

B. DISTRICT OFFICE, FILE NAME, AND NUMBER:

C. PROJECT LOCATION AND BACKGROUND INFORMATION: Main drainage - East
State: California County/parish/borough: San Bernardino City: Rialto and Unincorporated Areas
Center coordinates of site (lat/long in degree decimal format): Lat. 34.2025° N, Long. 117.4228° W.
Universal Transverse Mercator:
Name of nearest waterbody: Lytle Creek
Name of nearest Traditional Navigable Water (TNW) into which the aquatic resource flows: Pacific Ocean
Name of watershed or Hydrologic Unit Code (HUC): 18070203
- ☒ Check if map/diagram of review area and/or potential jurisdictional areas is/are available upon request.
- ☐ Check if other sites (e.g., offsite mitigation sites, disposal sites, etc…) are associated with this action and are recorded on a different JD form.

D. REVIEW PERFORMED FOR SITE EVALUATION (CHECK ALL THAT APPLY):
- ☐ Office (Desk) Determination. Date:
- ☐ Field Determination. Date(s):

SECTION II: SUMMARY OF FINDINGS

A. RHA SECTION 10 DETERMINATION OF JURISDICTION.

There **Are no** "*navigable waters of the U.S.*" within Rivers and Harbors Act (RHA) jurisdiction (as defined by 33 CFR part 329) in the review area. [*Required*]
- ☐ Waters subject to the ebb and flow of the tide.
- ☐ Waters are presently used, or have been used in the past, or may be susceptible for use to transport interstate or foreign commerce. Explain:

B. CWA SECTION 404 DETERMINATION OF JURISDICTION.

There **Are** "*waters of the U.S.*" within Clean Water Act (CWA) jurisdiction (as defined by 33 CFR part 328) in the review area. [*Required*]

1. **Waters of the U.S.**
   a. **Indicate presence of waters of U.S. in review area (check all that apply):** [1]
   - ☐ TNWs, including territorial seas
   - ☐ Wetlands adjacent to TNWs
   - ☐ Relatively permanent waters[2] (RPWs) that flow directly or indirectly into TNWs
   - ☒ Non-RPWs that flow directly or indirectly into TNWs
   - ☐ Wetlands directly abutting RPWs that flow directly or indirectly into TNWs
   - ☐ Wetlands adjacent to but not directly abutting RPWs that flow directly or indirectly into TNWs
   - ☐ Wetlands adjacent to non-RPWs that flow directly or indirectly into TNWs
   - ☐ Impoundments of jurisdictional waters
   - ☐ Isolated (interstate or intrastate) waters, including isolated wetlands

   b. **Identify (estimate) size of waters of the U.S. in the review area:**
   Non-wetland waters: 10,269 linear feet: width (ft) and/or 0.65 acres.
   Wetlands: 1.63 acres.

   c. **Limits (boundaries) of jurisdiction** based on: **1987 Delineation Manual**
   Elevation of established OHWM (if known): 2,000 ft.

2. **Non-regulated waters/wetlands (check if applicable):**[3]
   - ☐ Potentially jurisdictional waters and/or wetlands were assessed within the review area and determined to be not jurisdictional. Explain:

---

[1] Boxes checked below shall be supported by completing the appropriate sections in Section III below.
[2] For purposes of this form, an RPW is defined as a tributary that is not a TNW and that typically flows year-round or has continuous flow at least "seasonally" (e.g., typically 3 months).
[3] Supporting documentation is presented in Section III.F.

SECTION III: CWA ANALYSIS

A. TNWs AND WETLANDS ADJACENT TO TNWs

The agencies will assert jurisdiction over TNWs and wetlands adjacent to TNWs. If the aquatic resource is a TNW, complete Section III.A.1 and Section III.D.1. only; if the aquatic resource is a wetland adjacent to a TNW, complete Sections III.A.1 and 2 and Section III.D.1.; otherwise, see Section III.B below.

1. TNW
   Identify TNW:

   Summarize rationale supporting determination:

2. Wetland adjacent to TNW
   Summarize rationale supporting conclusion that wetland is "adjacent":

B. CHARACTERISTICS OF TRIBUTARY (THAT IS NOT A TNW) AND ITS ADJACENT WETLANDS (IF ANY):

This section summarizes information regarding characteristics of the tributary and its adjacent wetlands, if any, and it helps determine whether or not the standards for jurisdiction established under *Rapanos* have been met.

The agencies will assert jurisdiction over non-navigable tributaries of TNWs where the tributaries are "relatively permanent waters" (RPWs), i.e. tributaries that typically flow year-round or have continuous flow at least seasonally (e.g., typically 3 months). A wetland that directly abuts an RPW is also jurisdictional. If the aquatic resource is not a TNW, but has year-round (perennial) flow, skip to Section III.D.2. If the aquatic resource is a wetland directly abutting a tributary with perennial flow, skip to Section III.D.4.

A wetland that is adjacent to but that does not directly abut an RPW requires a significant nexus evaluation. Corps districts and EPA regions will include in the record any available information that documents the existence of a significant nexus between a relatively permanent tributary that is not perennial (and its adjacent wetlands if any) and a traditional navigable water, even though a significant nexus finding is not required as a matter of law.

If the waterbody[4] is not an RPW, or a wetland directly abutting an RPW, a JD will require additional data to determine if the waterbody has a significant nexus with a TNW. If the tributary has adjacent wetlands, the significant nexus evaluation must consider the tributary in combination with all of its adjacent wetlands. This significant nexus evaluation that combines, for analytical purposes, the tributary and all of its adjacent wetlands is used whether the review area identified in the JD request is the tributary, or its adjacent wetlands, or both. If the JD covers a tributary with adjacent wetlands, complete Section III.B.1 for the tributary, Section III.B.2 for any onsite wetlands, and Section III.B.3 for all wetlands adjacent to that tributary, both onsite and offsite. The determination whether a significant nexus exists is determined in Section III.C below.

1. Characteristics of non-TNWs that flow directly or indirectly into TNW

   (i) General Area Conditions:
   Watershed size: 1,681 square miles
   Drainage area: 141 acres
   Average annual rainfall: 16 inches
   Average annual snowfall: 0 inches

   (ii) Physical Characteristics:
   (a) Relationship with TNW:
   ☐ Tributary flows directly into TNW.
   ☒ Tributary flows through 4 tributaries before entering TNW.

   Project waters are 30 (or more) river miles from TNW.
   Project waters are 10-15 river miles from RPW.
   Project waters are 30 (or more) aerial (straight) miles from TNW.
   Project waters are 10-15 aerial (straight) miles from RPW.
   Project waters cross or serve as state boundaries. Explain:

   Identify flow route to TNW[5]: Main drainage-East, Lytle Creek, Cajon Creek, Santa Ana River, Pacific Ocean.
   Tributary stream order, if known: 1st.

[4] Note that the Instructional Guidebook contains additional information regarding swales, ditches, washes, and erosional features generally and in the arid West.

[5] Flow route can be described by identifying, e.g., tributary a, which flows through the review area, to flow into tributary b, which then flows into TNW.

(b) General Tributary Characteristics (check all that apply):

Tributary is:
- ☒ Natural
- ☐ Artificial (man-made). Explain:
- ☐ Manipulated (man-altered). Explain:

Tributary properties with respect to top of bank (estimate):
Average width: 3 feet
Average depth: 1 feet
Average side slopes: **2:1.**

Primary tributary substrate composition (check all that apply):

☐ Silts	☒ Sands	☐ Concrete
☒ Cobbles	☐ Gravel	☐ Muck
☐ Bedrock	☒ Vegetation. Type/% cover: 20% willow/mulefat	
☐ Other. Explain:		

Tributary condition/stability [e.g., highly eroding, sloughing banks]. Explain: relatively stable.
Presence of run/riffle/pool complexes. Explain: N/A.
Tributary geometry: **Meandering**
Tributary gradient (approximate average slope): 0-1 %

(c) Flow:
Tributary provides for: **Ephemeral flow**
Estimate average number of flow events in review area/year: **2-5**
Describe flow regime: Only flows during heavy rain events.
Other information on duration and volume: Flows immediately after storm events.

Surface flow is: **Confined.** Characteristics:

Subsurface flow: **Unknown.** Explain findings:
- ☐ Dye (or other) test performed:

Tributary has (check all that apply):
- ☒ Bed and banks
- ☒ OHWM[6] (check all indicators that apply):

☒ clear, natural line impressed on the bank	☒ the presence of litter and debris
☐ changes in the character of soil	☒ destruction of terrestrial vegetation
☒ shelving	☒ the presence of wrack line
☐ vegetation matted down, bent, or absent	☐ sediment sorting
☐ leaf litter disturbed or washed away	☐ scour
☐ sediment deposition	☐ multiple observed or predicted flow events
☐ water staining	☐ abrupt change in plant community
☐ other (list):	

- ☐ Discontinuous OHWM.[7] Explain:

If factors other than the OHWM were used to determine lateral extent of CWA jurisdiction (check all that apply):

☐ High Tide Line indicated by:	☐ Mean High Water Mark indicated by:
☐ oil or scum line along shore objects	☐ survey to available datum;
☐ fine shell or debris deposits (foreshore)	☐ physical markings;
☐ physical markings/characteristics	☐ vegetation lines/changes in vegetation types.
☐ tidal gauges	
☐ other (list):	

(iii) Chemical Characteristics:
Characterize tributary (e.g., water color is clear, discolored, oily film; water quality; general watershed characteristics, etc.).
Explain: Watershed contains some development.
Identify specific pollutants, if known: Hydrocarbons, sediment.

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[6] A natural or man-made discontinuity in the OHWM does not necessarily sever jurisdiction (e.g., where the stream temporarily flows underground, or where the OHWM has been removed by development or agricultural practices). Where there is a break in the OHWM that is unrelated to the waterbody's flow regime (e.g., flow over a rock outcrop or through a culvert), the agencies will look for indicators of flow above and below the break.
[7] Ibid.

(iv) **Biological Characteristics. Channel supports (check all that apply):**

☒ Riparian corridor. Characteristics (type, average width): willow riparian, avg width approx 195 ft.

☐ Wetland fringe. Characteristics: .

☒ Habitat for:

☒ Federally Listed species. Explain findings: least Bell's vireo (Vireo bellii pusillus).

☐ Fish/spawn areas. Explain findings: .

☐ Other environmentally-sensitive species. Explain findings: .

☐ Aquatic/wildlife diversity. Explain findings: .

2. **Characteristics of wetlands adjacent to non-TNW that flow directly or indirectly into TNW**

(i) **Physical Characteristics:**

(a) General Wetland Characteristics:

Properties:

Wetland size: 1.63 acres

Wetland type. Explain: depressional.

Wetland quality. Explain: high quality based on hydrology, vegetative cover and soils.

Project wetlands cross or serve as state boundaries. Explain: .

(b) General Flow Relationship with Non-TNW:

Flow is: **Intermittent flow.** Explain: Water is present in the wetlands when the adjacent drainages are dry. Ponded or saturated for more than 16 days during the growing season.

Surface flow is: **Confined**

Characteristics: .

Subsurface flow: **Unknown.** Explain findings: .

☐ Dye (or other) test performed: .

(c) Wetland Adjacency Determination with Non-TNW:

☒ Directly abutting

☐ Not directly abutting

☐ Discrete wetland hydrologic connection. Explain: .

☐ Ecological connection. Explain: .

☐ Separated by berm/barrier. Explain: .

(d) Proximity (Relationship) to TNW

Project wetlands are **30 (or more)** river miles from TNW.

Project waters are **10-15** aerial (straight) miles from TNW.

Flow is from: **Wetland to navigable waters.**

Estimate approximate location of wetland as within the **500-year or greater** floodplain.

(ii) **Chemical Characteristics:**

Characterize wetland system (e.g., water color is clear, brown, oil film on surface; water quality; general watershed characteristics; etc.). Explain: Water is clear and watershed is mostly undeveloped. Nearby paved roads would contribute some pollutants to wetland .

Identify specific pollutants, if known: Hydrocarbons, sediment runoff.

(iii) **Biological Characteristics. Wetland supports (check all that apply):**

☐ Riparian buffer. Characteristics (type, average width): .

☒ Vegetation type/percent cover. Explain: mulefat (Baccharis salicifolia, FACW), black willow (Salix goodingii, OBL), slender cat-tail (Typha domingensis, OBL), fireweed (Epilobium ciliatum, FACW), nutsedge (Cyperus sp.), and red willow (Salix laevigata, FACW).

☐ Habitat for:

☐ Federally Listed species. Explain findings: .

☐ Fish/spawn areas. Explain findings: .

☐ Other environmentally-sensitive species. Explain findings: .

☐ Aquatic/wildlife diversity. Explain findings: .

3. **Characteristics of all wetlands adjacent to the tributary (if any)**

All wetland(s) being considered in the cumulative analysis: 3

Approximately (1.63) acres in total are being considered in the cumulative analysis.

For each wetland, specify the following:

Directly abuts? (Y/N)	Size (in acres)	Directly abuts? (Y/N)	Size (in acres)
Y	0.98		
Y	0.59		
Y	0.06		

Summarize overall biological, chemical and physical functions being performed: The wetlands are high-functioning based on hydrology, vegetative cover, and soils. Presumably, the wetlands are performing water quality functions and providing biological habitat.

C. SIGNIFICANT NEXUS DETERMINATION

A significant nexus analysis will assess the flow characteristics and functions of the tributary itself and the functions performed by any wetlands adjacent to the tributary to determine if they significantly affect the chemical, physical, and biological integrity of a TNW. For each of the following situations, a significant nexus exists if the tributary, in combination with all of its adjacent wetlands, has more than a speculative or insubstantial effect on the chemical, physical and/or biological integrity of a TNW. Considerations when evaluating significant nexus include, but are not limited to the volume, duration, and frequency of the flow of water in the tributary and its proximity to a TNW, and the functions performed by the tributary and all its adjacent wetlands. It is not appropriate to determine significant nexus based solely on any specific threshold of distance (e.g. between a tributary and its adjacent wetland or between a tributary and the TNW). Similarly, the fact an adjacent wetland lies within or outside of a floodplain is not solely determinative of significant nexus.

Draw connections between the features documented and the effects on the TNW, as identified in the *Rapanos* Guidance and discussed in the Instructional Guidebook. Factors to consider include, for example:

- Does the tributary, in combination with its adjacent wetlands (if any), have the capacity to carry pollutants or flood waters to TNWs, or to reduce the amount of pollutants or flood waters reaching a TNW?
- Does the tributary, in combination with its adjacent wetlands (if any), provide habitat and lifecycle support functions for fish and other species, such as feeding, nesting, spawning, or rearing young for species that are present in the TNW?
- Does the tributary, in combination with its adjacent wetlands (if any), have the capacity to transfer nutrients and organic carbon that support downstream foodwebs?
- Does the tributary, in combination with its adjacent wetlands (if any), have other relationships to the physical, chemical, or biological integrity of the TNW?

Note: the above list of considerations is not inclusive and other functions observed or known to occur should be documented below:

1. **Significant nexus findings for non-RPW that has no adjacent wetlands and flows directly or indirectly into TNWs.** Explain findings of presence or absence of significant nexus below, based on the tributary itself, then go to Section III.D:

2. **Significant nexus findings for non-RPW and its adjacent wetlands, where the non-RPW flows directly or indirectly into TNWs.** Explain findings of presence or absence of significant nexus below, based on the tributary in combination with all of its adjacent wetlands, then go to Section III.D: Please see Jurisdictional Delineation repot for significant nexus evaluation.

3. **Significant nexus findings for wetlands adjacent to an RPW but that do not directly abut the RPW.** Explain findings of presence or absence of significant nexus below, based on the tributary in combination with all of its adjacent wetlands, then go to Section III.D:

D. DETERMINATIONS OF JURISDICTIONAL FINDINGS. THE SUBJECT WATERS/WETLANDS ARE (CHECK ALL THAT APPLY):

1. **TNWs and Adjacent Wetlands.** Check all that apply and provide size estimates in review area:
   - ☐ TNWs: linear feet width (ft), Or, acres.
   - ☐ Wetlands adjacent to TNWs: acres.

2. **RPWs that flow directly or indirectly into TNWs.**
   - ☐ Tributaries of TNWs where tributaries typically flow year-round are jurisdictional. Provide data and rationale indicating that tributary is perennial:
   - ☐ Tributaries of TNW where tributaries have continuous flow "seasonally" (e.g., typically three months each year) are jurisdictional. Data supporting this conclusion is provided at Section III.B. Provide rationale indicating that tributary flows seasonally:

Provide estimates for jurisdictional waters in the review area (check all that apply):
☐ Tributary waters: linear feet width (ft).
☐ Other non-wetland waters: acres.
Identify type(s) of waters: .

3. **Non-RPWs[8] that flow directly or indirectly into TNWs.**
☒ Waterbody that is not a TNW or an RPW, but flows directly or indirectly into a TNW, and it has a significant nexus with a TNW is jurisdictional. Data supporting this conclusion is provided at Section III.C.

Provide estimates for jurisdictional waters within the review area (check all that apply):
☒ Tributary waters: **10,269** linear feet 3 width (ft).
☐ Other non-wetland waters: acres.
Identify type(s) of waters: .

4. **Wetlands directly abutting an RPW that flow directly or indirectly into TNWs.**
☐ Wetlands directly abut RPW and thus are jurisdictional as adjacent wetlands.
☐ Wetlands directly abutting an RPW where tributaries typically flow year-round. Provide data and rationale indicating that tributary is perennial in Section III.D.2, above. Provide rationale indicating that wetland is directly abutting an RPW: .

☐ Wetlands directly abutting an RPW where tributaries typically flow "seasonally." Provide data indicating that tributary is seasonal in Section III.B and rationale in Section III.D.2, above. Provide rationale indicating that wetland is directly abutting an RPW: .

Provide acreage estimates for jurisdictional wetlands in the review area: acres.

5. **Wetlands adjacent to but not directly abutting an RPW that flow directly or indirectly into TNWs.**
☐ Wetlands that do not directly abut an RPW, but when considered in combination with the tributary to which they are adjacent and with similarly situated adjacent wetlands, have a significant nexus with a TNW are jurisidictional. Data supporting this conclusion is provided at Section III.C.

Provide acreage estimates for jurisdictional wetlands in the review area: acres.

6. **Wetlands adjacent to non-RPWs that flow directly or indirectly into TNWs.**
☒ Wetlands adjacent to such waters, and have when considered in combination with the tributary to which they are adjacent and with similarly situated adjacent wetlands, have a significant nexus with a TNW are jurisdictional. Data supporting this conclusion is provided at Section III.C.

Provide estimates for jurisdictional wetlands in the review area: **1.63** acres.

7. **Impoundments of jurisdictional waters.[9]**
As a general rule, the impoundment of a jurisdictional tributary remains jurisdictional.
☐ Demonstrate that impoundment was created from "waters of the U.S.," or
☐ Demonstrate that water meets the criteria for one of the categories presented above (1-6), or
☐ Demonstrate that water is isolated with a nexus to commerce (see E below).

E. **ISOLATED [INTERSTATE OR INTRA-STATE] WATERS, INCLUDING ISOLATED WETLANDS, THE USE, DEGRADATION OR DESTRUCTION OF WHICH COULD AFFECT INTERSTATE COMMERCE, INCLUDING ANY SUCH WATERS (CHECK ALL THAT APPLY):[10]**
☐ which are or could be used by interstate or foreign travelers for recreational or other purposes.
☐ from which fish or shellfish are or could be taken and sold in interstate or foreign commerce.
☐ which are or could be used for industrial purposes by industries in interstate commerce.
☐ Interstate isolated waters. Explain: .

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[8] See Footnote # 3.
[9] To complete the analysis refer to the key in Section III.D.6 of the Instructional Guidebook.
[10] **Prior to asserting or declining CWA jurisdiction based solely on this category, Corps Districts will elevate the action to Corps and EPA HQ for review consistent with the process described in the Corps/EPA *Memorandum Regarding CWA Act Jurisdiction Following Rapanos.***

☐ Other factors. Explain:

Identify water body and summarize rationale supporting determination:

Provide estimates for jurisdictional waters in the review area (check all that apply):
☐ Tributary waters: linear feet width (ft).
☐ Other non-wetland waters: acres.
Identify type(s) of waters:
☐ Wetlands: acres.

F. NON-JURISDICTIONAL WATERS, INCLUDING WETLANDS (CHECK ALL THAT APPLY):
☐ If potential wetlands were assessed within the review area, these areas did not meet the criteria in the 1987 Corps of Engineers Wetland Delineation Manual and/or appropriate Regional Supplements.
☐ Review area included isolated waters with no substantial nexus to interstate (or foreign) commerce.
☐ Prior to the Jan 2001 Supreme Court decision in "*SWANCC*," the review area would have been regulated based solely on the "Migratory Bird Rule" (MBR).
☐ Waters do not meet the "Significant Nexus" standard, where such a finding is required for jurisdiction. Explain:
☐ Other: (explain, if not covered above):

Provide acreage estimates for non-jurisdictional waters in the review area, where the sole potential basis of jurisdiction is the MBR factors (i.e., presence of migratory birds, presence of endangered species, use of water for irrigated agriculture), using best professional judgment (check all that apply):
☐ Non-wetland waters (i.e., rivers, streams): linear feet width (ft).
☐ Lakes/ponds: acres.
☐ Other non-wetland waters: acres. List type of aquatic resource:
☐ Wetlands: acres.

Provide acreage estimates for non-jurisdictional waters in the review area that do not meet the "Significant Nexus" standard, where such a finding is required for jurisdiction (check all that apply):
☐ Non-wetland waters (i.e., rivers, streams): linear feet, width (ft).
☐ Lakes/ponds: acres.
☐ Other non-wetland waters: acres. List type of aquatic resource:
☐ Wetlands: acres.

SECTION IV: DATA SOURCES.

A. SUPPORTING DATA. **Data reviewed for JD (check all that apply** - checked items shall be included in case file and, where checked and requested, appropriately reference sources below):
☒ Maps, plans, plots or plat submitted by or on behalf of the applicant/consultant:
☒ Data sheets prepared/submitted by or on behalf of the applicant/consultant.
☐ Office concurs with data sheets/delineation report.
☐ Office does not concur with data sheets/delineation report.
☐ Data sheets prepared by the Corps:
☐ Corps navigable waters' study:
☒ U.S. Geological Survey Hydrologic Atlas:
☐ USGS NHD data.
☒ USGS 8 and 12 digit HUC maps.
☒ U.S. Geological Survey map(s). Cite scale & quad name:7.5 Minute Devore & San Bernardino North, CA.
☒ USDA Natural Resources Conservation Service Soil Survey. Citation:www.websoilsurvey.nrcs.usda.gov/app/WebSoilSurvey.aspx.
☒ National wetlands inventory map(s). Cite name:www.wetlandsfws.er.usgs.gov/NWI/index.html.
☐ State/Local wetland inventory map(s):
☒ FEMA/FIRM maps: 06071C7910F: Zone X - Areas determined to be outside of 500-year floodplain.
☒ 100-year Floodplain Elevation is: Approximate elevation is 2,000 feet above Mean Sea Level (National Geodectic Vertical Datum of 1929)
☒ Photographs: ☒ Aerial (Name & Date): Google Earth 2007.
or ☒ Other (Name & Date): Site Photographs 12/03/06.
☐ Previous determination(s). File no. and date of response letter:
☐ Applicable/supporting case law:
☐ Applicable/supporting scientific literature:
☐ Other information (please specify):

B. ADDITIONAL COMMENTS TO SUPPORT JD:

APPROVED JURISDICTIONAL DETERMINATION FORM
U.S. Army Corps of Engineers

This form should be completed by following the instructions provided in Section IV of the JD Form Instructional Guidebook.

SECTION I: BACKGROUND INFORMATION

A. REPORT COMPLETION DATE FOR APPROVED JURISDICTIONAL DETERMINATION (JD):

B. DISTRICT OFFICE, FILE NAME, AND NUMBER:

C. PROJECT LOCATION AND BACKGROUND INFORMATION: Main drainage - East (gasline on-site)
State: California County/parish/borough: San Bernardino City: Rialto and Unincorporated Areas
Center coordinates of site (lat/long in degree decimal format): Lat. 34.2025° N, Long. 117.4228° W.
Universal Transverse Mercator:
Name of nearest waterbody: Lytle Creek
Name of nearest Traditional Navigable Water (TNW) into which the aquatic resource flows: Pacific Ocean
Name of watershed or Hydrologic Unit Code (HUC): 18070203
- ☒ Check if map/diagram of review area and/or potential jurisdictional areas is/are available upon request.
- ☐ Check if other sites (e.g., offsite mitigation sites, disposal sites, etc…) are associated with this action and are recorded on a different JD form.

D. REVIEW PERFORMED FOR SITE EVALUATION (CHECK ALL THAT APPLY):
- ☐ Office (Desk) Determination. Date:
- ☐ Field Determination. Date(s):

SECTION II: SUMMARY OF FINDINGS

A. RHA SECTION 10 DETERMINATION OF JURISDICTION.

There Are no "*navigable waters of the U.S.*" within Rivers and Harbors Act (RHA) jurisdiction (as defined by 33 CFR part 329) in the review area. [*Required*]
- ☐ Waters subject to the ebb and flow of the tide.
- ☐ Waters are presently used, or have been used in the past, or may be susceptible for use to transport interstate or foreign commerce. Explain:

B. CWA SECTION 404 DETERMINATION OF JURISDICTION.

There Are "*waters of the U.S.*" within Clean Water Act (CWA) jurisdiction (as defined by 33 CFR part 328) in the review area. [*Required*]

1. **Waters of the U.S.**
   a. **Indicate presence of waters of U.S. in review area (check all that apply):** [1]
   - ☐ TNWs, including territorial seas
   - ☐ Wetlands adjacent to TNWs
   - ☐ Relatively permanent waters[2] (RPWs) that flow directly or indirectly into TNWs
   - ☒ Non-RPWs that flow directly or indirectly into TNWs
   - ☐ Wetlands directly abutting RPWs that flow directly or indirectly into TNWs
   - ☐ Wetlands adjacent to but not directly abutting RPWs that flow directly or indirectly into TNWs
   - ☐ Wetlands adjacent to non-RPWs that flow directly or indirectly into TNWs
   - ☐ Impoundments of jurisdictional waters
   - ☐ Isolated (interstate or intrastate) waters, including isolated wetlands

   b. **Identify (estimate) size of waters of the U.S. in the review area:**
   Non-wetland waters: 336 linear feet: width (ft) and/or 0.03 acres.
   Wetlands: acres.

   c. **Limits (boundaries) of jurisdiction** based on: **1987 Delineation Manual**
   Elevation of established OHWM (if known): 2,000 ft.

2. **Non-regulated waters/wetlands (check if applicable):**[3]
   - ☐ Potentially jurisdictional waters and/or wetlands were assessed within the review area and determined to be not jurisdictional. Explain:

---

[1] Boxes checked below shall be supported by completing the appropriate sections in Section III below.
[2] For purposes of this form, an RPW is defined as a tributary that is not a TNW and that typically flows year-round or has continuous flow at least "seasonally" (e.g., typically 3 months).
[3] Supporting documentation is presented in Section III.F.

SECTION III: CWA ANALYSIS

A. TNWs AND WETLANDS ADJACENT TO TNWs

The agencies will assert jurisdiction over TNWs and wetlands adjacent to TNWs. If the aquatic resource is a TNW, complete Section III.A.1 and Section III.D.1. only; if the aquatic resource is a wetland adjacent to a TNW, complete Sections III.A.1 and 2 and Section III.D.1.; otherwise, see Section III.B below.

1. TNW
   Identify TNW:

   Summarize rationale supporting determination:

2. Wetland adjacent to TNW
   Summarize rationale supporting conclusion that wetland is "adjacent":

B. CHARACTERISTICS OF TRIBUTARY (THAT IS NOT A TNW) AND ITS ADJACENT WETLANDS (IF ANY):

This section summarizes information regarding characteristics of the tributary and its adjacent wetlands, if any, and it helps determine whether or not the standards for jurisdiction established under *Rapanos* have been met.

The agencies will assert jurisdiction over non-navigable tributaries of TNWs where the tributaries are "relatively permanent waters" (RPWs), i.e. tributaries that typically flow year-round or have continuous flow at least seasonally (e.g., typically 3 months). A wetland that directly abuts an RPW is also jurisdictional. If the aquatic resource is not a TNW, but has year-round (perennial) flow, skip to Section III.D.2. If the aquatic resource is a wetland directly abutting a tributary with perennial flow, skip to Section III.D.4.

A wetland that is adjacent to but that does not directly abut an RPW requires a significant nexus evaluation. Corps districts and EPA regions will include in the record any available information that documents the existence of a significant nexus between a relatively permanent tributary that is not perennial (and its adjacent wetlands if any) and a traditional navigable water, even though a significant nexus finding is not required as a matter of law.

If the waterbody[4] is not an RPW, or a wetland directly abutting an RPW, a JD will require additional data to determine if the waterbody has a significant nexus with a TNW. If the tributary has adjacent wetlands, the significant nexus evaluation must consider the tributary in combination with all of its adjacent wetlands. This significant nexus evaluation that combines, for analytical purposes, the tributary and all of its adjacent wetlands is used whether the review area identified in the JD request is the tributary, or its adjacent wetlands, or both. If the JD covers a tributary with adjacent wetlands, complete Section III.B.1 for the tributary, Section III.B.2 for any onsite wetlands, and Section III.B.3 for all wetlands adjacent to that tributary, both onsite and offsite. The determination whether a significant nexus exists is determined in Section III.C below.

1. Characteristics of non-TNWs that flow directly or indirectly into TNW

   (i) General Area Conditions:
   Watershed size: 1,681 square miles
   Drainage area: 141 acres
   Average annual rainfall: 16 inches
   Average annual snowfall: 0 inches

   (ii) Physical Characteristics:
   (a) Relationship with TNW:
   ☐ Tributary flows directly into TNW.
   ☒ Tributary flows through 4 tributaries before entering TNW.

   Project waters are 30 (or more) river miles from TNW.
   Project waters are 10-15 river miles from RPW.
   Project waters are 30 (or more) aerial (straight) miles from TNW.
   Project waters are 10-15 aerial (straight) miles from RPW.
   Project waters cross or serve as state boundaries. Explain:

   Identify flow route to TNW[5]: Main drainage - East, Lytle Creek, Cajon Creek, Santa Ana River, Pacific Ocean.
   Tributary stream order, if known: 1st.

[4] Note that the Instructional Guidebook contains additional information regarding swales, ditches, washes, and erosional features generally and in the arid West.
[5] Flow route can be described by identifying, e.g., tributary a, which flows through the review area, to flow into tributary b, which then flows into TNW.

(b) General Tributary Characteristics (check all that apply):

Tributary is: ☒ Natural
☐ Artificial (man-made). Explain:
☐ Manipulated (man-altered). Explain:

Tributary properties with respect to top of bank (estimate):
Average width: 4 feet
Average depth: feet
Average side slopes: **2:1.**

Primary tributary substrate composition (check all that apply):

☐ Silts	☒ Sands	☐ Concrete
☒ Cobbles	☐ Gravel	☐ Muck
☐ Bedrock	☒ Vegetation. Type/% cover: 20% willow/mulefat	
☐ Other. Explain:		

Tributary condition/stability [e.g., highly eroding, sloughing banks]. Explain: relatively stable.
Presence of run/riffle/pool complexes. Explain: N/A.
Tributary geometry: **Meandering**
Tributary gradient (approximate average slope): 0-1 %

(c) Flow:
Tributary provides for: **Ephemeral flow**
Estimate average number of flow events in review area/year: **2-5**
Describe flow regime: Only flows during heavy rain events.
Other information on duration and volume: Flows immediately after storm events.

Surface flow is: **Confined.** Characteristics:

Subsurface flow: **Unknown.** Explain findings:
☐ Dye (or other) test performed:

Tributary has (check all that apply):
☒ Bed and banks
☒ OHWM[5] (check all indicators that apply):

☒ clear, natural line impressed on the bank	☒ the presence of litter and debris
☐ changes in the character of soil	☒ destruction of terrestrial vegetation
☒ shelving	☒ the presence of wrack line
☐ vegetation matted down, bent, or absent	☐ sediment sorting
☐ leaf litter disturbed or washed away	☐ scour
☐ sediment deposition	☐ multiple observed or predicted flow events
☐ water staining	☐ abrupt change in plant community
☐ other (list):	

☐ Discontinuous OHWM.[7] Explain:

If factors other than the OHWM were used to determine lateral extent of CWA jurisdiction (check all that apply):

☐ High Tide Line indicated by:	☐ Mean High Water Mark indicated by:
☐ oil or scum line along shore objects	☐ survey to available datum;
☐ fine shell or debris deposits (foreshore)	☐ physical markings;
☐ physical markings/characteristics	☐ vegetation lines/changes in vegetation types.
☐ tidal gauges	
☐ other (list):	

(iii) **Chemical Characteristics:**
Characterize tributary (e.g., water color is clear, discolored, oily film; water quality; general watershed characteristics, etc.).
Explain: Watershed contains some development.
Identify specific pollutants, if known: Hydrocarbons, sediment.

---

[6] A natural or man-made discontinuity in the OHWM does not necessarily sever jurisdiction (e.g., where the stream temporarily flows underground, or where the OHWM has been removed by development or agricultural practices). Where there is a break in the OHWM that is unrelated to the waterbody's flow regime (e.g., flow over a rock outcrop or through a culvert), the agencies will look for indicators of flow above and below the break.
[7] Ibid.

(iv) **Biological Characteristics. Channel supports (check all that apply):**

- ☒ Riparian corridor. Characteristics (type, average width): willow riparian, avg width approx 22 ft.
- ☐ Wetland fringe. Characteristics:
- ☒ Habitat for:
  - ☒ Federally Listed species. Explain findings: least Bell's vireo (Vireo bellii pusillus).
  - ☐ Fish/spawn areas. Explain findings:
  - ☐ Other environmentally-sensitive species. Explain findings:
  - ☐ Aquatic/wildlife diversity. Explain findings:

2. **Characteristics of wetlands adjacent to non-TNW that flow directly or indirectly into TNW**

(i) **Physical Characteristics:**

(a) General Wetland Characteristics:

Properties:

Wetland size: acres

Wetland type. Explain:

Wetland quality. Explain:

Project wetlands cross or serve as state boundaries. Explain:

(b) General Flow Relationship with Non-TNW:

Flow is: **Pick List**. Explain:

Surface flow is: **Pick List**

Characteristics:

Subsurface flow: **Pick List**. Explain findings:

- ☐ Dye (or other) test performed:

(c) Wetland Adjacency Determination with Non-TNW:

- ☐ Directly abutting
- ☐ Not directly abutting
  - ☐ Discrete wetland hydrologic connection. Explain:
  - ☐ Ecological connection. Explain:
  - ☐ Separated by berm/barrier. Explain:

(d) Proximity (Relationship) to TNW

Project wetlands are **Pick List** river miles from TNW.

Project waters are **Pick List** aerial (straight) miles from TNW.

Flow is from: **Pick List.**

Estimate approximate location of wetland as within the **Pick List** floodplain.

(ii) **Chemical Characteristics:**

Characterize wetland system (e.g., water color is clear, brown, oil film on surface; water quality; general watershed characteristics; etc.). Explain:

Identify specific pollutants, if known:

(iii) **Biological Characteristics. Wetland supports (check all that apply):**

- ☐ Riparian buffer. Characteristics (type, average width):
- ☐ Vegetation type/percent cover. Explain:
- ☐ Habitat for:
  - ☐ Federally Listed species. Explain findings:
  - ☐ Fish/spawn areas. Explain findings:
  - ☐ Other environmentally-sensitive species. Explain findings:
  - ☐ Aquatic/wildlife diversity. Explain findings:

3. **Characteristics of all wetlands adjacent to the tributary (if any)**

All wetland(s) being considered in the cumulative analysis: **Pick List**

Approximately ( ) acres in total are being considered in the cumulative analysis.

For each wetland, specify the following:

Directly abuts? (Y/N)	Size (in acres)	Directly abuts? (Y/N)	Size (in acres)

Summarize overall biological, chemical and physical functions being performed:

C. SIGNIFICANT NEXUS DETERMINATION

A significant nexus analysis will assess the flow characteristics and functions of the tributary itself and the functions performed by any wetlands adjacent to the tributary to determine if they significantly affect the chemical, physical, and biological integrity of a TNW. For each of the following situations, a significant nexus exists if the tributary, in combination with all of its adjacent wetlands, has more than a speculative or insubstantial effect on the chemical, physical and/or biological integrity of a TNW. Considerations when evaluating significant nexus include, but are not limited to the volume, duration, and frequency of the flow of water in the tributary and its proximity to a TNW, and the functions performed by the tributary and all its adjacent wetlands. It is not appropriate to determine significant nexus based solely on any specific threshold of distance (e.g. between a tributary and its adjacent wetland or between a tributary and the TNW). Similarly, the fact an adjacent wetland lies within or outside of a floodplain is not solely determinative of significant nexus.

Draw connections between the features documented and the effects on the TNW, as identified in the *Rapanos* Guidance and discussed in the Instructional Guidebook. Factors to consider include, for example:

- Does the tributary, in combination with its adjacent wetlands (if any), have the capacity to carry pollutants or flood waters to TNWs, or to reduce the amount of pollutants or flood waters reaching a TNW?
- Does the tributary, in combination with its adjacent wetlands (if any), provide habitat and lifecycle support functions for fish and other species, such as feeding, nesting, spawning, or rearing young for species that are present in the TNW?
- Does the tributary, in combination with its adjacent wetlands (if any), have the capacity to transfer nutrients and organic carbon that support downstream foodwebs?
- Does the tributary, in combination with its adjacent wetlands (if any), have other relationships to the physical, chemical, or biological integrity of the TNW?

Note: the above list of considerations is not inclusive and other functions observed or known to occur should be documented below:

1. **Significant nexus findings for non-RPW that has no adjacent wetlands and flows directly or indirectly into TNWs.** Explain findings of presence or absence of significant nexus below, based on the tributary itself, then go to Section III.D:Please see Jurisdictional Delineation repot for significant nexus evaluation.

2. **Significant nexus findings for non-RPW and its adjacent wetlands, where the non-RPW flows directly or indirectly into TNWs.** Explain findings of presence or absence of significant nexus below, based on the tributary in combination with all of its adjacent wetlands, then go to Section III.D:

3. **Significant nexus findings for wetlands adjacent to an RPW but that do not directly abut the RPW.** Explain findings of presence or absence of significant nexus below, based on the tributary in combination with all of its adjacent wetlands, then go to Section III.D:

D. DETERMINATIONS OF JURISDICTIONAL FINDINGS. THE SUBJECT WATERS/WETLANDS ARE (CHECK ALL THAT APPLY):

1. **TNWs and Adjacent Wetlands.** Check all that apply and provide size estimates in review area:
   - ☐ TNWs: linear feet width (ft), Or, acres.
   - ☐ Wetlands adjacent to TNWs: acres.

2. **RPWs that flow directly or indirectly into TNWs.**
   - ☐ Tributaries of TNWs where tributaries typically flow year-round are jurisdictional. Provide data and rationale indicating that tributary is perennial:
   - ☐ Tributaries of TNW where tributaries have continuous flow "seasonally" (e.g., typically three months each year) are jurisdictional. Data supporting this conclusion is provided at Section III.B. Provide rationale indicating that tributary flows seasonally:

Provide estimates for jurisdictional waters in the review area (check all that apply):
- ☐ Tributary waters: linear feet width (ft).
- ☐ Other non-wetland waters: acres.
  Identify type(s) of waters: .

3. **Non-RPWs[8] that flow directly or indirectly into TNWs.**
   - ☒ Waterbody that is not a TNW or an RPW, but flows directly or indirectly into a TNW, and it has a significant nexus with a TNW is jurisdictional. Data supporting this conclusion is provided at Section III.C.

   Provide estimates for jurisdictional waters within the review area (check all that apply):
   - ☒ Tributary waters: 336 linear feet 4 width (ft).
   - ☐ Other non-wetland waters: acres.
     Identify type(s) of waters: .

4. **Wetlands directly abutting an RPW that flow directly or indirectly into TNWs.**
   - ☐ Wetlands directly abut RPW and thus are jurisdictional as adjacent wetlands.
     - ☐ Wetlands directly abutting an RPW where tributaries typically flow year-round. Provide data and rationale indicating that tributary is perennial in Section III.D.2, above. Provide rationale indicating that wetland is directly abutting an RPW: .
     - ☐ Wetlands directly abutting an RPW where tributaries typically flow "seasonally." Provide data indicating that tributary is seasonal in Section III.B and rationale in Section III.D.2, above. Provide rationale indicating that wetland is directly abutting an RPW: .

   Provide acreage estimates for jurisdictional wetlands in the review area: acres.

5. **Wetlands adjacent to but not directly abutting an RPW that flow directly or indirectly into TNWs.**
   - ☐ Wetlands that do not directly abut an RPW, but when considered in combination with the tributary to which they are adjacent and with similarly situated adjacent wetlands, have a significant nexus with a TNW are jurisidictional. Data supporting this conclusion is provided at Section III.C.

   Provide acreage estimates for jurisdictional wetlands in the review area: acres.

6. **Wetlands adjacent to non-RPWs that flow directly or indirectly into TNWs.**
   - ☐ Wetlands adjacent to such waters, and have when considered in combination with the tributary to which they are adjacent and with similarly situated adjacent wetlands, have a significant nexus with a TNW are jurisdictional. Data supporting this conclusion is provided at Section III.C.

   Provide estimates for jurisdictional wetlands in the review area: acres.

7. **Impoundments of jurisdictional waters.[9]**
   As a general rule, the impoundment of a jurisdictional tributary remains jurisdictional.
   - ☐ Demonstrate that impoundment was created from "waters of the U.S.," or
   - ☐ Demonstrate that water meets the criteria for one of the categories presented above (1-6), or
   - ☐ Demonstrate that water is isolated with a nexus to commerce (see E below).

E. **ISOLATED [INTERSTATE OR INTRA-STATE] WATERS, INCLUDING ISOLATED WETLANDS, THE USE, DEGRADATION OR DESTRUCTION OF WHICH COULD AFFECT INTERSTATE COMMERCE, INCLUDING ANY SUCH WATERS (CHECK ALL THAT APPLY):[10]**
- ☐ which are or could be used by interstate or foreign travelers for recreational or other purposes.
- ☐ from which fish or shellfish are or could be taken and sold in interstate or foreign commerce.
- ☐ which are or could be used for industrial purposes by industries in interstate commerce.
- ☐ Interstate isolated waters. Explain: .
- ☐ Other factors. Explain: .

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[8] See Footnote # 3.
[9] To complete the analysis refer to the key in Section III.D.6 of the Instructional Guidebook.
[10] **Prior to asserting or declining CWA jurisdiction based solely on this category, Corps Districts will elevate the action to Corps and EPA HQ for review consistent with the process described in the Corps/EPA *Memorandum Regarding CWA Act Jurisdiction Following Rapanos.***

Identify water body and summarize rationale supporting determination:

Provide estimates for jurisdictional waters in the review area (check all that apply):
- ☐ Tributary waters: linear feet width (ft).
- ☐ Other non-wetland waters: acres.
  - Identify type(s) of waters:
- ☐ Wetlands: acres.

F. NON-JURISDICTIONAL WATERS, INCLUDING WETLANDS (CHECK ALL THAT APPLY):
- ☐ If potential wetlands were assessed within the review area, these areas did not meet the criteria in the 1987 Corps of Engineers Wetland Delineation Manual and/or appropriate Regional Supplements.
- ☐ Review area included isolated waters with no substantial nexus to interstate (or foreign) commerce.
  - ☐ Prior to the Jan 2001 Supreme Court decision in "*SWANCC*," the review area would have been regulated based solely on the "Migratory Bird Rule" (MBR).
- ☐ Waters do not meet the "Significant Nexus" standard, where such a finding is required for jurisdiction. Explain:
- ☐ Other: (explain, if not covered above):

Provide acreage estimates for non-jurisdictional waters in the review area, where the sole potential basis of jurisdiction is the MBR factors (i.e., presence of migratory birds, presence of endangered species, use of water for irrigated agriculture), using best professional judgment (check all that apply):
- ☐ Non-wetland waters (i.e., rivers, streams): linear feet width (ft).
- ☐ Lakes/ponds: acres.
- ☐ Other non-wetland waters: acres. List type of aquatic resource:
- ☐ Wetlands: acres.

Provide acreage estimates for non-jurisdictional waters in the review area that do not meet the "Significant Nexus" standard, where such a finding is required for jurisdiction (check all that apply):
- ☐ Non-wetland waters (i.e., rivers, streams): linear feet, width (ft).
- ☐ Lakes/ponds: acres.
- ☐ Other non-wetland waters: acres. List type of aquatic resource:
- ☐ Wetlands: acres.

SECTION IV: DATA SOURCES.

A. SUPPORTING DATA. **Data reviewed for JD (check all that apply** - checked items shall be included in case file and, where checked and requested, appropriately reference sources below):
- ☒ Maps, plans, plots or plat submitted by or on behalf of the applicant/consultant:
- ☒ Data sheets prepared/submitted by or on behalf of the applicant/consultant.
  - ☐ Office concurs with data sheets/delineation report.
  - ☐ Office does not concur with data sheets/delineation report.
- ☐ Data sheets prepared by the Corps:
- ☐ Corps navigable waters' study:
- ☒ U.S. Geological Survey Hydrologic Atlas:
  - ☐ USGS NHD data.
  - ☒ USGS 8 and 12 digit HUC maps.
- ☒ U.S. Geological Survey map(s). Cite scale & quad name:7.5 Minute Devore & San Bernardino North, CA.
- ☒ USDA Natural Resources Conservation Service Soil Survey. Citation:www.websoilsurvey.nrcs.usda.gov/app/WebSoilSurvey.aspx.
- ☒ National wetlands inventory map(s). Cite name:www.wetlandsfws.er.usgs.gov/NWI/index.html.
- ☐ State/Local wetland inventory map(s):
- ☒ FEMA/FIRM maps: 06071C7910F: Zone X - Areas determined to be outside of 500-year floodplain.
- ☒ 100-year Floodplain Elevation is: Approximate elevation is 2,000 feet above Mean Sea Level (National Geodectic Vertical Datum of 1929)
- ☒ Photographs: ☒ Aerial (Name & Date): Google Earth 2007.
  or ☒ Other (Name & Date): Site Photographs 12/03/06.
- ☐ Previous determination(s). File no. and date of response letter:
- ☐ Applicable/supporting case law:
- ☐ Applicable/supporting scientific literature:
- ☐ Other information (please specify):

B. ADDITIONAL COMMENTS TO SUPPORT JD:

APPROVED JURISDICTIONAL DETERMINATION FORM
U.S. Army Corps of Engineers

This form should be completed by following the instructions provided in Section IV of the JD Form Instructional Guidebook.

SECTION I: BACKGROUND INFORMATION

A. REPORT COMPLETION DATE FOR APPROVED JURISDICTIONAL DETERMINATION (JD):

B. DISTRICT OFFICE, FILE NAME, AND NUMBER:

C. PROJECT LOCATION AND BACKGROUND INFORMATION: Main drainage - East (gasline off site)
State: California County/parish/borough: San Bernardino City: Rialto and Unincorporated Areas
Center coordinates of site (lat/long in degree decimal format): Lat. 34.2025° N, Long. 117.4228° W.
Universal Transverse Mercator:
Name of nearest waterbody: Lytle Creek
Name of nearest Traditional Navigable Water (TNW) into which the aquatic resource flows: Pacific Ocean
Name of watershed or Hydrologic Unit Code (HUC): 18070203
- ☒ Check if map/diagram of review area and/or potential jurisdictional areas is/are available upon request.
- ☐ Check if other sites (e.g., offsite mitigation sites, disposal sites, etc…) are associated with this action and are recorded on a different JD form.

D. REVIEW PERFORMED FOR SITE EVALUATION (CHECK ALL THAT APPLY):
- ☐ Office (Desk) Determination. Date:
- ☐ Field Determination. Date(s):

SECTION II: SUMMARY OF FINDINGS

A. RHA SECTION 10 DETERMINATION OF JURISDICTION.

There **Are no** "*navigable waters of the U.S.*" within Rivers and Harbors Act (RHA) jurisdiction (as defined by 33 CFR part 329) in the review area. [*Required*]
- ☐ Waters subject to the ebb and flow of the tide.
- ☐ Waters are presently used, or have been used in the past, or may be susceptible for use to transport interstate or foreign commerce. Explain: .

B. CWA SECTION 404 DETERMINATION OF JURISDICTION.

There **Are** "*waters of the U.S.*" within Clean Water Act (CWA) jurisdiction (as defined by 33 CFR part 328) in the review area. [*Required*]

1. **Waters of the U.S.**
   a. **Indicate presence of waters of U.S. in review area (check all that apply):** [1]
   - ☐ TNWs, including territorial seas
   - ☐ Wetlands adjacent to TNWs
   - ☐ Relatively permanent waters[2] (RPWs) that flow directly or indirectly into TNWs
   - ☒ Non-RPWs that flow directly or indirectly into TNWs
   - ☐ Wetlands directly abutting RPWs that flow directly or indirectly into TNWs
   - ☐ Wetlands adjacent to but not directly abutting RPWs that flow directly or indirectly into TNWs
   - ☐ Wetlands adjacent to non-RPWs that flow directly or indirectly into TNWs
   - ☐ Impoundments of jurisdictional waters
   - ☐ Isolated (interstate or intrastate) waters, including isolated wetlands

   b. **Identify (estimate) size of waters of the U.S. in the review area:**
   Non-wetland waters: 765 linear feet: width (ft) and/or 0.046 acres.
   Wetlands: acres.

   c. **Limits (boundaries) of jurisdiction** based on: **1987 Delineation Manual**
   Elevation of established OHWM (if known): 2,000 ft.

2. **Non-regulated waters/wetlands (check if applicable):**[3]
   - ☐ Potentially jurisdictional waters and/or wetlands were assessed within the review area and determined to be not jurisdictional. Explain: .

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[1] Boxes checked below shall be supported by completing the appropriate sections in Section III below.
[2] For purposes of this form, an RPW is defined as a tributary that is not a TNW and that typically flows year-round or has continuous flow at least "seasonally" (e.g., typically 3 months).
[3] Supporting documentation is presented in Section III.F.

SECTION III: CWA ANALYSIS

A. TNWs AND WETLANDS ADJACENT TO TNWs

The agencies will assert jurisdiction over TNWs and wetlands adjacent to TNWs. If the aquatic resource is a TNW, complete Section III.A.1 and Section III.D.1. only; if the aquatic resource is a wetland adjacent to a TNW, complete Sections III.A.1 and 2 and Section III.D.1.; otherwise, see Section III.B below.

1. TNW
   Identify TNW:

   Summarize rationale supporting determination:

2. Wetland adjacent to TNW
   Summarize rationale supporting conclusion that wetland is "adjacent":

B. CHARACTERISTICS OF TRIBUTARY (THAT IS NOT A TNW) AND ITS ADJACENT WETLANDS (IF ANY):

This section summarizes information regarding characteristics of the tributary and its adjacent wetlands, if any, and it helps determine whether or not the standards for jurisdiction established under *Rapanos* have been met.

The agencies will assert jurisdiction over non-navigable tributaries of TNWs where the tributaries are "relatively permanent waters" (RPWs), i.e. tributaries that typically flow year-round or have continuous flow at least seasonally (e.g., typically 3 months). A wetland that directly abuts an RPW is also jurisdictional. If the aquatic resource is not a TNW, but has year-round (perennial) flow, skip to Section III.D.2. If the aquatic resource is a wetland directly abutting a tributary with perennial flow, skip to Section III.D.4.

A wetland that is adjacent to but that does not directly abut an RPW requires a significant nexus evaluation. Corps districts and EPA regions will include in the record any available information that documents the existence of a significant nexus between a relatively permanent tributary that is not perennial (and its adjacent wetlands if any) and a traditional navigable water, even though a significant nexus finding is not required as a matter of law.

If the waterbody[4] is not an RPW, or a wetland directly abutting an RPW, a JD will require additional data to determine if the waterbody has a significant nexus with a TNW. If the tributary has adjacent wetlands, the significant nexus evaluation must consider the tributary in combination with all of its adjacent wetlands. This significant nexus evaluation that combines, for analytical purposes, the tributary and all of its adjacent wetlands is used whether the review area identified in the JD request is the tributary, or its adjacent wetlands, or both. If the JD covers a tributary with adjacent wetlands, complete Section III.B.1 for the tributary, Section III.B.2 for any onsite wetlands, and Section III.B.3 for all wetlands adjacent to that tributary, both onsite and offsite. The determination whether a significant nexus exists is determined in Section III.C below.

1. Characteristics of non-TNWs that flow directly or indirectly into TNW

   (i) General Area Conditions:
   Watershed size: 1,681 square miles
   Drainage area: 141 acres
   Average annual rainfall: 16 inches
   Average annual snowfall: 0 inches

   (ii) Physical Characteristics:
   (a) Relationship with TNW:
   ☐ Tributary flows directly into TNW.
   ☒ Tributary flows through 4 tributaries before entering TNW.

   Project waters are 30 (or more) river miles from TNW.
   Project waters are 10-15 river miles from RPW.
   Project waters are 30 (or more) aerial (straight) miles from TNW.
   Project waters are 10-15 aerial (straight) miles from RPW.
   Project waters cross or serve as state boundaries. Explain:

   Identify flow route to TNW[5]: Main drainage-east, Lytle Creek, Cajon Creek, Santa Ana River, Pacific Ocean.
   Tributary stream order, if known: 1st-2nd.

[4] Note that the Instructional Guidebook contains additional information regarding swales, ditches, washes, and erosional features generally and in the arid West.

[5] Flow route can be described by identifying, e.g., tributary a, which flows through the review area, to flow into tributary b, which then flows into TNW.

(b) General Tributary Characteristics (check all that apply):

Tributary is:
- ☒ Natural
- ☐ Artificial (man-made). Explain:
- ☐ Manipulated (man-altered). Explain:

Tributary properties with respect to top of bank (estimate):
Average width: 5 feet
Average depth: feet
Average side slopes: **2:1.**

Primary tributary substrate composition (check all that apply):
- ☐ Silts
- ☒ Sands
- ☐ Concrete
- ☒ Cobbles
- ☐ Gravel
- ☐ Muck
- ☐ Bedrock
- ☒ Vegetation. Type/% cover: 20% willow/mulefat
- ☐ Other. Explain:

Tributary condition/stability [e.g., highly eroding, sloughing banks]. Explain: relatively stable.
Presence of run/riffle/pool complexes. Explain: N/A.
Tributary geometry: **Meandering**
Tributary gradient (approximate average slope): 0-1 %

(c) Flow:
Tributary provides for: **Ephemeral flow**
Estimate average number of flow events in review area/year: **2-5**
Describe flow regime: Only flows during heavy rain events.
Other information on duration and volume: Flows immediately after storm events.

Surface flow is: **Confined.** Characteristics:

Subsurface flow: **Unknown.** Explain findings:
- ☐ Dye (or other) test performed:

Tributary has (check all that apply):
- ☒ Bed and banks
- ☒ OHWM[6] (check all indicators that apply):
  - ☒ clear, natural line impressed on the bank
  - ☐ changes in the character of soil
  - ☒ shelving
  - ☐ vegetation matted down, bent, or absent
  - ☐ leaf litter disturbed or washed away
  - ☐ sediment deposition
  - ☐ water staining
  - ☐ other (list):
  - ☒ the presence of litter and debris
  - ☒ destruction of terrestrial vegetation
  - ☒ the presence of wrack line
  - ☐ sediment sorting
  - ☐ scour
  - ☐ multiple observed or predicted flow events
  - ☐ abrupt change in plant community
- ☐ Discontinuous OHWM.[7] Explain:

If factors other than the OHWM were used to determine lateral extent of CWA jurisdiction (check all that apply):
- ☐ High Tide Line indicated by:
  - ☐ oil or scum line along shore objects
  - ☐ fine shell or debris deposits (foreshore)
  - ☐ physical markings/characteristics
  - ☐ tidal gauges
  - ☐ other (list):
- ☐ Mean High Water Mark indicated by:
  - ☐ survey to available datum;
  - ☐ physical markings;
  - ☐ vegetation lines/changes in vegetation types.

(iii) **Chemical Characteristics:**
Characterize tributary (e.g., water color is clear, discolored, oily film; water quality; general watershed characteristics, etc.).
Explain: Watershed contains some development.
Identify specific pollutants, if known: Hydrocarbons, sediment.

---

[6] A natural or man-made discontinuity in the OHWM does not necessarily sever jurisdiction (e.g., where the stream temporarily flows underground, or where the OHWM has been removed by development or agricultural practices). Where there is a break in the OHWM that is unrelated to the waterbody's flow regime (e.g., flow over a rock outcrop or through a culvert), the agencies will look for indicators of flow above and below the break.
[7] Ibid.

(iv) **Biological Characteristics. Channel supports (check all that apply):**

- ☒ Riparian corridor. Characteristics (type, average width): willow riparian, avg width approx 16 ft.
- ☐ Wetland fringe. Characteristics: .
- ☒ Habitat for:
  - ☒ Federally Listed species. Explain findings: least Bell's vireo (Vireo bellii pusillus).
  - ☐ Fish/spawn areas. Explain findings: .
  - ☐ Other environmentally-sensitive species. Explain findings: .
  - ☐ Aquatic/wildlife diversity. Explain findings: .

2. **Characteristics of wetlands adjacent to non-TNW that flow directly or indirectly into TNW**

(i) **Physical Characteristics:**

(a) General Wetland Characteristics:

Properties:

Wetland size: acres

Wetland type. Explain: .

Wetland quality. Explain: .

Project wetlands cross or serve as state boundaries. Explain: .

(b) General Flow Relationship with Non-TNW:

Flow is: **Pick List**. Explain: .

Surface flow is: **Pick List**

Characteristics: .

Subsurface flow: **Pick List**. Explain findings: .

- ☐ Dye (or other) test performed: .

(c) Wetland Adjacency Determination with Non-TNW:

- ☐ Directly abutting
- ☐ Not directly abutting
  - ☐ Discrete wetland hydrologic connection. Explain: .
  - ☐ Ecological connection. Explain: .
  - ☐ Separated by berm/barrier. Explain: .

(d) Proximity (Relationship) to TNW

Project wetlands are **Pick List** river miles from TNW.

Project waters are **Pick List** aerial (straight) miles from TNW.

Flow is from: **Pick List.**

Estimate approximate location of wetland as within the **Pick List** floodplain.

(ii) **Chemical Characteristics:**

Characterize wetland system (e.g., water color is clear, brown, oil film on surface; water quality; general watershed characteristics; etc.). Explain: .

Identify specific pollutants, if known: .

(iii) **Biological Characteristics. Wetland supports (check all that apply):**

- ☐ Riparian buffer. Characteristics (type, average width): .
- ☐ Vegetation type/percent cover. Explain: .
- ☐ Habitat for:
  - ☐ Federally Listed species. Explain findings: .
  - ☐ Fish/spawn areas. Explain findings: .
  - ☐ Other environmentally-sensitive species. Explain findings: .
  - ☐ Aquatic/wildlife diversity. Explain findings: .

3. **Characteristics of all wetlands adjacent to the tributary (if any)**

All wetland(s) being considered in the cumulative analysis: **Pick List**

Approximately ( ) acres in total are being considered in the cumulative analysis.

For each wetland, specify the following:

Directly abuts? (Y/N)	Size (in acres)	Directly abuts? (Y/N)	Size (in acres)

Summarize overall biological, chemical and physical functions being performed:

C. SIGNIFICANT NEXUS DETERMINATION

A significant nexus analysis will assess the flow characteristics and functions of the tributary itself and the functions performed by any wetlands adjacent to the tributary to determine if they significantly affect the chemical, physical, and biological integrity of a TNW. For each of the following situations, a significant nexus exists if the tributary, in combination with all of its adjacent wetlands, has more than a speculative or insubstantial effect on the chemical, physical and/or biological integrity of a TNW. Considerations when evaluating significant nexus include, but are not limited to the volume, duration, and frequency of the flow of water in the tributary and its proximity to a TNW, and the functions performed by the tributary and all its adjacent wetlands. It is not appropriate to determine significant nexus based solely on any specific threshold of distance (e.g. between a tributary and its adjacent wetland or between a tributary and the TNW). Similarly, the fact an adjacent wetland lies within or outside of a floodplain is not solely determinative of significant nexus.

Draw connections between the features documented and the effects on the TNW, as identified in the *Rapanos* Guidance and discussed in the Instructional Guidebook. Factors to consider include, for example:

- Does the tributary, in combination with its adjacent wetlands (if any), have the capacity to carry pollutants or flood waters to TNWs, or to reduce the amount of pollutants or flood waters reaching a TNW?
- Does the tributary, in combination with its adjacent wetlands (if any), provide habitat and lifecycle support functions for fish and other species, such as feeding, nesting, spawning, or rearing young for species that are present in the TNW?
- Does the tributary, in combination with its adjacent wetlands (if any), have the capacity to transfer nutrients and organic carbon that support downstream foodwebs?
- Does the tributary, in combination with its adjacent wetlands (if any), have other relationships to the physical, chemical, or biological integrity of the TNW?

Note: the above list of considerations is not inclusive and other functions observed or known to occur should be documented below:

1. **Significant nexus findings for non-RPW that has no adjacent wetlands and flows directly or indirectly into TNWs.** Explain findings of presence or absence of significant nexus below, based on the tributary itself, then go to Section III.D: Please see Jurisdictional Delineation repot for significant nexus evaluation.

2. **Significant nexus findings for non-RPW and its adjacent wetlands, where the non-RPW flows directly or indirectly into TNWs.** Explain findings of presence or absence of significant nexus below, based on the tributary in combination with all of its adjacent wetlands, then go to Section III.D:

3. **Significant nexus findings for wetlands adjacent to an RPW but that do not directly abut the RPW.** Explain findings of presence or absence of significant nexus below, based on the tributary in combination with all of its adjacent wetlands, then go to Section III.D:

D. DETERMINATIONS OF JURISDICTIONAL FINDINGS. THE SUBJECT WATERS/WETLANDS ARE (CHECK ALL THAT APPLY):

1. **TNWs and Adjacent Wetlands.** Check all that apply and provide size estimates in review area:
   - ☐ TNWs: linear feet width (ft), Or, acres.
   - ☐ Wetlands adjacent to TNWs: acres.

2. **RPWs that flow directly or indirectly into TNWs.**
   - ☐ Tributaries of TNWs where tributaries typically flow year-round are jurisdictional. Provide data and rationale indicating that tributary is perennial:
   - ☐ Tributaries of TNW where tributaries have continuous flow "seasonally" (e.g., typically three months each year) are jurisdictional. Data supporting this conclusion is provided at Section III.B. Provide rationale indicating that tributary flows seasonally:

Provide estimates for jurisdictional waters in the review area (check all that apply):
- ☐ Tributary waters: linear feet width (ft).
- ☐ Other non-wetland waters: acres.
  Identify type(s) of waters: .

3. **Non-RPWs[8] that flow directly or indirectly into TNWs.**
   ☒ Waterbody that is not a TNW or an RPW, but flows directly or indirectly into a TNW, and it has a significant nexus with a TNW is jurisdictional. Data supporting this conclusion is provided at Section III.C.

   Provide estimates for jurisdictional waters within the review area (check all that apply):
   - ☒ Tributary waters: **765** linear feet **5** width (ft).
   - ☐ Other non-wetland waters: acres.
     Identify type(s) of waters: .

4. **Wetlands directly abutting an RPW that flow directly or indirectly into TNWs.**
   ☐ Wetlands directly abut RPW and thus are jurisdictional as adjacent wetlands.
   - ☐ Wetlands directly abutting an RPW where tributaries typically flow year-round. Provide data and rationale indicating that tributary is perennial in Section III.D.2, above. Provide rationale indicating that wetland is directly abutting an RPW: .
   - ☐ Wetlands directly abutting an RPW where tributaries typically flow "seasonally." Provide data indicating that tributary is seasonal in Section III.B and rationale in Section III.D.2, above. Provide rationale indicating that wetland is directly abutting an RPW: .

   Provide acreage estimates for jurisdictional wetlands in the review area: acres.

5. **Wetlands adjacent to but not directly abutting an RPW that flow directly or indirectly into TNWs.**
   ☐ Wetlands that do not directly abut an RPW, but when considered in combination with the tributary to which they are adjacent and with similarly situated adjacent wetlands, have a significant nexus with a TNW are jurisidictional. Data supporting this conclusion is provided at Section III.C.

   Provide acreage estimates for jurisdictional wetlands in the review area: acres.

6. **Wetlands adjacent to non-RPWs that flow directly or indirectly into TNWs.**
   ☐ Wetlands adjacent to such waters, and have when considered in combination with the tributary to which they are adjacent and with similarly situated adjacent wetlands, have a significant nexus with a TNW are jurisdictional. Data supporting this conclusion is provided at Section III.C.

   Provide estimates for jurisdictional wetlands in the review area: acres.

7. **Impoundments of jurisdictional waters.[9]**
   As a general rule, the impoundment of a jurisdictional tributary remains jurisdictional.
   - ☐ Demonstrate that impoundment was created from "waters of the U.S.," or
   - ☐ Demonstrate that water meets the criteria for one of the categories presented above (1-6), or
   - ☐ Demonstrate that water is isolated with a nexus to commerce (see E below).

E. **ISOLATED [INTERSTATE OR INTRA-STATE] WATERS, INCLUDING ISOLATED WETLANDS, THE USE, DEGRADATION OR DESTRUCTION OF WHICH COULD AFFECT INTERSTATE COMMERCE, INCLUDING ANY SUCH WATERS (CHECK ALL THAT APPLY):[10]**
- ☐ which are or could be used by interstate or foreign travelers for recreational or other purposes.
- ☐ from which fish or shellfish are or could be taken and sold in interstate or foreign commerce.
- ☐ which are or could be used for industrial purposes by industries in interstate commerce.
- ☐ Interstate isolated waters. Explain: .
- ☐ Other factors. Explain: .

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[8] See Footnote # 3.
[9] To complete the analysis refer to the key in Section III.D.6 of the Instructional Guidebook.
[10] **Prior to asserting or declining CWA jurisdiction based solely on this category, Corps Districts will elevate the action to Corps and EPA HQ for review consistent with the process described in the Corps/EPA *Memorandum Regarding CWA Act Jurisdiction Following Rapanos*.**

Identify water body and summarize rationale supporting determination:

Provide estimates for jurisdictional waters in the review area (check all that apply):
☐ Tributary waters: linear feet width (ft).
☐ Other non-wetland waters: acres.
Identify type(s) of waters:
☐ Wetlands: acres.

F. NON-JURISDICTIONAL WATERS, INCLUDING WETLANDS (CHECK ALL THAT APPLY):
☐ If potential wetlands were assessed within the review area, these areas did not meet the criteria in the 1987 Corps of Engineers Wetland Delineation Manual and/or appropriate Regional Supplements.
☐ Review area included isolated waters with no substantial nexus to interstate (or foreign) commerce.
☐ Prior to the Jan 2001 Supreme Court decision in "*SWANCC*," the review area would have been regulated based solely on the "Migratory Bird Rule" (MBR).
☐ Waters do not meet the "Significant Nexus" standard, where such a finding is required for jurisdiction. Explain:
☐ Other: (explain, if not covered above):

Provide acreage estimates for non-jurisdictional waters in the review area, where the sole potential basis of jurisdiction is the MBR factors (i.e., presence of migratory birds, presence of endangered species, use of water for irrigated agriculture), using best professional judgment (check all that apply):
☐ Non-wetland waters (i.e., rivers, streams): linear feet width (ft).
☐ Lakes/ponds: acres.
☐ Other non-wetland waters: acres. List type of aquatic resource:
☐ Wetlands: acres.

Provide acreage estimates for non-jurisdictional waters in the review area that do not meet the "Significant Nexus" standard, where such a finding is required for jurisdiction (check all that apply):
☐ Non-wetland waters (i.e., rivers, streams): linear feet, width (ft).
☐ Lakes/ponds: acres.
☐ Other non-wetland waters: acres. List type of aquatic resource:
☐ Wetlands: acres.

SECTION IV: DATA SOURCES.

A. SUPPORTING DATA. **Data reviewed for JD (check all that apply** - checked items shall be included in case file and, where checked and requested, appropriately reference sources below):
☒ Maps, plans, plots or plat submitted by or on behalf of the applicant/consultant:
☒ Data sheets prepared/submitted by or on behalf of the applicant/consultant.
☐ Office concurs with data sheets/delineation report.
☐ Office does not concur with data sheets/delineation report.
☐ Data sheets prepared by the Corps:
☐ Corps navigable waters' study:
☒ U.S. Geological Survey Hydrologic Atlas:
☐ USGS NHD data.
☒ USGS 8 and 12 digit HUC maps.
☒ U.S. Geological Survey map(s). Cite scale & quad name:7.5 Minute Devore & San Bernardino North, CA.
☒ USDA Natural Resources Conservation Service Soil Survey. Citation:www.websoilsurvey.nrcs.usda.gov/app/WebSoilSurvey.aspx.
☒ National wetlands inventory map(s). Cite name:www.wetlandsfws.er.usgs.gov/NWI/index.html.
☐ State/Local wetland inventory map(s):
☒ FEMA/FIRM maps: 06071C7910F: Zone X - Areas determined to be outside of 500-year floodplain.
☒ 100-year Floodplain Elevation is: Approximate elevation is 2,000 feet above Mean Sea Level (National Geodectic Vertical Datum of 1929)
☒ Photographs: ☒ Aerial (Name & Date): Google Earth 2007.
or ☒ Other (Name & Date): Site Photographs 12/03/06.
☐ Previous determination(s). File no. and date of response letter:
☐ Applicable/supporting case law:
☐ Applicable/supporting scientific literature:
☐ Other information (please specify):

B. ADDITIONAL COMMENTS TO SUPPORT JD:

APPROVED JURISDICTIONAL DETERMINATION FORM
U.S. Army Corps of Engineers

This form should be completed by following the instructions provided in Section IV of the JD Form Instructional Guidebook.

SECTION I: BACKGROUND INFORMATION

A. REPORT COMPLETION DATE FOR APPROVED JURISDICTIONAL DETERMINATION (JD):

B. DISTRICT OFFICE, FILE NAME, AND NUMBER: Lytle Creek - Area II

C. PROJECT LOCATION AND BACKGROUND INFORMATION:
State: California County/parish/borough: San Bernardino City: Rialto and Unincorporated Areas
Center coordinates of site (lat/long in degree decimal format): Lat. 34.2025° N, Long. 117.4228° W.
Universal Transverse Mercator:
Name of nearest waterbody: Lytle Creek
Name of nearest Traditional Navigable Water (TNW) into which the aquatic resource flows: Pacific Ocean
Name of watershed or Hydrologic Unit Code (HUC): 18070203
☒ Check if map/diagram of review area and/or potential jurisdictional areas is/are available upon request.
☐ Check if other sites (e.g., offsite mitigation sites, disposal sites, etc…) are associated with this action and are recorded on a different JD form.

D. REVIEW PERFORMED FOR SITE EVALUATION (CHECK ALL THAT APPLY):
☐ Office (Desk) Determination. Date:
☐ Field Determination. Date(s):

SECTION II: SUMMARY OF FINDINGS

A. RHA SECTION 10 DETERMINATION OF JURISDICTION.

There **Are no** "*navigable waters of the U.S.*" within Rivers and Harbors Act (RHA) jurisdiction (as defined by 33 CFR part 329) in the review area. [*Required*]
☐ Waters subject to the ebb and flow of the tide.
☐ Waters are presently used, or have been used in the past, or may be susceptible for use to transport interstate or foreign commerce.
Explain:

B. CWA SECTION 404 DETERMINATION OF JURISDICTION.

There Are "*waters of the U.S.*" within Clean Water Act (CWA) jurisdiction (as defined by 33 CFR part 328) in the review area. [*Required*]

1. **Waters of the U.S.**
   a. **Indicate presence of waters of U.S. in review area (check all that apply):** [1]
   - ☐ TNWs, including territorial seas
   - ☐ Wetlands adjacent to TNWs
   - ☐ Relatively permanent waters[2] (RPWs) that flow directly or indirectly into TNWs
   - ☒ Non-RPWs that flow directly or indirectly into TNWs
   - ☐ Wetlands directly abutting RPWs that flow directly or indirectly into TNWs
   - ☐ Wetlands adjacent to but not directly abutting RPWs that flow directly or indirectly into TNWs
   - ☐ Wetlands adjacent to non-RPWs that flow directly or indirectly into TNWs
   - ☐ Impoundments of jurisdictional waters
   - ☐ Isolated (interstate or intrastate) waters, including isolated wetlands

   b. **Identify (estimate) size of waters of the U.S. in the review area:**
   Non-wetland waters: 5,856 linear feet: width (ft) and/or 18.9 acres.
   Wetlands: acres.

   c. **Limits (boundaries) of jurisdiction** based on: **1987 Delineation Manual**
   Elevation of established OHWM (if known): 1,500 ft.

2. **Non-regulated waters/wetlands (check if applicable):**[3]
   ☐ Potentially jurisdictional waters and/or wetlands were assessed within the review area and determined to be not jurisdictional.
   Explain:

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[1] Boxes checked below shall be supported by completing the appropriate sections in Section III below.
[2] For purposes of this form, an RPW is defined as a tributary that is not a TNW and that typically flows year-round or has continuous flow at least "seasonally" (e.g., typically 3 months).
[3] Supporting documentation is presented in Section III.F.

SECTION III: CWA ANALYSIS

A. TNWs AND WETLANDS ADJACENT TO TNWs

The agencies will assert jurisdiction over TNWs and wetlands adjacent to TNWs. If the aquatic resource is a TNW, complete Section III.A.1 and Section III.D.1. only; if the aquatic resource is a wetland adjacent to a TNW, complete Sections III.A.1 and 2 and Section III.D.1.; otherwise, see Section III.B below.

1. TNW
   Identify TNW:

   Summarize rationale supporting determination:

2. Wetland adjacent to TNW
   Summarize rationale supporting conclusion that wetland is "adjacent":

B. CHARACTERISTICS OF TRIBUTARY (THAT IS NOT A TNW) AND ITS ADJACENT WETLANDS (IF ANY):

This section summarizes information regarding characteristics of the tributary and its adjacent wetlands, if any, and it helps determine whether or not the standards for jurisdiction established under *Rapanos* have been met.

The agencies will assert jurisdiction over non-navigable tributaries of TNWs where the tributaries are "relatively permanent waters" (RPWs), i.e. tributaries that typically flow year-round or have continuous flow at least seasonally (e.g., typically 3 months). A wetland that directly abuts an RPW is also jurisdictional. If the aquatic resource is not a TNW, but has year-round (perennial) flow, skip to Section III.D.2. If the aquatic resource is a wetland directly abutting a tributary with perennial flow, skip to Section III.D.4.

A wetland that is adjacent to but that does not directly abut an RPW requires a significant nexus evaluation. Corps districts and EPA regions will include in the record any available information that documents the existence of a significant nexus between a relatively permanent tributary that is not perennial (and its adjacent wetlands if any) and a traditional navigable water, even though a significant nexus finding is not required as a matter of law.

If the waterbody[4] is not an RPW, or a wetland directly abutting an RPW, a JD will require additional data to determine if the waterbody has a significant nexus with a TNW. If the tributary has adjacent wetlands, the significant nexus evaluation must consider the tributary in combination with all of its adjacent wetlands. This significant nexus evaluation that combines, for analytical purposes, the tributary and all of its adjacent wetlands is used whether the review area identified in the JD request is the tributary, or its adjacent wetlands, or both. If the JD covers a tributary with adjacent wetlands, complete Section III.B.1 for the tributary, Section III.B.2 for any onsite wetlands, and Section III.B.3 for all wetlands adjacent to that tributary, both onsite and offsite. The determination whether a significant nexus exists is determined in Section III.C below.

1. Characteristics of non-TNWs that flow directly or indirectly into TNW

   (i) General Area Conditions:
   Watershed size: 1,681 square miles
   Drainage area: 38,830 acres
   Average annual rainfall: 16 inches
   Average annual snowfall: 0 inches

   (ii) Physical Characteristics:
   (a) Relationship with TNW:
   ☐ Tributary flows directly into TNW.
   ☒ Tributary flows through 3 tributaries before entering TNW.

   Project waters are 30 (or more) river miles from TNW.
   Project waters are 10-15 river miles from RPW.
   Project waters are 30 (or more) aerial (straight) miles from TNW.
   Project waters are 10-15 aerial (straight) miles from RPW.
   Project waters cross or serve as state boundaries. Explain:

   Identify flow route to TNW[5]: Lytle Creek, Cajon Creek, Santa Ana River, Pacific Ocean.
   Tributary stream order, if known: 2nd-3rd.

[4] Note that the Instructional Guidebook contains additional information regarding swales, ditches, washes, and erosional features generally and in the arid West.
[5] Flow route can be described by identifying, e.g., tributary a, which flows through the review area, to flow into tributary b, which then flows into TNW.

(b) General Tributary Characteristics (check all that apply):

Tributary is: ☒ Natural
☐ Artificial (man-made). Explain:
☐ Manipulated (man-altered). Explain:

Tributary properties with respect to top of bank (estimate):
Average width: 107 feet
Average depth: feet
Average side slopes: **Vertical (1:1 or less).**

Primary tributary substrate composition (check all that apply):
☐ Silts ☒ Sands ☐ Concrete
☒ Cobbles ☐ Gravel ☐ Muck
☐ Bedrock ☒ Vegetation. Type/% cover: Intermittent patches of vegetation associated with the channel bottom include mulefat (Baccharis salicifolia, FACW) and western sycamores (Platanus racemosa, FACW). Vegetation usually associated with the adjacent slopes and terraces, but which also occurs within drainages, includes sage thistle (Salvia carduacea, UPL), croton (Croton californicus, UPL), scalebroom (Lepidospartum squamatum, UPL), wreath plant (Stephanomaria virgata, UPL), ripgut brome (Bromus diandrus, UPL), deerweed (Lotus scoparius, UPL), California sagebrush (Artemisia californica, UPL), yerba santa (Eriodictyon crassifolium, UPL), and mountain-mahogany (Cercocarpus betuloides, UPL).
☐ Other. Explain:

Tributary condition/stability [e.g., highly eroding, sloughing banks]. Explain: eroded.
Presence of run/riffle/pool complexes. Explain: N/A.
Tributary geometry: **Meandering**
Tributary gradient (approximate average slope): 3 %

(c) Flow:
Tributary provides for: **Ephemeral flow**
Estimate average number of flow events in review area/year: **Pick List**
Describe flow regime: Only flows during heavy rain events.
Other information on duration and volume: Flows immediately after storm events.

Surface flow is: **Discrete and confined.** Characteristics:

Subsurface flow: **Unknown**. Explain findings:
☐ Dye (or other) test performed:

Tributary has (check all that apply):
☒ Bed and banks
☒ OHWM[6] (check all indicators that apply):
☒ clear, natural line impressed on the bank
☐ changes in the character of soil
☒ shelving
☐ vegetation matted down, bent, or absent
☐ leaf litter disturbed or washed away
☐ sediment deposition
☐ water staining
☐ other (list):
☒ the presence of litter and debris
☒ destruction of terrestrial vegetation
☒ the presence of wrack line
☐ sediment sorting
☐ scour
☐ multiple observed or predicted flow events
☐ abrupt change in plant community
☐ Discontinuous OHWM.[7] Explain:

If factors other than the OHWM were used to determine lateral extent of CWA jurisdiction (check all that apply):
☐ High Tide Line indicated by:
☐ oil or scum line along shore objects
☐ fine shell or debris deposits (foreshore)
☐ physical markings/characteristics
☐ tidal gauges
☐ other (list):
☐ Mean High Water Mark indicated by:
☐ survey to available datum;
☐ physical markings;
☐ vegetation lines/changes in vegetation types.

(iii) Chemical Characteristics:

[6] A natural or man-made discontinuity in the OHWM does not necessarily sever jurisdiction (e.g., where the stream temporarily flows underground, or where the OHWM has been removed by development or agricultural practices). Where there is a break in the OHWM that is unrelated to the waterbody's flow regime (e.g., flow over a rock outcrop or through a culvert), the agencies will look for indicators of flow above and below the break.
[7] Ibid.

Characterize tributary (e.g., water color is clear, discolored, oily film; water quality; general watershed characteristics, etc.).
Explain: The upper watershed is mostly undisturbed with some development occuring in the lower watershed contributing to pollutants.

Identify specific pollutants, if known: Trash, sediment, hydrocarbons.

(iv) **Biological Characteristics. Channel supports (check all that apply):**

☐ Riparian corridor. Characteristics (type, average width):

☐ Wetland fringe. Characteristics:

☒ Habitat for:

☒ Federally Listed species. Explain findings: least Bell's vireo (Vireo bellii pusillus) and San Bernardino kangaroo rat (Dipodomys merriami parvus) .

☐ Fish/spawn areas. Explain findings:

☐ Other environmentally-sensitive species. Explain findings:

☐ Aquatic/wildlife diversity. Explain findings:

2. **Characteristics of wetlands adjacent to non-TNW that flow directly or indirectly into TNW**

(i) **Physical Characteristics:**

(a) General Wetland Characteristics:

Properties:

Wetland size: acres

Wetland type. Explain:

Wetland quality. Explain:

Project wetlands cross or serve as state boundaries. Explain:

(b) General Flow Relationship with Non-TNW:

Flow is: **Pick List**. Explain:

Surface flow is: **Pick List**

Characteristics:

Subsurface flow: **Pick List**. Explain findings:

☐ Dye (or other) test performed:

(c) Wetland Adjacency Determination with Non-TNW:

☐ Directly abutting

☐ Not directly abutting

☐ Discrete wetland hydrologic connection. Explain:

☐ Ecological connection. Explain:

☐ Separated by berm/barrier. Explain:

(d) Proximity (Relationship) to TNW

Project wetlands are **Pick List** river miles from TNW.

Project waters are **Pick List** aerial (straight) miles from TNW.

Flow is from: **Pick List.**

Estimate approximate location of wetland as within the **Pick List** floodplain.

(ii) **Chemical Characteristics:**

Characterize wetland system (e.g., water color is clear, brown, oil film on surface; water quality; general watershed characteristics; etc.). Explain:

Identify specific pollutants, if known:

(iii) **Biological Characteristics. Wetland supports (check all that apply):**

☐ Riparian buffer. Characteristics (type, average width):

☐ Vegetation type/percent cover. Explain:

☐ Habitat for:

☐ Federally Listed species. Explain findings:

☐ Fish/spawn areas. Explain findings:

☐ Other environmentally-sensitive species. Explain findings:

☐ Aquatic/wildlife diversity. Explain findings:

3. **Characteristics of all wetlands adjacent to the tributary (if any)**

All wetland(s) being considered in the cumulative analysis: **Pick List**

Approximately ( ) acres in total are being considered in the cumulative analysis.

For each wetland, specify the following:

Directly abuts? (Y/N)	Size (in acres)	Directly abuts? (Y/N)	Size (in acres)

Summarize overall biological, chemical and physical functions being performed:

C. SIGNIFICANT NEXUS DETERMINATION

A significant nexus analysis will assess the flow characteristics and functions of the tributary itself and the functions performed by any wetlands adjacent to the tributary to determine if they significantly affect the chemical, physical, and biological integrity of a TNW. For each of the following situations, a significant nexus exists if the tributary, in combination with all of its adjacent wetlands, has more than a speculative or insubstantial effect on the chemical, physical and/or biological integrity of a TNW. Considerations when evaluating significant nexus include, but are not limited to the volume, duration, and frequency of the flow of water in the tributary and its proximity to a TNW, and the functions performed by the tributary and all its adjacent wetlands. It is not appropriate to determine significant nexus based solely on any specific threshold of distance (e.g. between a tributary and its adjacent wetland or between a tributary and the TNW). Similarly, the fact an adjacent wetland lies within or outside of a floodplain is not solely determinative of significant nexus.

Draw connections between the features documented and the effects on the TNW, as identified in the *Rapanos* Guidance and discussed in the Instructional Guidebook. Factors to consider include, for example:

- Does the tributary, in combination with its adjacent wetlands (if any), have the capacity to carry pollutants or flood waters to TNWs, or to reduce the amount of pollutants or flood waters reaching a TNW?
- Does the tributary, in combination with its adjacent wetlands (if any), provide habitat and lifecycle support functions for fish and other species, such as feeding, nesting, spawning, or rearing young for species that are present in the TNW?
- Does the tributary, in combination with its adjacent wetlands (if any), have the capacity to transfer nutrients and organic carbon that support downstream foodwebs?
- Does the tributary, in combination with its adjacent wetlands (if any), have other relationships to the physical, chemical, or biological integrity of the TNW?

Note: the above list of considerations is not inclusive and other functions observed or known to occur should be documented below:

1. **Significant nexus findings for non-RPW that has no adjacent wetlands and flows directly or indirectly into TNWs.** Explain findings of presence or absence of significant nexus below, based on the tributary itself, then go to Section III.D:Please see Jurisdictional Delineation repot for significant nexus evaluation.

2. **Significant nexus findings for non-RPW and its adjacent wetlands, where the non-RPW flows directly or indirectly into TNWs.** Explain findings of presence or absence of significant nexus below, based on the tributary in combination with all of its adjacent wetlands, then go to Section III.D:

3. **Significant nexus findings for wetlands adjacent to an RPW but that do not directly abut the RPW.** Explain findings of presence or absence of significant nexus below, based on the tributary in combination with all of its adjacent wetlands, then go to Section III.D:

D. DETERMINATIONS OF JURISDICTIONAL FINDINGS. THE SUBJECT WATERS/WETLANDS ARE (CHECK ALL THAT APPLY):

1. **TNWs and Adjacent Wetlands.** Check all that apply and provide size estimates in review area:
   - ☐ TNWs: linear feet width (ft), Or, acres.
   - ☐ Wetlands adjacent to TNWs: acres.

2. **RPWs that flow directly or indirectly into TNWs.**
   - ☐ Tributaries of TNWs where tributaries typically flow year-round are jurisdictional. Provide data and rationale indicating that tributary is perennial:
   - ☐ Tributaries of TNW where tributaries have continuous flow "seasonally" (e.g., typically three months each year) are jurisdictional. Data supporting this conclusion is provided at Section III.B. Provide rationale indicating that tributary flows seasonally:

Provide estimates for jurisdictional waters in the review area (check all that apply):
- ☐ Tributary waters: linear feet width (ft).
- ☐ Other non-wetland waters: acres.
  - Identify type(s) of waters: .

3. **Non-RPWs[8] that flow directly or indirectly into TNWs.**
   - ☒ Waterbody that is not a TNW or an RPW, but flows directly or indirectly into a TNW, and it has a significant nexus with a TNW is jurisdictional. Data supporting this conclusion is provided at Section III.C.

Provide estimates for jurisdictional waters within the review area (check all that apply):
- ☒ Tributary waters: **5,856** linear feet **107** width (ft).
- ☐ Other non-wetland waters: acres.
  - Identify type(s) of waters: .

4. **Wetlands directly abutting an RPW that flow directly or indirectly into TNWs.**
   - ☐ Wetlands directly abut RPW and thus are jurisdictional as adjacent wetlands.
     - ☐ Wetlands directly abutting an RPW where tributaries typically flow year-round. Provide data and rationale indicating that tributary is perennial in Section III.D.2, above. Provide rationale indicating that wetland is directly abutting an RPW: .
     - ☐ Wetlands directly abutting an RPW where tributaries typically flow "seasonally." Provide data indicating that tributary is seasonal in Section III.B and rationale in Section III.D.2, above. Provide rationale indicating that wetland is directly abutting an RPW: .

Provide acreage estimates for jurisdictional wetlands in the review area: acres.

5. **Wetlands adjacent to but not directly abutting an RPW that flow directly or indirectly into TNWs.**
   - ☐ Wetlands that do not directly abut an RPW, but when considered in combination with the tributary to which they are adjacent and with similarly situated adjacent wetlands, have a significant nexus with a TNW are jurisidictional. Data supporting this conclusion is provided at Section III.C.

Provide acreage estimates for jurisdictional wetlands in the review area: acres.

6. **Wetlands adjacent to non-RPWs that flow directly or indirectly into TNWs.**
   - ☐ Wetlands adjacent to such waters, and have when considered in combination with the tributary to which they are adjacent and with similarly situated adjacent wetlands, have a significant nexus with a TNW are jurisdictional. Data supporting this conclusion is provided at Section III.C.

Provide estimates for jurisdictional wetlands in the review area: acres.

7. **Impoundments of jurisdictional waters.[9]**
   As a general rule, the impoundment of a jurisdictional tributary remains jurisdictional.
   - ☐ Demonstrate that impoundment was created from "waters of the U.S.," or
   - ☐ Demonstrate that water meets the criteria for one of the categories presented above (1-6), or
   - ☐ Demonstrate that water is isolated with a nexus to commerce (see E below).

E. ISOLATED [INTERSTATE OR INTRA-STATE] WATERS, INCLUDING ISOLATED WETLANDS, THE USE, DEGRADATION OR DESTRUCTION OF WHICH COULD AFFECT INTERSTATE COMMERCE, INCLUDING ANY SUCH WATERS (CHECK ALL THAT APPLY):[10]
- ☐ which are or could be used by interstate or foreign travelers for recreational or other purposes.
- ☐ from which fish or shellfish are or could be taken and sold in interstate or foreign commerce.
- ☐ which are or could be used for industrial purposes by industries in interstate commerce.
- ☐ Interstate isolated waters. Explain: .
- ☐ Other factors. Explain: .

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[8] See Footnote # 3.
[9] To complete the analysis refer to the key in Section III.D.6 of the Instructional Guidebook.
[10] **Prior to asserting or declining CWA jurisdiction based solely on this category, Corps Districts will elevate the action to Corps and EPA HQ for review consistent with the process described in the Corps/EPA *Memorandum Regarding CWA Act Jurisdiction Following Rapanos.***

Identify water body and summarize rationale supporting determination:

Provide estimates for jurisdictional waters in the review area (check all that apply):
- ☐ Tributary waters: linear feet width (ft).
- ☐ Other non-wetland waters: acres.
  - Identify type(s) of waters:
- ☐ Wetlands: acres.

F. NON-JURISDICTIONAL WATERS, INCLUDING WETLANDS (CHECK ALL THAT APPLY):
- ☐ If potential wetlands were assessed within the review area, these areas did not meet the criteria in the 1987 Corps of Engineers Wetland Delineation Manual and/or appropriate Regional Supplements.
- ☐ Review area included isolated waters with no substantial nexus to interstate (or foreign) commerce.
  - ☐ Prior to the Jan 2001 Supreme Court decision in "*SWANCC*," the review area would have been regulated based solely on the "Migratory Bird Rule" (MBR).
- ☐ Waters do not meet the "Significant Nexus" standard, where such a finding is required for jurisdiction. Explain:
- ☐ Other: (explain, if not covered above):

Provide acreage estimates for non-jurisdictional waters in the review area, where the sole potential basis of jurisdiction is the MBR factors (i.e., presence of migratory birds, presence of endangered species, use of water for irrigated agriculture), using best professional judgment (check all that apply):
- ☐ Non-wetland waters (i.e., rivers, streams): linear feet width (ft).
- ☐ Lakes/ponds: -acres.
- ☐ Other non-wetland waters: acres. List type of aquatic resource:
- ☐ Wetlands: acres.

Provide acreage estimates for non-jurisdictional waters in the review area that do not meet the "Significant Nexus" standard, where such a finding is required for jurisdiction (check all that apply):
- ☐ Non-wetland waters (i.e., rivers, streams): linear feet, width (ft).
- ☐ Lakes/ponds: acres.
- ☐ Other non-wetland waters: acres. List type of aquatic resource:
- ☐ Wetlands: acres.

SECTION IV: DATA SOURCES.

A. SUPPORTING DATA. **Data reviewed for JD (check all that apply** - checked items shall be included in case file and, where checked and requested, appropriately reference sources below):
- ☒ Maps, plans, plots or plat submitted by or on behalf of the applicant/consultant:
- ☒ Data sheets prepared/submitted by or on behalf of the applicant/consultant.
  - ☐ Office concurs with data sheets/delineation report.
  - ☐ Office does not concur with data sheets/delineation report.
- ☐ Data sheets prepared by the Corps:
- ☐ Corps navigable waters' study:
- ☒ U.S. Geological Survey Hydrologic Atlas:
  - ☐ USGS NHD data.
  - ☒ USGS 8 and 12 digit HUC maps.
- ☒ U.S. Geological Survey map(s). Cite scale & quad name:7.5 Minute Devore & San Bernardino North, CA.
- ☒ USDA Natural Resources Conservation Service Soil Survey. Citation:www.websoilsurvey.nrcs.usda.gov/app/WebSoilSurvey.aspx.
- ☒ National wetlands inventory map(s). Cite name:www.wetlandsfws.er.usgs.gov/NWI/index.html.
- ☐ State/Local wetland inventory map(s):
- ☒ FEMA/FIRM maps: 06071C7940F; 06071C7910F; 06071C7905F; 06071C7920F.
- ☒ 100-year Floodplain Elevation is: approximately 1,500 feet above mean sea level (National Geodectic Vertical Datum of 1929)
- ☒ Photographs: ☒ Aerial (Name & Date): Google Earth 2007.
  - or ☒ Other (Name & Date): Site Photographs 12/03/06.
- ☐ Previous determination(s). File no. and date of response letter:
- ☐ Applicable/supporting case law:
- ☐ Applicable/supporting scientific literature:
- ☐ Other information (please specify):

B. ADDITIONAL COMMENTS TO SUPPORT JD:

APPROVED JURISDICTIONAL DETERMINATION FORM
U.S. Army Corps of Engineers

This form should be completed by following the instructions provided in Section IV of the JD Form Instructional Guidebook.

SECTION I: BACKGROUND INFORMATION

A. REPORT COMPLETION DATE FOR APPROVED JURISDICTIONAL DETERMINATION (JD):

B. DISTRICT OFFICE, FILE NAME, AND NUMBER:

C. PROJECT LOCATION AND BACKGROUND INFORMATION: Main drainage - East (off-site)
State: California County/parish/borough: San Bernardino City: Rialto and Unincorporated Areas
Center coordinates of site (lat/long in degree decimal format): Lat. 34.2025° N, Long. 117.4228° W.
Universal Transverse Mercator:
Name of nearest waterbody: Lytle Creek
Name of nearest Traditional Navigable Water (TNW) into which the aquatic resource flows: Pacific Ocean
Name of watershed or Hydrologic Unit Code (HUC): 18070203
- ☒ Check if map/diagram of review area and/or potential jurisdictional areas is/are available upon request.
- ☐ Check if other sites (e.g., offsite mitigation sites, disposal sites, etc…) are associated with this action and are recorded on a different JD form.

D. REVIEW PERFORMED FOR SITE EVALUATION (CHECK ALL THAT APPLY):
- ☐ Office (Desk) Determination. Date:
- ☐ Field Determination. Date(s):

SECTION II: SUMMARY OF FINDINGS

A. RHA SECTION 10 DETERMINATION OF JURISDICTION.

There **Are no** "*navigable waters of the U.S.*" within Rivers and Harbors Act (RHA) jurisdiction (as defined by 33 CFR part 329) in the review area. [*Required*]
- ☐ Waters subject to the ebb and flow of the tide.
- ☐ Waters are presently used, or have been used in the past, or may be susceptible for use to transport interstate or foreign commerce. Explain:

B. CWA SECTION 404 DETERMINATION OF JURISDICTION.

There **Are** "*waters of the U.S.*" within Clean Water Act (CWA) jurisdiction (as defined by 33 CFR part 328) in the review area. [*Required*]

1. **Waters of the U.S.**
   a. **Indicate presence of waters of U.S. in review area (check all that apply):** [1]
   - ☐ TNWs, including territorial seas
   - ☐ Wetlands adjacent to TNWs
   - ☐ Relatively permanent waters[2] (RPWs) that flow directly or indirectly into TNWs
   - ☒ Non-RPWs that flow directly or indirectly into TNWs
   - ☐ Wetlands directly abutting RPWs that flow directly or indirectly into TNWs
   - ☐ Wetlands adjacent to but not directly abutting RPWs that flow directly or indirectly into TNWs
   - ☐ Wetlands adjacent to non-RPWs that flow directly or indirectly into TNWs
   - ☐ Impoundments of jurisdictional waters
   - ☐ Isolated (interstate or intrastate) waters, including isolated wetlands

   b. **Identify (estimate) size of waters of the U.S. in the review area:**
   Non-wetland waters: 4,908 linear feet: width (ft) and/or 0.37 acres.
   Wetlands: 0.39 acres.

   c. **Limits (boundaries) of jurisdiction** based on: **1987 Delineation Manual**
   Elevation of established OHWM (if known): 2,000 ft.

2. **Non-regulated waters/wetlands (check if applicable):**[3]
   - ☐ Potentially jurisdictional waters and/or wetlands were assessed within the review area and determined to be not jurisdictional. Explain:

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[1] Boxes checked below shall be supported by completing the appropriate sections in Section III below.
[2] For purposes of this form, an RPW is defined as a tributary that is not a TNW and that typically flows year-round or has continuous flow at least "seasonally" (e.g., typically 3 months).
[3] Supporting documentation is presented in Section III.F.

SECTION III: CWA ANALYSIS

A. TNWs AND WETLANDS ADJACENT TO TNWs

The agencies will assert jurisdiction over TNWs and wetlands adjacent to TNWs. If the aquatic resource is a TNW, complete Section III.A.1 and Section III.D.1. only; if the aquatic resource is a wetland adjacent to a TNW, complete Sections III.A.1 and 2 and Section III.D.1.; otherwise, see Section III.B below.

1. TNW
   Identify TNW:

   Summarize rationale supporting determination:

2. Wetland adjacent to TNW
   Summarize rationale supporting conclusion that wetland is "adjacent":

B. CHARACTERISTICS OF TRIBUTARY (THAT IS NOT A TNW) AND ITS ADJACENT WETLANDS (IF ANY):

This section summarizes information regarding characteristics of the tributary and its adjacent wetlands, if any, and it helps determine whether or not the standards for jurisdiction established under *Rapanos* have been met.

The agencies will assert jurisdiction over non-navigable tributaries of TNWs where the tributaries are "relatively permanent waters" (RPWs), i.e. tributaries that typically flow year-round or have continuous flow at least seasonally (e.g., typically 3 months). A wetland that directly abuts an RPW is also jurisdictional. If the aquatic resource is not a TNW, but has year-round (perennial) flow, skip to Section III.D.2. If the aquatic resource is a wetland directly abutting a tributary with perennial flow, skip to Section III.D.4.

A wetland that is adjacent to but that does not directly abut an RPW requires a significant nexus evaluation. Corps districts and EPA regions will include in the record any available information that documents the existence of a significant nexus between a relatively permanent tributary that is not perennial (and its adjacent wetlands if any) and a traditional navigable water, even though a significant nexus finding is not required as a matter of law.

If the waterbody[4] is not an RPW, or a wetland directly abutting an RPW, a JD will require additional data to determine if the waterbody has a significant nexus with a TNW. If the tributary has adjacent wetlands, the significant nexus evaluation must consider the tributary in combination with all of its adjacent wetlands. This significant nexus evaluation that combines, for analytical purposes, the tributary and all of its adjacent wetlands is used whether the review area identified in the JD request is the tributary, or its adjacent wetlands, or both. If the JD covers a tributary with adjacent wetlands, complete Section III.B.1 for the tributary, Section III.B.2 for any onsite wetlands, and Section III.B.3 for all wetlands adjacent to that tributary, both onsite and offsite. The determination whether a significant nexus exists is determined in Section III.C below.

1. Characteristics of non-TNWs that flow directly or indirectly into TNW

   (i) General Area Conditions:
   Watershed size: 1,681 square miles
   Drainage area: 141 acres
   Average annual rainfall: 16 inches
   Average annual snowfall: 0 inches

   (ii) Physical Characteristics:
   (a) Relationship with TNW:
   ☐ Tributary flows directly into TNW.
   ☒ Tributary flows through 4 tributaries before entering TNW.

   Project waters are 30 (or more) river miles from TNW.
   Project waters are 10-15 river miles from RPW.
   Project waters are 30 (or more) aerial (straight) miles from TNW.
   Project waters are 10-15 aerial (straight) miles from RPW.
   Project waters cross or serve as state boundaries. Explain:

   Identify flow route to TNW[5]: Main drainage - East, Lytle Creek, Cajon Creek, Santa Ana River, Pacific Ocean.
   Tributary stream order, if known: 1st.

[4] Note that the Instructional Guidebook contains additional information regarding swales, ditches, washes, and erosional features generally and in the arid West.
[5] Flow route can be described by identifying, e.g., tributary a, which flows through the review area, to flow into tributary b, which then flows into TNW.

(b) General Tributary Characteristics (check all that apply):

Tributary is:
- ☒ Natural
- ☐ Artificial (man-made). Explain:
- ☐ Manipulated (man-altered). Explain:

Tributary properties with respect to top of bank (estimate):
Average width: 4 feet
Average depth: 1 feet
Average side slopes: 2:1.

Primary tributary substrate composition (check all that apply):
- ☐ Silts
- ☒ Cobbles
- ☐ Bedrock
- ☐ Other. Explain:
- ☒ Sands
- ☐ Gravel
- ☒ Vegetation. Type/% cover: 20% willow/mulefat
- ☐ Concrete
- ☐ Muck

Tributary condition/stability [e.g., highly eroding, sloughing banks]. Explain: relatively stable.
Presence of run/riffle/pool complexes. Explain: N/A.
Tributary geometry: **Meandering**
Tributary gradient (approximate average slope): 0-1 %

(c) Flow:
Tributary provides for: **Ephemeral flow**
Estimate average number of flow events in review area/year: **2-5**
Describe flow regime: Only flows during heavy rain events.
Other information on duration and volume: Flows immediately after storm events.

Surface flow is: **Confined.** Characteristics:

Subsurface flow: **Unknown.** Explain findings:
- ☐ Dye (or other) test performed:

Tributary has (check all that apply):
- ☒ Bed and banks
- ☒ OHWM[6] (check all indicators that apply):
  - ☒ clear, natural line impressed on the bank
  - ☐ changes in the character of soil
  - ☒ shelving
  - ☐ vegetation matted down, bent, or absent
  - ☐ leaf litter disturbed or washed away
  - ☐ sediment deposition
  - ☐ water staining
  - ☐ other (list):
  - ☒ the presence of litter and debris
  - ☒ destruction of terrestrial vegetation
  - ☒ the presence of wrack line
  - ☐ sediment sorting
  - ☐ scour
  - ☐ multiple observed or predicted flow events
  - ☐ abrupt change in plant community
- ☐ Discontinuous OHWM.[7] Explain:

If factors other than the OHWM were used to determine lateral extent of CWA jurisdiction (check all that apply):
- ☐ High Tide Line indicated by:
  - ☐ oil or scum line along shore objects
  - ☐ fine shell or debris deposits (foreshore)
  - ☐ physical markings/characteristics
  - ☐ tidal gauges
  - ☐ other (list):
- ☐ Mean High Water Mark indicated by:
  - ☐ survey to available datum;
  - ☐ physical markings;
  - ☐ vegetation lines/changes in vegetation types.

(iii) Chemical Characteristics:
Characterize tributary (e.g., water color is clear, discolored, oily film; water quality; general watershed characteristics, etc.).
Explain: Watershed contains some development.
Identify specific pollutants, if known: Hydrocarbons, sediment.

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[6] A natural or man-made discontinuity in the OHWM does not necessarily sever jurisdiction (e.g., where the stream temporarily flows underground, or where the OHWM has been removed by development or agricultural practices). Where there is a break in the OHWM that is unrelated to the waterbody's flow regime (e.g., flow over a rock outcrop or through a culvert), the agencies will look for indicators of flow above and below the break.
[7] Ibid.

(iv) **Biological Characteristics. Channel supports (check all that apply):**

☒ Riparian corridor. Characteristics (type, average width): willow riparian, avg width approx 110 ft.

☐ Wetland fringe. Characteristics:

☒ Habitat for:

☒ Federally Listed species. Explain findings: least Bell's vireo (Vireo bellii pusillus).

☐ Fish/spawn areas. Explain findings:

☐ Other environmentally-sensitive species. Explain findings:

☐ Aquatic/wildlife diversity. Explain findings:

2. **Characteristics of wetlands adjacent to non-TNW that flow directly or indirectly into TNW**

(i) **Physical Characteristics:**

(a) General Wetland Characteristics:

Properties:

Wetland size: 0.39 acres

Wetland type. Explain: depressional.

Wetland quality. Explain: high quality based on hydrology, vegetative cover and soils.

Project wetlands cross or serve as state boundaries. Explain:

(b) General Flow Relationship with Non-TNW:

Flow is: **Intermittent flow.** Explain: Water is present in the wetlands when the adjacent drainages are dry. Ponded or saturated for more than 16 days during the growing season.

Surface flow is: **Confined**

Characteristics:

Subsurface flow: **Unknown.** Explain findings:

☐ Dye (or other) test performed:

(c) Wetland Adjacency Determination with Non-TNW:

☒ Directly abutting

☐ Not directly abutting

☐ Discrete wetland hydrologic connection. Explain:

☐ Ecological connection. Explain:

☐ Separated by berm/barrier. Explain:

(d) Proximity (Relationship) to TNW

Project wetlands are **30 (or more)** river miles from TNW.

Project waters are **10-15** aerial (straight) miles from TNW.

Flow is from: **Wetland to navigable waters.**

Estimate approximate location of wetland as within the **500-year or greater** floodplain.

(ii) **Chemical Characteristics:**

Characterize wetland system (e.g., water color is clear, brown, oil film on surface; water quality; general watershed characteristics; etc.). Explain: Water is clear and watershed is mostly undeveloped. Nearby paved roads would contribute some pollutants to wetland.

Identify specific pollutants, if known: Hydrocarbons, sediment runoff.

(iii) **Biological Characteristics. Wetland supports (check all that apply):**

☐ Riparian buffer. Characteristics (type, average width):

☒ Vegetation type/percent cover. Explain: 100% cover. mulefat (Baccharis salicifolia, FACW), black willow (Salix goodingii, OBL), arroyo willow (Salix lasiolepis, FACW), slender cat-tail (Typha domingensis, OBL), nutsedge (Cyperus sp.), bulrush (Scirpus californicus, OBL).

☐ Habitat for:

☐ Federally Listed species. Explain findings:

☐ Fish/spawn areas. Explain findings:

☐ Other environmentally-sensitive species. Explain findings:

☐ Aquatic/wildlife diversity. Explain findings:

3. **Characteristics of all wetlands adjacent to the tributary (if any)**

All wetland(s) being considered in the cumulative analysis: 2

Approximately (0.39) acres in total are being considered in the cumulative analysis.

For each wetland, specify the following:

Directly abuts? (Y/N)	Size (in acres)	Directly abuts? (Y/N)	Size (in acres)
Y	0.387		
Y	0.005		

Summarize overall biological, chemical and physical functions being performed: The wetlands are high-functioning based on hydrology, vegetative cover, and soils. Presumably, the wetlands are performing water quality functions and providing biological habitat.

C. SIGNIFICANT NEXUS DETERMINATION

A significant nexus analysis will assess the flow characteristics and functions of the tributary itself and the functions performed by any wetlands adjacent to the tributary to determine if they significantly affect the chemical, physical, and biological integrity of a TNW. For each of the following situations, a significant nexus exists if the tributary, in combination with all of its adjacent wetlands, has more than a speculative or insubstantial effect on the chemical, physical and/or biological integrity of a TNW. Considerations when evaluating significant nexus include, but are not limited to the volume, duration, and frequency of the flow of water in the tributary and its proximity to a TNW, and the functions performed by the tributary and all its adjacent wetlands. It is not appropriate to determine significant nexus based solely on any specific threshold of distance (e.g. between a tributary and its adjacent wetland or between a tributary and the TNW). Similarly, the fact an adjacent wetland lies within or outside of a floodplain is not solely determinative of significant nexus.

Draw connections between the features documented and the effects on the TNW, as identified in the *Rapanos* Guidance and discussed in the Instructional Guidebook. Factors to consider include, for example:

- Does the tributary, in combination with its adjacent wetlands (if any), have the capacity to carry pollutants or flood waters to TNWs, or to reduce the amount of pollutants or flood waters reaching a TNW?
- Does the tributary, in combination with its adjacent wetlands (if any), provide habitat and lifecycle support functions for fish and other species, such as feeding, nesting, spawning, or rearing young for species that are present in the TNW?
- Does the tributary, in combination with its adjacent wetlands (if any), have the capacity to transfer nutrients and organic carbon that support downstream foodwebs?
- Does the tributary, in combination with its adjacent wetlands (if any), have other relationships to the physical, chemical, or biological integrity of the TNW?

Note: the above list of considerations is not inclusive and other functions observed or known to occur should be documented below:

1. **Significant nexus findings for non-RPW that has no adjacent wetlands and flows directly or indirectly into TNWs.** Explain findings of presence or absence of significant nexus below, based on the tributary itself, then go to Section III.D:

2. **Significant nexus findings for non-RPW and its adjacent wetlands, where the non-RPW flows directly or indirectly into TNWs.** Explain findings of presence or absence of significant nexus below, based on the tributary in combination with all of its adjacent wetlands, then go to Section III.D: Please see Jurisdictional Delineation repot for significant nexus evaluation.

3. **Significant nexus findings for wetlands adjacent to an RPW but that do not directly abut the RPW.** Explain findings of presence or absence of significant nexus below, based on the tributary in combination with all of its adjacent wetlands, then go to Section III.D:

D. DETERMINATIONS OF JURISDICTIONAL FINDINGS. THE SUBJECT WATERS/WETLANDS ARE (CHECK ALL THAT APPLY):

1. **TNWs and Adjacent Wetlands.** Check all that apply and provide size estimates in review area:
   - ☐ TNWs: linear feet width (ft), Or, acres.
   - ☐ Wetlands adjacent to TNWs: acres.

2. **RPWs that flow directly or indirectly into TNWs.**
   - ☐ Tributaries of TNWs where tributaries typically flow year-round are jurisdictional. Provide data and rationale indicating that tributary is perennial:

☐ Tributaries of TNW where tributaries have continuous flow "seasonally" (e.g., typically three months each year) are jurisdictional. Data supporting this conclusion is provided at Section III.B. Provide rationale indicating that tributary flows seasonally: .

Provide estimates for jurisdictional waters in the review area (check all that apply):
☐ Tributary waters: linear feet width (ft).
☐ Other non-wetland waters: acres.
Identify type(s) of waters: .

3. **Non-RPWs[8] that flow directly or indirectly into TNWs.**
☒ Waterbody that is not a TNW or an RPW, but flows directly or indirectly into a TNW, and it has a significant nexus with a TNW is jurisdictional. Data supporting this conclusion is provided at Section III.C.

Provide estimates for jurisdictional waters within the review area (check all that apply):
☒ Tributary waters: 4,908 linear feet 4 width (ft).
☐ Other non-wetland waters: acres.
Identify type(s) of waters: .

4. **Wetlands directly abutting an RPW that flow directly or indirectly into TNWs.**
☐ Wetlands directly abut RPW and thus are jurisdictional as adjacent wetlands.
☐ Wetlands directly abutting an RPW where tributaries typically flow year-round. Provide data and rationale indicating that tributary is perennial in Section III.D.2, above. Provide rationale indicating that wetland is directly abutting an RPW: .

☐ Wetlands directly abutting an RPW where tributaries typically flow "seasonally." Provide data indicating that tributary is seasonal in Section III.B and rationale in Section III.D.2, above. Provide rationale indicating that wetland is directly abutting an RPW: .

Provide acreage estimates for jurisdictional wetlands in the review area: acres.

5. **Wetlands adjacent to but not directly abutting an RPW that flow directly or indirectly into TNWs.**
☐ Wetlands that do not directly abut an RPW, but when considered in combination with the tributary to which they are adjacent and with similarly situated adjacent wetlands, have a significant nexus with a TNW are jurisidictional. Data supporting this conclusion is provided at Section III.C.

Provide acreage estimates for jurisdictional wetlands in the review area: acres.

6. **Wetlands adjacent to non-RPWs that flow directly or indirectly into TNWs.**
☒ Wetlands adjacent to such waters, and have when considered in combination with the tributary to which they are adjacent and with similarly situated adjacent wetlands, have a significant nexus with a TNW are jurisdictional. Data supporting this conclusion is provided at Section III.C.

Provide estimates for jurisdictional wetlands in the review area: 0.40 acres.

7. **Impoundments of jurisdictional waters.[9]**
As a general rule, the impoundment of a jurisdictional tributary remains jurisdictional.
☐ Demonstrate that impoundment was created from "waters of the U.S.," or
☐ Demonstrate that water meets the criteria for one of the categories presented above (1-6), or
☐ Demonstrate that water is isolated with a nexus to commerce (see E below).

E. ISOLATED [INTERSTATE OR INTRA-STATE] WATERS, INCLUDING ISOLATED WETLANDS, THE USE, DEGRADATION OR DESTRUCTION OF WHICH COULD AFFECT INTERSTATE COMMERCE, INCLUDING ANY SUCH WATERS (CHECK ALL THAT APPLY):[10]
☐ which are or could be used by interstate or foreign travelers for recreational or other purposes.

---

[8] See Footnote # 3.
[9] To complete the analysis refer to the key in Section III.D.6 of the Instructional Guidebook.
[10] **Prior to asserting or declining CWA jurisdiction based solely on this category, Corps Districts will elevate the action to Corps and EPA HQ for review consistent with the process described in the Corps/EPA *Memorandum Regarding CWA Act Jurisdiction Following Rapanos.***

☐ from which fish or shellfish are or could be taken and sold in interstate or foreign commerce.
☐ which are or could be used for industrial purposes by industries in interstate commerce.
☐ Interstate isolated waters. Explain:
☐ Other factors. Explain:

Identify water body and summarize rationale supporting determination:

Provide estimates for jurisdictional waters in the review area (check all that apply):
☐ Tributary waters: linear feet width (ft).
☐ Other non-wetland waters: acres.
Identify type(s) of waters:
☐ Wetlands: acres.

F. NON-JURISDICTIONAL WATERS, INCLUDING WETLANDS (CHECK ALL THAT APPLY):
☐ If potential wetlands were assessed within the review area, these areas did not meet the criteria in the 1987 Corps of Engineers Wetland Delineation Manual and/or appropriate Regional Supplements.
☐ Review area included isolated waters with no substantial nexus to interstate (or foreign) commerce.
☐ Prior to the Jan 2001 Supreme Court decision in "*SWANCC*," the review area would have been regulated based solely on the "Migratory Bird Rule" (MBR).
☐ Waters do not meet the "Significant Nexus" standard, where such a finding is required for jurisdiction. Explain:
☐ Other: (explain, if not covered above):

Provide acreage estimates for non-jurisdictional waters in the review area, where the sole potential basis of jurisdiction is the MBR factors (i.e., presence of migratory birds, presence of endangered species, use of water for irrigated agriculture), using best professional judgment (check all that apply):
☐ Non-wetland waters (i.e., rivers, streams): linear feet width (ft).
☐ Lakes/ponds: acres.
☐ Other non-wetland waters: acres. List type of aquatic resource:
☐ Wetlands: acres.

Provide acreage estimates for non-jurisdictional waters in the review area that do not meet the "Significant Nexus" standard, where such a finding is required for jurisdiction (check all that apply):
☐ Non-wetland waters (i.e., rivers, streams): linear feet, width (ft).
☐ Lakes/ponds: acres.
☐ Other non-wetland waters: acres. List type of aquatic resource:
☐ Wetlands: acres.

SECTION IV: DATA SOURCES.

A. SUPPORTING DATA. **Data reviewed for JD (check all that apply** - checked items shall be included in case file and, where checked and requested, appropriately reference sources below):
☒ Maps, plans, plots or plat submitted by or on behalf of the applicant/consultant:
☒ Data sheets prepared/submitted by or on behalf of the applicant/consultant.
☐ Office concurs with data sheets/delineation report.
☐ Office does not concur with data sheets/delineation report.
☐ Data sheets prepared by the Corps:
☐ Corps navigable waters' study:
☒ U.S. Geological Survey Hydrologic Atlas:
☐ USGS NHD data.
☒ USGS 8 and 12 digit HUC maps.
☒ U.S. Geological Survey map(s). Cite scale & quad name:7.5 Minute Devore & San Bernardino North, CA.
☒ USDA Natural Resources Conservation Service Soil Survey. Citation:www.websoilsurvey.nrcs.usda.gov/app/WebSoilSurvey.aspx.
☒ National wetlands inventory map(s). Cite name:www.wetlandsfws.er.usgs.gov/NWI/index.html.
☐ State/Local wetland inventory map(s):
☒ FEMA/FIRM maps: 06071C7910F: Zone X - Areas determined to be outside of 500-year floodplain.
☒ 100-year Floodplain Elevation is: Approximate elevation is 2,000 feet above Mean Sea Level (National Geodectic Vertical Datum of 1929)
☒ Photographs: ☒ Aerial (Name & Date): Google Earth 2007.
or ☒ Other (Name & Date): Site Photographs 12/03/06.
☐ Previous determination(s). File no. and date of response letter:
☐ Applicable/supporting case law:
☐ Applicable/supporting scientific literature:

☐ Other information (please specify):

B. ADDITIONAL COMMENTS TO SUPPORT JD:

APPROVED JURISDICTIONAL DETERMINATION FORM
U.S. Army Corps of Engineers

This form should be completed by following the instructions provided in Section IV of the JD Form Instructional Guidebook.

SECTION I: BACKGROUND INFORMATION

A. REPORT COMPLETION DATE FOR APPROVED JURISDICTIONAL DETERMINATION (JD):

B. DISTRICT OFFICE, FILE NAME, AND NUMBER: Lytle Creek - Area III

C. PROJECT LOCATION AND BACKGROUND INFORMATION:
State: California County/parish/borough: San Bernardino City: Rialto and Unincorporated Areas
Center coordinates of site (lat/long in degree decimal format): Lat. 34.2025° N, Long. 117.4228° W.
Universal Transverse Mercator:
Name of nearest waterbody: Lytle Creek
Name of nearest Traditional Navigable Water (TNW) into which the aquatic resource flows: Pacific Ocean
Name of watershed or Hydrologic Unit Code (HUC): 18070203
☒ Check if map/diagram of review area and/or potential jurisdictional areas is/are available upon request.
☐ Check if other sites (e.g., offsite mitigation sites, disposal sites, etc…) are associated with this action and are recorded on a different JD form.

D. REVIEW PERFORMED FOR SITE EVALUATION (CHECK ALL THAT APPLY):
☐ Office (Desk) Determination. Date:
☐ Field Determination. Date(s):

SECTION II: SUMMARY OF FINDINGS

A. RHA SECTION 10 DETERMINATION OF JURISDICTION.

There Are no "*navigable waters of the U.S.*" within Rivers and Harbors Act (RHA) jurisdiction (as defined by 33 CFR part 329) in the review area. [*Required*]
☐ Waters subject to the ebb and flow of the tide.
☐ Waters are presently used, or have been used in the past, or may be susceptible for use to transport interstate or foreign commerce.
Explain: .

B. CWA SECTION 404 DETERMINATION OF JURISDICTION.

There Are "*waters of the U.S.*" within Clean Water Act (CWA) jurisdiction (as defined by 33 CFR part 328) in the review area. [*Required*]

1. **Waters of the U.S.**
   a. **Indicate presence of waters of U.S. in review area (check all that apply):** [1]
   - ☐ TNWs, including territorial seas
   - ☐ Wetlands adjacent to TNWs
   - ☐ Relatively permanent waters[2] (RPWs) that flow directly or indirectly into TNWs
   - ☒ Non-RPWs that flow directly or indirectly into TNWs
   - ☐ Wetlands directly abutting RPWs that flow directly or indirectly into TNWs
   - ☐ Wetlands adjacent to but not directly abutting RPWs that flow directly or indirectly into TNWs
   - ☐ Wetlands adjacent to non-RPWs that flow directly or indirectly into TNWs
   - ☐ Impoundments of jurisdictional waters
   - ☐ Isolated (interstate or intrastate) waters, including isolated wetlands

   b. **Identify (estimate) size of waters of the U.S. in the review area:**
   Non-wetland waters: 17,868 linear feet: width (ft) and/or 37.21 acres.
   Wetlands: acres.

   c. **Limits (boundaries) of jurisdiction** based on: **1987 Delineation Manual**
   Elevation of established OHWM (if known): 1,700 ft.

2. **Non-regulated waters/wetlands (check if applicable):**[3]
   ☐ Potentially jurisdictional waters and/or wetlands were assessed within the review area and determined to be not jurisdictional.
   Explain: .

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[1] Boxes checked below shall be supported by completing the appropriate sections in Section III below.
[2] For purposes of this form, an RPW is defined as a tributary that is not a TNW and that typically flows year-round or has continuous flow at least "seasonally" (e.g., typically 3 months).
[3] Supporting documentation is presented in Section III.F.

SECTION III: CWA ANALYSIS

A. TNWs AND WETLANDS ADJACENT TO TNWs

The agencies will assert jurisdiction over TNWs and wetlands adjacent to TNWs. If the aquatic resource is a TNW, complete Section III.A.1 and Section III.D.1. only; if the aquatic resource is a wetland adjacent to a TNW, complete Sections III.A.1 and 2 and Section III.D.1.; otherwise, see Section III.B below.

1. TNW
   Identify TNW:

   Summarize rationale supporting determination:

2. Wetland adjacent to TNW
   Summarize rationale supporting conclusion that wetland is "adjacent":

B. CHARACTERISTICS OF TRIBUTARY (THAT IS NOT A TNW) AND ITS ADJACENT WETLANDS (IF ANY):

This section summarizes information regarding characteristics of the tributary and its adjacent wetlands, if any, and it helps determine whether or not the standards for jurisdiction established under *Rapanos* have been met.

The agencies will assert jurisdiction over non-navigable tributaries of TNWs where the tributaries are "relatively permanent waters" (RPWs), i.e. tributaries that typically flow year-round or have continuous flow at least seasonally (e.g., typically 3 months). A wetland that directly abuts an RPW is also jurisdictional. If the aquatic resource is not a TNW, but has year-round (perennial) flow, skip to Section III.D.2. If the aquatic resource is a wetland directly abutting a tributary with perennial flow, skip to Section III.D.4.

A wetland that is adjacent to but that does not directly abut an RPW requires a significant nexus evaluation. Corps districts and EPA regions will include in the record any available information that documents the existence of a significant nexus between a relatively permanent tributary that is not perennial (and its adjacent wetlands if any) and a traditional navigable water, even though a significant nexus finding is not required as a matter of law.

If the waterbody[4] is not an RPW, or a wetland directly abutting an RPW, a JD will require additional data to determine if the waterbody has a significant nexus with a TNW. If the tributary has adjacent wetlands, the significant nexus evaluation must consider the tributary in combination with all of its adjacent wetlands. This significant nexus evaluation that combines, for analytical purposes, the tributary and all of its adjacent wetlands is used whether the review area identified in the JD request is the tributary, or its adjacent wetlands, or both. If the JD covers a tributary with adjacent wetlands, complete Section III.B.1 for the tributary, Section III.B.2 for any onsite wetlands, and Section III.B.3 for all wetlands adjacent to that tributary, both onsite and offsite. The determination whether a significant nexus exists is determined in Section III.C below.

1. Characteristics of non-TNWs that flow directly or indirectly into TNW

   (i) General Area Conditions:
   Watershed size: 1,681 square miles
   Drainage area: 38,830 acres
   Average annual rainfall: 16 inches
   Average annual snowfall: 0 inches

   (ii) Physical Characteristics:
   (a) Relationship with TNW:
   ☐ Tributary flows directly into TNW.
   ☒ Tributary flows through 3 tributaries before entering TNW.

   Project waters are 30 (or more) river miles from TNW.
   Project waters are 10-15 river miles from RPW.
   Project waters are 30 (or more) aerial (straight) miles from TNW.
   Project waters are 10-15 aerial (straight) miles from RPW.
   Project waters cross or serve as state boundaries. Explain:

   Identify flow route to TNW[5]: Lytle Creek, Cajon Creek, Santa Ana River, Pacific Ocean.
   Tributary stream order, if known: 2nd-3rd.

[4] Note that the Instructional Guidebook contains additional information regarding swales, ditches, washes, and erosional features generally and in the arid West.
[5] Flow route can be described by identifying, e.g., tributary a, which flows through the review area, to flow into tributary b, which then flows into TNW.

(b) General Tributary Characteristics (check all that apply):

Tributary is: ☒ Natural
☐ Artificial (man-made). Explain:
☐ Manipulated (man-altered). Explain:

Tributary properties with respect to top of bank (estimate):
Average width: 107 feet
Average depth: feet
Average side slopes: **Vertical (1:1 or less).**

Primary tributary substrate composition (check all that apply):
☐ Silts ☒ Sands ☐ Concrete
☒ Cobbles ☐ Gravel ☐ Muck
☐ Bedrock ☒ Vegetation. Type/% cover: Intermittent patches of vegetation associated with the channel bottom include mulefat (Baccharis salicifolia, FACW) and western sycamores (Platanus racemosa, FACW). Vegetation usually associated with the adjacent slopes and terraces, but which also occurs within drainages, includes sage thistle (Salvia carduacea, UPL), croton (Croton californicus, UPL), scalebroom (Lepidospartum squamatum, UPL), wreath plant (Stephanomaria virgata, UPL), ripgut brome (Bromus diandrus, UPL), deerweed (Lotus scoparius, UPL), California sagebrush (Artemisia californica, UPL), yerba santa (Eriodictyon crassifolium, UPL), and mountain-mahogany (Cercocarpus betuloides, UPL).
☐ Other. Explain:

Tributary condition/stability [e.g., highly eroding, sloughing banks]. Explain: eroded.
Presence of run/riffle/pool complexes. Explain: N/A.
Tributary geometry: **Meandering**
Tributary gradient (approximate average slope): 3 %

(c) Flow:
Tributary provides for: **Ephemeral flow**
Estimate average number of flow events in review area/year: **Pick List**
Describe flow regime: Only flows during heavy rain events.
Other information on duration and volume: Flows immediately after storm events.

Surface flow is: **Discrete and confined.** Characteristics:

Subsurface flow: **Unknown.** Explain findings:
☐ Dye (or other) test performed:

Tributary has (check all that apply):
☒ Bed and banks
☒ OHWM[6] (check all indicators that apply):
☒ clear, natural line impressed on the bank
☐ changes in the character of soil
☒ shelving
☐ vegetation matted down, bent, or absent
☐ leaf litter disturbed or washed away
☐ sediment deposition
☐ water staining
☐ other (list):
☒ the presence of litter and debris
☒ destruction of terrestrial vegetation
☒ the presence of wrack line
☐ sediment sorting
☐ scour
☐ multiple observed or predicted flow events
☐ abrupt change in plant community
☐ Discontinuous OHWM.[7] Explain:

If factors other than the OHWM were used to determine lateral extent of CWA jurisdiction (check all that apply):
☐ High Tide Line indicated by:
☐ oil or scum line along shore objects
☐ fine shell or debris deposits (foreshore)
☐ physical markings/characteristics
☐ tidal gauges
☐ other (list):
☐ Mean High Water Mark indicated by:
☐ survey to available datum;
☐ physical markings;
☐ vegetation lines/changes in vegetation types.

(iii) Chemical Characteristics:

[6] A natural or man-made discontinuity in the OHWM does not necessarily sever jurisdiction (e.g., where the stream temporarily flows underground, or where the OHWM has been removed by development or agricultural practices). Where there is a break in the OHWM that is unrelated to the waterbody's flow regime (e.g., flow over a rock outcrop or through a culvert), the agencies will look for indicators of flow above and below the break.
[7] Ibid.

Characterize tributary (e.g., water color is clear, discolored, oily film; water quality; general watershed characteristics, etc.).

Explain: The upper watershed is mostly undisturbed with some development occuring in the lower watershed contributing to pollutants.

Identify specific pollutants, if known: Trash, sediment, hydrocarbons.

(iv) **Biological Characteristics. Channel supports (check all that apply):**

☐ Riparian corridor. Characteristics (type, average width):

☐ Wetland fringe. Characteristics:

☒ Habitat for:

☒ Federally Listed species. Explain findings: least Bell's vireo (Vireo bellii pusillus) and San Bernardino kangaroo rat (Dipodomys merriami parvus).

☐ Fish/spawn areas. Explain findings:

☐ Other environmentally-sensitive species. Explain findings:

☐ Aquatic/wildlife diversity. Explain findings:

2. **Characteristics of wetlands adjacent to non-TNW that flow directly or indirectly into TNW**

(i) **Physical Characteristics:**

(a) General Wetland Characteristics:

Properties:

Wetland size: acres

Wetland type. Explain:

Wetland quality. Explain:

Project wetlands cross or serve as state boundaries. Explain:

(b) General Flow Relationship with Non-TNW:

Flow is: **Pick List**. Explain:

Surface flow is: **Pick List**

Characteristics:

Subsurface flow: **Pick List**. Explain findings:

☐ Dye (or other) test performed:

(c) Wetland Adjacency Determination with Non-TNW:

☐ Directly abutting

☐ Not directly abutting

☐ Discrete wetland hydrologic connection. Explain:

☐ Ecological connection. Explain:

☐ Separated by berm/barrier. Explain:

(d) Proximity (Relationship) to TNW

Project wetlands are **Pick List** river miles from TNW.

Project waters are **Pick List** aerial (straight) miles from TNW.

Flow is from: **Pick List.**

Estimate approximate location of wetland as within the **Pick List** floodplain.

(ii) **Chemical Characteristics:**

Characterize wetland system (e.g., water color is clear, brown, oil film on surface; water quality; general watershed characteristics; etc.). Explain:

Identify specific pollutants, if known:

(iii) **Biological Characteristics. Wetland supports (check all that apply):**

☐ Riparian buffer. Characteristics (type, average width):

☐ Vegetation type/percent cover. Explain:

☐ Habitat for:

☐ Federally Listed species. Explain findings:

☐ Fish/spawn areas. Explain findings:

☐ Other environmentally-sensitive species. Explain findings:

☐ Aquatic/wildlife diversity. Explain findings:

3. **Characteristics of all wetlands adjacent to the tributary (if any)**

All wetland(s) being considered in the cumulative analysis: **Pick List**

Approximately ( ) acres in total are being considered in the cumulative analysis.

For each wetland, specify the following:

Directly abuts? (Y/N)	Size (in acres)	Directly abuts? (Y/N)	Size (in acres)

Summarize overall biological, chemical and physical functions being performed:

C. SIGNIFICANT NEXUS DETERMINATION

A significant nexus analysis will assess the flow characteristics and functions of the tributary itself and the functions performed by any wetlands adjacent to the tributary to determine if they significantly affect the chemical, physical, and biological integrity of a TNW. For each of the following situations, a significant nexus exists if the tributary, in combination with all of its adjacent wetlands, has more than a speculative or insubstantial effect on the chemical, physical and/or biological integrity of a TNW. Considerations when evaluating significant nexus include, but are not limited to the volume, duration, and frequency of the flow of water in the tributary and its proximity to a TNW, and the functions performed by the tributary and all its adjacent wetlands. It is not appropriate to determine significant nexus based solely on any specific threshold of distance (e.g. between a tributary and its adjacent wetland or between a tributary and the TNW). Similarly, the fact an adjacent wetland lies within or outside of a floodplain is not solely determinative of significant nexus.

Draw connections between the features documented and the effects on the TNW, as identified in the *Rapanos* Guidance and discussed in the Instructional Guidebook. Factors to consider include, for example:

- Does the tributary, in combination with its adjacent wetlands (if any), have the capacity to carry pollutants or flood waters to TNWs, or to reduce the amount of pollutants or flood waters reaching a TNW?
- Does the tributary, in combination with its adjacent wetlands (if any), provide habitat and lifecycle support functions for fish and other species, such as feeding, nesting, spawning, or rearing young for species that are present in the TNW?
- Does the tributary, in combination with its adjacent wetlands (if any), have the capacity to transfer nutrients and organic carbon that support downstream foodwebs?
- Does the tributary, in combination with its adjacent wetlands (if any), have other relationships to the physical, chemical, or biological integrity of the TNW?

Note: the above list of considerations is not inclusive and other functions observed or known to occur should be documented below:

1. **Significant nexus findings for non-RPW that has no adjacent wetlands and flows directly or indirectly into TNWs.** Explain findings of presence or absence of significant nexus below, based on the tributary itself, then go to Section III.D:Please see Jurisdictional Delineation repot for significant nexus evaluation.

2. **Significant nexus findings for non-RPW and its adjacent wetlands, where the non-RPW flows directly or indirectly into TNWs.** Explain findings of presence or absence of significant nexus below, based on the tributary in combination with all of its adjacent wetlands, then go to Section III.D:

3. **Significant nexus findings for wetlands adjacent to an RPW but that do not directly abut the RPW.** Explain findings of presence or absence of significant nexus below, based on the tributary in combination with all of its adjacent wetlands, then go to Section III.D:

D. DETERMINATIONS OF JURISDICTIONAL FINDINGS. THE SUBJECT WATERS/WETLANDS ARE (CHECK ALL THAT APPLY):

1. **TNWs and Adjacent Wetlands.** Check all that apply and provide size estimates in review area:
   - ☐ TNWs: linear feet width (ft), Or, acres.
   - ☐ Wetlands adjacent to TNWs: acres.

2. **RPWs that flow directly or indirectly into TNWs.**
   - ☐ Tributaries of TNWs where tributaries typically flow year-round are jurisdictional. Provide data and rationale indicating that tributary is perennial:
   - ☐ Tributaries of TNW where tributaries have continuous flow "seasonally" (e.g., typically three months each year) are jurisdictional. Data supporting this conclusion is provided at Section III.B. Provide rationale indicating that tributary flows seasonally:

Provide estimates for jurisdictional waters in the review area (check all that apply):
- ☐ Tributary waters: linear feet width (ft).
- ☐ Other non-wetland waters: acres.
  - Identify type(s) of waters: .

3. **Non-RPWs[8] that flow directly or indirectly into TNWs.**
   - ☒ Waterbody that is not a TNW or an RPW, but flows directly or indirectly into a TNW, and it has a significant nexus with a TNW is jurisdictional. Data supporting this conclusion is provided at Section III.C.

   Provide estimates for jurisdictional waters within the review area (check all that apply):
   - ☒ Tributary waters: **17,868** linear feet **107** width (ft).
   - ☒ Other non-wetland waters: **3.71** acres.
     - Identify type(s) of waters: **groundwater recharge basin.**

4. **Wetlands directly abutting an RPW that flow directly or indirectly into TNWs.**
   - ☐ Wetlands directly abut RPW and thus are jurisdictional as adjacent wetlands.
     - ☐ Wetlands directly abutting an RPW where tributaries typically flow year-round. Provide data and rationale indicating that tributary is perennial in Section III.D.2, above. Provide rationale indicating that wetland is directly abutting an RPW: .
     - ☐ Wetlands directly abutting an RPW where tributaries typically flow "seasonally." Provide data indicating that tributary is seasonal in Section III.B and rationale in Section III.D.2, above. Provide rationale indicating that wetland is directly abutting an RPW: .

   Provide acreage estimates for jurisdictional wetlands in the review area: acres.

5. **Wetlands adjacent to but not directly abutting an RPW that flow directly or indirectly into TNWs.**
   - ☐ Wetlands that do not directly abut an RPW, but when considered in combination with the tributary to which they are adjacent and with similarly situated adjacent wetlands, have a significant nexus with a TNW are jurisidictional. Data supporting this conclusion is provided at Section III.C.

   Provide acreage estimates for jurisdictional wetlands in the review area: acres.

6. **Wetlands adjacent to non-RPWs that flow directly or indirectly into TNWs.**
   - ☐ Wetlands adjacent to such waters, and have when considered in combination with the tributary to which they are adjacent and with similarly situated adjacent wetlands, have a significant nexus with a TNW are jurisdictional. Data supporting this conclusion is provided at Section III.C.

   Provide estimates for jurisdictional wetlands in the review area: acres.

7. **Impoundments of jurisdictional waters.[9]**
   As a general rule, the impoundment of a jurisdictional tributary remains jurisdictional.
   - ☐ Demonstrate that impoundment was created from "waters of the U.S.," or
   - ☐ Demonstrate that water meets the criteria for one of the categories presented above (1-6), or
   - ☐ Demonstrate that water is isolated with a nexus to commerce (see E below).

E. **ISOLATED [INTERSTATE OR INTRA-STATE] WATERS, INCLUDING ISOLATED WETLANDS, THE USE, DEGRADATION OR DESTRUCTION OF WHICH COULD AFFECT INTERSTATE COMMERCE, INCLUDING ANY SUCH WATERS (CHECK ALL THAT APPLY):[10]**
- ☐ which are or could be used by interstate or foreign travelers for recreational or other purposes.
- ☐ from which fish or shellfish are or could be taken and sold in interstate or foreign commerce.
- ☐ which are or could be used for industrial purposes by industries in interstate commerce.
- ☐ Interstate isolated waters. Explain: .
- ☐ Other factors. Explain: .

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[8] See Footnote # 3.
[9] To complete the analysis refer to the key in Section III.D.6 of the Instructional Guidebook.
[10] **Prior to asserting or declining CWA jurisdiction based solely on this category, Corps Districts will elevate the action to Corps and EPA HQ for review consistent with the process described in the Corps/EPA *Memorandum Regarding CWA Act Jurisdiction Following Rapanos.***

Identify water body and summarize rationale supporting determination:

Provide estimates for jurisdictional waters in the review area (check all that apply):
- ☐ Tributary waters: linear feet width (ft).
- ☐ Other non-wetland waters: acres.
  - Identify type(s) of waters:
- ☐ Wetlands: acres.

F. NON-JURISDICTIONAL WATERS, INCLUDING WETLANDS (CHECK ALL THAT APPLY):
- ☐ If potential wetlands were assessed within the review area, these areas did not meet the criteria in the 1987 Corps of Engineers Wetland Delineation Manual and/or appropriate Regional Supplements.
- ☐ Review area included isolated waters with no substantial nexus to interstate (or foreign) commerce.
  - ☐ Prior to the Jan 2001 Supreme Court decision in "*SWANCC*," the review area would have been regulated based solely on the "Migratory Bird Rule" (MBR).
- ☐ Waters do not meet the "Significant Nexus" standard, where such a finding is required for jurisdiction. Explain:
- ☐ Other: (explain, if not covered above):

Provide acreage estimates for non-jurisdictional waters in the review area, where the sole potential basis of jurisdiction is the MBR factors (i.e., presence of migratory birds, presence of endangered species, use of water for irrigated agriculture), using best professional judgment (check all that apply):
- ☐ Non-wetland waters (i.e., rivers, streams): linear feet width (ft).
- ☐ Lakes/ponds: acres.
- ☐ Other non-wetland waters: acres. List type of aquatic resource:
- ☐ Wetlands: acres.

Provide acreage estimates for non-jurisdictional waters in the review area that do not meet the "Significant Nexus" standard, where such a finding is required for jurisdiction (check all that apply):
- ☐ Non-wetland waters (i.e., rivers, streams): linear feet, width (ft).
- ☐ Lakes/ponds: acres.
- ☐ Other non-wetland waters: acres. List type of aquatic resource:
- ☐ Wetlands: acres.

SECTION IV: DATA SOURCES.

A. SUPPORTING DATA. **Data reviewed for JD (check all that apply** - checked items shall be included in case file and, where checked and requested, appropriately reference sources below):
- ☒ Maps, plans, plots or plat submitted by or on behalf of the applicant/consultant:
- ☒ Data sheets prepared/submitted by or on behalf of the applicant/consultant.
  - ☐ Office concurs with data sheets/delineation report.
  - ☐ Office does not concur with data sheets/delineation report.
- ☐ Data sheets prepared by the Corps:
- ☐ Corps navigable waters' study:
- ☒ U.S. Geological Survey Hydrologic Atlas:
  - ☐ USGS NHD data.
  - ☒ USGS 8 and 12 digit HUC maps.
- ☒ U.S. Geological Survey map(s). Cite scale & quad name:7.5 Minute Devore & San Bernardino North, CA.
- ☒ USDA Natural Resources Conservation Service Soil Survey. Citation:www.websoilsurvey.nrcs.usda.gov/app/WebSoilSurvey.aspx.
- ☒ National wetlands inventory map(s). Cite name:www.wetlandsfws.er.usgs.gov/NWI/index.html.
- ☐ State/Local wetland inventory map(s):
- ☒ FEMA/FIRM maps: 06071C7940F; 06071C7910F; 06071C7905F; 06071C7920F.
- ☒ 100-year Floodplain Elevation is: approximately 1,700 feet above mean sea level (National Geodectic Vertical Datum of 1929)
- ☒ Photographs: ☒ Aerial (Name & Date): Google Earth 2007.
  - or ☒ Other (Name & Date): Site Photographs 12/03/06.
- ☐ Previous determination(s). File no. and date of response letter:
- ☐ Applicable/supporting case law:
- ☐ Applicable/supporting scientific literature:
- ☐ Other information (please specify):

B. ADDITIONAL COMMENTS TO SUPPORT JD:

APPROVED JURISDICTIONAL DETERMINATION FORM
U.S. Army Corps of Engineers

This form should be completed by following the instructions provided in Section IV of the JD Form Instructional Guidebook.

SECTION I: BACKGROUND INFORMATION

A. REPORT COMPLETION DATE FOR APPROVED JURISDICTIONAL DETERMINATION (JD):

B. DISTRICT OFFICE, FILE NAME, AND NUMBER: Lytle Creek - Area IV

C. PROJECT LOCATION AND BACKGROUND INFORMATION:
State: California County/parish/borough: San Bernardino City: Rialto and Unincorporated Areas
Center coordinates of site (lat/long in degree decimal format): Lat. 34.2025° N, Long. 117.4228° W.
Universal Transverse Mercator:
Name of nearest waterbody: Lytle Creek
Name of nearest Traditional Navigable Water (TNW) into which the aquatic resource flows: Pacific Ocean
Name of watershed or Hydrologic Unit Code (HUC): 18070203
☒ Check if map/diagram of review area and/or potential jurisdictional areas is/are available upon request.
☐ Check if other sites (e.g., offsite mitigation sites, disposal sites, etc…) are associated with this action and are recorded on a different JD form.

D. REVIEW PERFORMED FOR SITE EVALUATION (CHECK ALL THAT APPLY):
☐ Office (Desk) Determination. Date:
☐ Field Determination. Date(s):

SECTION II: SUMMARY OF FINDINGS

A. RHA SECTION 10 DETERMINATION OF JURISDICTION.

There **Are no** "*navigable waters of the U.S.*" within Rivers and Harbors Act (RHA) jurisdiction (as defined by 33 CFR part 329) in the review area. [*Required*]
☐ Waters subject to the ebb and flow of the tide.
☐ Waters are presently used, or have been used in the past, or may be susceptible for use to transport interstate or foreign commerce.
Explain:

B. CWA SECTION 404 DETERMINATION OF JURISDICTION.

There **Are** "*waters of the U.S.*" within Clean Water Act (CWA) jurisdiction (as defined by 33 CFR part 328) in the review area. [*Required*]

1. **Waters of the U.S.**
   a. **Indicate presence of waters of U.S. in review area (check all that apply):** [1]
   - ☐ TNWs, including territorial seas
   - ☐ Wetlands adjacent to TNWs
   - ☐ Relatively permanent waters[2] (RPWs) that flow directly or indirectly into TNWs
   - ☒ Non-RPWs that flow directly or indirectly into TNWs
   - ☐ Wetlands directly abutting RPWs that flow directly or indirectly into TNWs
   - ☐ Wetlands adjacent to but not directly abutting RPWs that flow directly or indirectly into TNWs
   - ☐ Wetlands adjacent to non-RPWs that flow directly or indirectly into TNWs
   - ☐ Impoundments of jurisdictional waters
   - ☐ Isolated (interstate or intrastate) waters, including isolated wetlands

   b. **Identify (estimate) size of waters of the U.S. in the review area:**
   Non-wetland waters: 12,804 linear feet: width (ft) and/or 24.79 acres.
   Wetlands: acres.

   c. **Limits (boundaries) of jurisdiction** based on: **1987 Delineation Manual**
   Elevation of established OHWM (if known): 1,800 ft.

2. **Non-regulated waters/wetlands (check if applicable):**[3]
   ☐ Potentially jurisdictional waters and/or wetlands were assessed within the review area and determined to be not jurisdictional.
   Explain:

---

[1] Boxes checked below shall be supported by completing the appropriate sections in Section III below.
[2] For purposes of this form, an RPW is defined as a tributary that is not a TNW and that typically flows year-round or has continuous flow at least "seasonally" (e.g., typically 3 months).
[3] Supporting documentation is presented in Section III.F.

SECTION III: CWA ANALYSIS

A. TNWs AND WETLANDS ADJACENT TO TNWs

The agencies will assert jurisdiction over TNWs and wetlands adjacent to TNWs. If the aquatic resource is a TNW, complete Section III.A.1 and Section III.D.1. only; if the aquatic resource is a wetland adjacent to a TNW, complete Sections III.A.1 and 2 and Section III.D.1.; otherwise, see Section III.B below.

1. TNW
   Identify TNW:

   Summarize rationale supporting determination:

2. Wetland adjacent to TNW
   Summarize rationale supporting conclusion that wetland is "adjacent":

B. CHARACTERISTICS OF TRIBUTARY (THAT IS NOT A TNW) AND ITS ADJACENT WETLANDS (IF ANY):

This section summarizes information regarding characteristics of the tributary and its adjacent wetlands, if any, and it helps determine whether or not the standards for jurisdiction established under *Rapanos* have been met.

The agencies will assert jurisdiction over non-navigable tributaries of TNWs where the tributaries are "relatively permanent waters" (RPWs), i.e. tributaries that typically flow year-round or have continuous flow at least seasonally (e.g., typically 3 months). A wetland that directly abuts an RPW is also jurisdictional. If the aquatic resource is not a TNW, but has year-round (perennial) flow, skip to Section III.D.2. If the aquatic resource is a wetland directly abutting a tributary with perennial flow, skip to Section III.D.4.

A wetland that is adjacent to but that does not directly abut an RPW requires a significant nexus evaluation. Corps districts and EPA regions will include in the record any available information that documents the existence of a significant nexus between a relatively permanent tributary that is not perennial (and its adjacent wetlands if any) and a traditional navigable water, even though a significant nexus finding is not required as a matter of law.

If the waterbody[4] is not an RPW, or a wetland directly abutting an RPW, a JD will require additional data to determine if the waterbody has a significant nexus with a TNW. If the tributary has adjacent wetlands, the significant nexus evaluation must consider the tributary in combination with all of its adjacent wetlands. This significant nexus evaluation that combines, for analytical purposes, the tributary and all of its adjacent wetlands is used whether the review area identified in the JD request is the tributary, or its adjacent wetlands, or both. If the JD covers a tributary with adjacent wetlands, complete Section III.B.1 for the tributary, Section III.B.2 for any onsite wetlands, and Section III.B.3 for all wetlands adjacent to that tributary, both onsite and offsite. The determination whether a significant nexus exists is determined in Section III.C below.

1. Characteristics of non-TNWs that flow directly or indirectly into TNW

   (i) General Area Conditions:
   Watershed size: 1,681 square miles
   Drainage area: 38,830 acres
   Average annual rainfall: 16 inches
   Average annual snowfall: 0 inches

   (ii) Physical Characteristics:
   (a) Relationship with TNW:
   ☐ Tributary flows directly into TNW.
   ☒ Tributary flows through 3 tributaries before entering TNW.

   Project waters are 30 (or more) river miles from TNW.
   Project waters are 10-15 river miles from RPW.
   Project waters are 30 (or more) aerial (straight) miles from TNW.
   Project waters are 10-15 aerial (straight) miles from RPW.
   Project waters cross or serve as state boundaries. Explain:

   Identify flow route to TNW[5]: Lytle Creek, Cajon Creek, Santa Ana River, Pacific Ocean.
   Tributary stream order, if known: 2nd-3rd.

[4] Note that the Instructional Guidebook contains additional information regarding swales, ditches, washes, and erosional features generally and in the arid West.

[5] Flow route can be described by identifying, e.g., tributary a, which flows through the review area, to flow into tributary b, which then flows into TNW.

(b) General Tributary Characteristics (check all that apply):

Tributary is: ☒ Natural
☐ Artificial (man-made). Explain:
☐ Manipulated (man-altered). Explain:

Tributary properties with respect to top of bank (estimate):
Average width: 107 feet
Average depth: feet
Average side slopes: **Vertical (1:1 or less).**

Primary tributary substrate composition (check all that apply):
☐ Silts ☒ Sands ☐ Concrete
☒ Cobbles ☐ Gravel ☐ Muck
☐ Bedrock ☒ Vegetation. Type/% cover: Intermittent patches of vegetation associated with the channel bottom include mulefat (Baccharis salicifolia, FACW) and western sycamores (Platanus racemosa, FACW). Vegetation usually associated with the adjacent slopes and terraces, but which also occurs within drainages, includes sage thistle (Salvia carduacea, UPL), croton (Croton californicus, UPL), scalebroom (Lepidospartum squamatum, UPL), wreath plant (Stephanomaria virgata, UPL), ripgut brome (Bromus diandrus, UPL), deerweed (Lotus scoparius, UPL), California sagebrush (Artemisia californica, UPL), yerba santa (Eriodictyon crassifolium, UPL), and mountain-mahogany (Cercocarpus betuloides, UPL).
☐ Other. Explain:

Tributary condition/stability [e.g., highly eroding, sloughing banks]. Explain: eroded.
Presence of run/riffle/pool complexes. Explain: N/A.
Tributary geometry: **Meandering**
Tributary gradient (approximate average slope): 3 %

(c) Flow:
Tributary provides for: **Ephemeral flow**
Estimate average number of flow events in review area/year: **Pick List**
Describe flow regime: Only flows during heavy rain events.
Other information on duration and volume: Flows immediately after storm events.

Surface flow is: **Discrete and confined.** Characteristics:

Subsurface flow: **Unknown.** Explain findings:
☐ Dye (or other) test performed:

Tributary has (check all that apply):
☒ Bed and banks
☒ OHWM[6] (check all indicators that apply):
☒ clear, natural line impressed on the bank
☐ changes in the character of soil
☒ shelving
☐ vegetation matted down, bent, or absent
☐ leaf litter disturbed or washed away
☐ sediment deposition
☐ water staining
☐ other (list):
☒ the presence of litter and debris
☒ destruction of terrestrial vegetation
☒ the presence of wrack line
☐ sediment sorting
☐ scour
☐ multiple observed or predicted flow events
☐ abrupt change in plant community
☐ Discontinuous OHWM.[7] Explain:

If factors other than the OHWM were used to determine lateral extent of CWA jurisdiction (check all that apply):
☐ High Tide Line indicated by:
☐ oil or scum line along shore objects
☐ fine shell or debris deposits (foreshore)
☐ physical markings/characteristics
☐ tidal gauges
☐ other (list):
☐ Mean High Water Mark indicated by:
☐ survey to available datum;
☐ physical markings;
☐ vegetation lines/changes in vegetation types.

(iii) Chemical Characteristics:

[6] A natural or man-made discontinuity in the OHWM does not necessarily sever jurisdiction (e.g., where the stream temporarily flows underground, or where the OHWM has been removed by development or agricultural practices). Where there is a break in the OHWM that is unrelated to the waterbody's flow regime (e.g., flow over a rock outcrop or through a culvert), the agencies will look for indicators of flow above and below the break.
[7] Ibid.

Characterize tributary (e.g., water color is clear, discolored, oily film; water quality; general watershed characteristics, etc.).
Explain: The upper watershed is mostly undisturbed with some development occuring in the lower watershed contributing to pollutants.

Identify specific pollutants, if known: Trash, sediment, hydrocarbons.

(iv) **Biological Characteristics. Channel supports (check all that apply):**

- ☐ Riparian corridor. Characteristics (type, average width):
- ☐ Wetland fringe. Characteristics:
- ☒ Habitat for:
  - ☒ Federally Listed species. Explain findings: least Bell's vireo (Vireo bellii pusillus) and San Bernardino kangaroo rat (Dipodomys merriami parvus) .
  - ☐ Fish/spawn areas. Explain findings:
  - ☐ Other environmentally-sensitive species. Explain findings:
  - ☐ Aquatic/wildlife diversity. Explain findings:

2. **Characteristics of wetlands adjacent to non-TNW that flow directly or indirectly into TNW**

(i) **Physical Characteristics:**

(a) General Wetland Characteristics:

Properties:

Wetland size: acres

Wetland type. Explain:

Wetland quality. Explain:

Project wetlands cross or serve as state boundaries. Explain:

(b) General Flow Relationship with Non-TNW:

Flow is: **Pick List**. Explain:

Surface flow is: **Pick List**

Characteristics:

Subsurface flow: **Pick List**. Explain findings:

- ☐ Dye (or other) test performed:

(c) Wetland Adjacency Determination with Non-TNW:

- ☐ Directly abutting
- ☐ Not directly abutting
  - ☐ Discrete wetland hydrologic connection. Explain:
  - ☐ Ecological connection. Explain:
  - ☐ Separated by berm/barrier. Explain:

(d) Proximity (Relationship) to TNW

Project wetlands are **Pick List** river miles from TNW.

Project waters are **Pick List** aerial (straight) miles from TNW.

Flow is from: **Pick List.**

Estimate approximate location of wetland as within the **Pick List** floodplain.

(ii) **Chemical Characteristics:**

Characterize wetland system (e.g., water color is clear, brown, oil film on surface; water quality; general watershed characteristics; etc.). Explain:

Identify specific pollutants, if known:

(iii) **Biological Characteristics. Wetland supports (check all that apply):**

- ☐ Riparian buffer. Characteristics (type, average width):
- ☐ Vegetation type/percent cover. Explain:
- ☐ Habitat for:
  - ☐ Federally Listed species. Explain findings:
  - ☐ Fish/spawn areas. Explain findings:
  - ☐ Other environmentally-sensitive species. Explain findings:
  - ☐ Aquatic/wildlife diversity. Explain findings:

3. **Characteristics of all wetlands adjacent to the tributary (if any)**

All wetland(s) being considered in the cumulative analysis: **Pick List**

Approximately ( ) acres in total are being considered in the cumulative analysis.

For each wetland, specify the following:

Directly abuts? (Y/N)	Size (in acres)	Directly abuts? (Y/N)	Size (in acres)

Summarize overall biological, chemical and physical functions being performed:

C. SIGNIFICANT NEXUS DETERMINATION

A significant nexus analysis will assess the flow characteristics and functions of the tributary itself and the functions performed by any wetlands adjacent to the tributary to determine if they significantly affect the chemical, physical, and biological integrity of a TNW. For each of the following situations, a significant nexus exists if the tributary, in combination with all of its adjacent wetlands, has more than a speculative or insubstantial effect on the chemical, physical and/or biological integrity of a TNW. Considerations when evaluating significant nexus include, but are not limited to the volume, duration, and frequency of the flow of water in the tributary and its proximity to a TNW, and the functions performed by the tributary and all its adjacent wetlands. It is not appropriate to determine significant nexus based solely on any specific threshold of distance (e.g. between a tributary and its adjacent wetland or between a tributary and the TNW). Similarly, the fact an adjacent wetland lies within or outside of a floodplain is not solely determinative of significant nexus.

Draw connections between the features documented and the effects on the TNW, as identified in the *Rapanos* Guidance and discussed in the Instructional Guidebook. Factors to consider include, for example:

- Does the tributary, in combination with its adjacent wetlands (if any), have the capacity to carry pollutants or flood waters to TNWs, or to reduce the amount of pollutants or flood waters reaching a TNW?
- Does the tributary, in combination with its adjacent wetlands (if any), provide habitat and lifecycle support functions for fish and other species, such as feeding, nesting, spawning, or rearing young for species that are present in the TNW?
- Does the tributary, in combination with its adjacent wetlands (if any), have the capacity to transfer nutrients and organic carbon that support downstream foodwebs?
- Does the tributary, in combination with its adjacent wetlands (if any), have other relationships to the physical, chemical, or biological integrity of the TNW?

Note: the above list of considerations is not inclusive and other functions observed or known to occur should be documented below:

1. **Significant nexus findings for non-RPW that has no adjacent wetlands and flows directly or indirectly into TNWs.** Explain findings of presence or absence of significant nexus below, based on the tributary itself, then go to Section III.D:Please see Jurisdictional Delineation repot for significant nexus evaluation.

2. **Significant nexus findings for non-RPW and its adjacent wetlands, where the non-RPW flows directly or indirectly into TNWs.** Explain findings of presence or absence of significant nexus below, based on the tributary in combination with all of its adjacent wetlands, then go to Section III.D:

3. **Significant nexus findings for wetlands adjacent to an RPW but that do not directly abut the RPW.** Explain findings of presence or absence of significant nexus below, based on the tributary in combination with all of its adjacent wetlands, then go to Section III.D:

D. DETERMINATIONS OF JURISDICTIONAL FINDINGS. THE SUBJECT WATERS/WETLANDS ARE (CHECK ALL THAT APPLY):

1. **TNWs and Adjacent Wetlands.** Check all that apply and provide size estimates in review area:
   - ☐ TNWs: linear feet width (ft), Or, acres.
   - ☐ Wetlands adjacent to TNWs: acres.

2. **RPWs that flow directly or indirectly into TNWs.**
   - ☐ Tributaries of TNWs where tributaries typically flow year-round are jurisdictional. Provide data and rationale indicating that tributary is perennial:
   - ☐ Tributaries of TNW where tributaries have continuous flow "seasonally" (e.g., typically three months each year) are jurisdictional. Data supporting this conclusion is provided at Section III.B. Provide rationale indicating that tributary flows seasonally:

Provide estimates for jurisdictional waters in the review area (check all that apply):
- ☐ Tributary waters: linear feet width (ft).
- ☐ Other non-wetland waters: acres.
  - Identify type(s) of waters: .

3. **Non-RPWs[8] that flow directly or indirectly into TNWs.**
   - ☒ Waterbody that is not a TNW or an RPW, but flows directly or indirectly into a TNW, and it has a significant nexus with a TNW is jurisdictional. Data supporting this conclusion is provided at Section III.C.

   Provide estimates for jurisdictional waters within the review area (check all that apply):
   - ☒ Tributary waters: **12,804** linear feet **107** width (ft).
   - ☐ Other non-wetland waters: acres.
     - Identify type(s) of waters: .

4. **Wetlands directly abutting an RPW that flow directly or indirectly into TNWs.**
   - ☐ Wetlands directly abut RPW and thus are jurisdictional as adjacent wetlands.
     - ☐ Wetlands directly abutting an RPW where tributaries typically flow year-round. Provide data and rationale indicating that tributary is perennial in Section III.D.2, above. Provide rationale indicating that wetland is directly abutting an RPW: .
     - ☐ Wetlands directly abutting an RPW where tributaries typically flow "seasonally." Provide data indicating that tributary is seasonal in Section III.B and rationale in Section III.D.2, above. Provide rationale indicating that wetland is directly abutting an RPW: .

   Provide acreage estimates for jurisdictional wetlands in the review area: acres.

5. **Wetlands adjacent to but not directly abutting an RPW that flow directly or indirectly into TNWs.**
   - ☐ Wetlands that do not directly abut an RPW, but when considered in combination with the tributary to which they are adjacent and with similarly situated adjacent wetlands, have a significant nexus with a TNW are jurisidictional. Data supporting this conclusion is provided at Section III.C.

   Provide acreage estimates for jurisdictional wetlands in the review area: acres.

6. **Wetlands adjacent to non-RPWs that flow directly or indirectly into TNWs.**
   - ☐ Wetlands adjacent to such waters, and have when considered in combination with the tributary to which they are adjacent and with similarly situated adjacent wetlands, have a significant nexus with a TNW are jurisdictional. Data supporting this conclusion is provided at Section III.C.

   Provide estimates for jurisdictional wetlands in the review area: acres.

7. **Impoundments of jurisdictional waters.[9]**
   As a general rule, the impoundment of a jurisdictional tributary remains jurisdictional.
   - ☐ Demonstrate that impoundment was created from "waters of the U.S.," or
   - ☐ Demonstrate that water meets the criteria for one of the categories presented above (1-6), or
   - ☐ Demonstrate that water is isolated with a nexus to commerce (see E below).

E. **ISOLATED [INTERSTATE OR INTRA-STATE] WATERS, INCLUDING ISOLATED WETLANDS, THE USE, DEGRADATION OR DESTRUCTION OF WHICH COULD AFFECT INTERSTATE COMMERCE, INCLUDING ANY SUCH WATERS (CHECK ALL THAT APPLY):[10]**
- ☐ which are or could be used by interstate or foreign travelers for recreational or other purposes.
- ☐ from which fish or shellfish are or could be taken and sold in interstate or foreign commerce.
- ☐ which are or could be used for industrial purposes by industries in interstate commerce.
- ☐ Interstate isolated waters. Explain: .
- ☐ Other factors. Explain: .

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[8] See Footnote # 3.
[9] To complete the analysis refer to the key in Section III.D.6 of the Instructional Guidebook.
[10] Prior to asserting or declining CWA jurisdiction based solely on this category, Corps Districts will elevate the action to Corps and EPA HQ for review consistent with the process described in the Corps/EPA *Memorandum Regarding CWA Act Jurisdiction Following Rapanos.*

Identify water body and summarize rationale supporting determination:

Provide estimates for jurisdictional waters in the review area (check all that apply):
- ☐ Tributary waters: linear feet width (ft).
- ☐ Other non-wetland waters: acres.
  - Identify type(s) of waters:
- ☐ Wetlands: acres.

F. NON-JURISDICTIONAL WATERS, INCLUDING WETLANDS (CHECK ALL THAT APPLY):
- ☐ If potential wetlands were assessed within the review area, these areas did not meet the criteria in the 1987 Corps of Engineers Wetland Delineation Manual and/or appropriate Regional Supplements.
- ☐ Review area included isolated waters with no substantial nexus to interstate (or foreign) commerce.
  - ☐ Prior to the Jan 2001 Supreme Court decision in "*SWANCC*," the review area would have been regulated based solely on the "Migratory Bird Rule" (MBR).
- ☐ Waters do not meet the "Significant Nexus" standard, where such a finding is required for jurisdiction. Explain:
- ☐ Other: (explain, if not covered above):

Provide acreage estimates for non-jurisdictional waters in the review area, where the sole potential basis of jurisdiction is the MBR factors (i.e., presence of migratory birds, presence of endangered species, use of water for irrigated agriculture), using best professional judgment (check all that apply):
- ☐ Non-wetland waters (i.e., rivers, streams): linear feet width (ft).
- ☐ Lakes/ponds: acres.
- ☐ Other non-wetland waters: acres. List type of aquatic resource:
- ☐ Wetlands: acres.

Provide acreage estimates for non-jurisdictional waters in the review area that do not meet the "Significant Nexus" standard, where such a finding is required for jurisdiction (check all that apply):
- ☐ Non-wetland waters (i.e., rivers, streams): linear feet, width (ft).
- ☐ Lakes/ponds: acres.
- ☐ Other non-wetland waters: acres. List type of aquatic resource:
- ☐ Wetlands: acres.

SECTION IV: DATA SOURCES.

A. SUPPORTING DATA. **Data reviewed for JD (check all that apply** - checked items shall be included in case file and, where checked and requested, appropriately reference sources below):
- ☒ Maps, plans, plots or plat submitted by or on behalf of the applicant/consultant:
- ☒ Data sheets prepared/submitted by or on behalf of the applicant/consultant.
  - ☐ Office concurs with data sheets/delineation report.
  - ☐ Office does not concur with data sheets/delineation report.
- ☐ Data sheets prepared by the Corps:
- ☐ Corps navigable waters' study:
- ☒ U.S. Geological Survey Hydrologic Atlas:
  - ☐ USGS NHD data.
  - ☒ USGS 8 and 12 digit HUC maps.
- ☒ U.S. Geological Survey map(s). Cite scale & quad name:7.5 Minute Devore & San Bernardino North, CA.
- ☒ USDA Natural Resources Conservation Service Soil Survey. Citation:www.websoilsurvey.nrcs.usda.gov/app/WebSoilSurvey.aspx.
- ☒ National wetlands inventory map(s). Cite name:www.wetlandsfws.er.usgs.gov/NWI/index.html.
- ☐ State/Local wetland inventory map(s):
- ☒ FEMA/FIRM maps: 06071C7940F; 06071C7910F; 06071C7905F; 06071C7920F.
- ☒ 100-year Floodplain Elevation is: approximately 1,800 feet above mean sea level (National Geodectic Vertical Datum of 1929)
- ☒ Photographs: ☒ Aerial (Name & Date): Google Earth 2007.
  - or ☒ Other (Name & Date): Site Photographs 12/03/06.
- ☐ Previous determination(s). File no. and date of response letter:
- ☐ Applicable/supporting case law:
- ☐ Applicable/supporting scientific literature:
- ☐ Other information (please specify):

B. ADDITIONAL COMMENTS TO SUPPORT JD:

APPROVED JURISDICTIONAL DETERMINATION FORM
U.S. Army Corps of Engineers

This form should be completed by following the instructions provided in Section IV of the JD Form Instructional Guidebook.

SECTION I: BACKGROUND INFORMATION

A. REPORT COMPLETION DATE FOR APPROVED JURISDICTIONAL DETERMINATION (JD):

B. DISTRICT OFFICE, FILE NAME, AND NUMBER:

C. PROJECT LOCATION AND BACKGROUND INFORMATION: unnamed tributaries to Blue-line drainage - West and Main drainage - East

State: California County/parish/borough: San Bernardino City: Rialto and Unincorporated Areas
Center coordinates of site (lat/long in degree decimal format): Lat. 34.2025° N, Long. 117.4228° W.
Universal Transverse Mercator:
Name of nearest waterbody: Lytle Creek
Name of nearest Traditional Navigable Water (TNW) into which the aquatic resource flows: Pacific Ocean
Name of watershed or Hydrologic Unit Code (HUC): 18070203

- ☒ Check if map/diagram of review area and/or potential jurisdictional areas is/are available upon request.
- ☐ Check if other sites (e.g., offsite mitigation sites, disposal sites, etc…) are associated with this action and are recorded on a different JD form.

D. REVIEW PERFORMED FOR SITE EVALUATION (CHECK ALL THAT APPLY):

- ☐ Office (Desk) Determination. Date:
- ☐ Field Determination. Date(s):

SECTION II: SUMMARY OF FINDINGS

A. RHA SECTION 10 DETERMINATION OF JURISDICTION.

There **Are no** "*navigable waters of the U.S.*" within Rivers and Harbors Act (RHA) jurisdiction (as defined by 33 CFR part 329) in the review area. [*Required*]

- ☐ Waters subject to the ebb and flow of the tide.
- ☐ Waters are presently used, or have been used in the past, or may be susceptible for use to transport interstate or foreign commerce. Explain:

B. CWA SECTION 404 DETERMINATION OF JURISDICTION.

There **Are** "*waters of the U.S.*" within Clean Water Act (CWA) jurisdiction (as defined by 33 CFR part 328) in the review area. [*Required*]

1. **Waters of the U.S.**
   a. **Indicate presence of waters of U.S. in review area (check all that apply):** [1]
   - ☐ TNWs, including territorial seas
   - ☐ Wetlands adjacent to TNWs
   - ☐ Relatively permanent waters[2] (RPWs) that flow directly or indirectly into TNWs
   - ☒ Non-RPWs that flow directly or indirectly into TNWs
   - ☐ Wetlands directly abutting RPWs that flow directly or indirectly into TNWs
   - ☐ Wetlands adjacent to but not directly abutting RPWs that flow directly or indirectly into TNWs
   - ☐ Wetlands adjacent to non-RPWs that flow directly or indirectly into TNWs
   - ☐ Impoundments of jurisdictional waters
   - ☐ Isolated (interstate or intrastate) waters, including isolated wetlands

   b. **Identify (estimate) size of waters of the U.S. in the review area:**
   Non-wetland waters: 23,980 linear feet: width (ft) and/or 1.61 acres.
   Wetlands: acres.

   c. **Limits (boundaries) of jurisdiction** based on: **1987 Delineation Manual**
   Elevation of established OHWM (if known): 2,000 ft.

2. **Non-regulated waters/wetlands (check if applicable):**[3]
   - ☐ Potentially jurisdictional waters and/or wetlands were assessed within the review area and determined to be not jurisdictional. Explain:

---

[1] Boxes checked below shall be supported by completing the appropriate sections in Section III below.
[2] For purposes of this form, an RPW is defined as a tributary that is not a TNW and that typically flows year-round or has continuous flow at least "seasonally" (e.g., typically 3 months).
[3] Supporting documentation is presented in Section III.F.

SECTION III: CWA ANALYSIS

A. TNWs AND WETLANDS ADJACENT TO TNWs

The agencies will assert jurisdiction over TNWs and wetlands adjacent to TNWs. If the aquatic resource is a TNW, complete Section III.A.1 and Section III.D.1. only; if the aquatic resource is a wetland adjacent to a TNW, complete Sections III.A.1 and 2 and Section III.D.1.; otherwise, see Section III.B below.

1. TNW
   Identify TNW:

   Summarize rationale supporting determination:

2. Wetland adjacent to TNW
   Summarize rationale supporting conclusion that wetland is "adjacent":

B. CHARACTERISTICS OF TRIBUTARY (THAT IS NOT A TNW) AND ITS ADJACENT WETLANDS (IF ANY):

This section summarizes information regarding characteristics of the tributary and its adjacent wetlands, if any, and it helps determine whether or not the standards for jurisdiction established under *Rapanos* have been met.

The agencies will assert jurisdiction over non-navigable tributaries of TNWs where the tributaries are "relatively permanent waters" (RPWs), i.e. tributaries that typically flow year-round or have continuous flow at least seasonally (e.g., typically 3 months). A wetland that directly abuts an RPW is also jurisdictional. If the aquatic resource is not a TNW, but has year-round (perennial) flow, skip to Section III.D.2. If the aquatic resource is a wetland directly abutting a tributary with perennial flow, skip to Section III.D.4.

A wetland that is adjacent to but that does not directly abut an RPW requires a significant nexus evaluation. Corps districts and EPA regions will include in the record any available information that documents the existence of a significant nexus between a relatively permanent tributary that is not perennial (and its adjacent wetlands if any) and a traditional navigable water, even though a significant nexus finding is not required as a matter of law.

If the waterbody[4] is not an RPW, or a wetland directly abutting an RPW, a JD will require additional data to determine if the waterbody has a significant nexus with a TNW. If the tributary has adjacent wetlands, the significant nexus evaluation must consider the tributary in combination with all of its adjacent wetlands. This significant nexus evaluation that combines, for analytical purposes, the tributary and all of its adjacent wetlands is used whether the review area identified in the JD request is the tributary, or its adjacent wetlands, or both. If the JD covers a tributary with adjacent wetlands, complete Section III.B.1 for the tributary, Section III.B.2 for any onsite wetlands, and Section III.B.3 for all wetlands adjacent to that tributary, both onsite and offsite. The determination whether a significant nexus exists is determined in Section III.C below.

1. Characteristics of non-TNWs that flow directly or indirectly into TNW

   (i) General Area Conditions:
   Watershed size: 1,681 square miles
   Drainage area: 366 acres
   Average annual rainfall: 16 inches
   Average annual snowfall: 0 inches

   (ii) Physical Characteristics:
   (a) Relationship with TNW:
   ☐ Tributary flows directly into TNW.
   ☒ Tributary flows through 4 tributaries before entering TNW.

   Project waters are 30 (or more) river miles from TNW.
   Project waters are 10-15 river miles from RPW.
   Project waters are 30 (or more) aerial (straight) miles from TNW.
   Project waters are 10-15 aerial (straight) miles from RPW.
   Project waters cross or serve as state boundaries. Explain:

   Identify flow route to TNW[5]: Unnamed tributaries, Blue-line drainage - West or Main drainage - East, Lytle Creek, Cajon Creek, Santa Ana River, Pacific Ocean.

[4] Note that the Instructional Guidebook contains additional information regarding swales, ditches, washes, and erosional features generally and in the arid West.
[5] Flow route can be described by identifying, e.g., tributary a, which flows through the review area, to flow into tributary b, which then flows into TNW.

Tributary stream order, if known: 1st.

(b) General Tributary Characteristics (check all that apply):

Tributary is: ☒ Natural
☐ Artificial (man-made). Explain:
☐ Manipulated (man-altered). Explain:

Tributary properties with respect to top of bank (estimate):
Average width: 3 feet
Average depth: 1 feet
Average side slopes: **2:1.**

Primary tributary substrate composition (check all that apply):

☐ Silts ☒ Sands ☐ Concrete
☒ Cobbles ☐ Gravel ☐ Muck
☐ Bedrock ☒ Vegetation. Type/% cover: 20% upland scrub
☐ Other. Explain:

Tributary condition/stability [e.g., highly eroding, sloughing banks]. Explain: relatively stable.
Presence of run/riffle/pool complexes. Explain: N/A.
Tributary geometry: **Meandering**
Tributary gradient (approximate average slope): 1 %

(c) Flow:
Tributary provides for: **Ephemeral flow**
Estimate average number of flow events in review area/year: **2-5**
Describe flow regime: Only flows during heavy rain events.
Other information on duration and volume: Flows immediately after storm events.

Surface flow is: **Confined.** Characteristics:

Subsurface flow: **Unknown.** Explain findings:
☐ Dye (or other) test performed:

Tributary has (check all that apply):
☒ Bed and banks
☒ OHWM[6] (check all indicators that apply):

☒ clear, natural line impressed on the bank
☐ changes in the character of soil
☒ shelving
☐ vegetation matted down, bent, or absent
☐ leaf litter disturbed or washed away
☐ sediment deposition
☐ water staining
☐ other (list):
☒ the presence of litter and debris
☒ destruction of terrestrial vegetation
☒ the presence of wrack line
☐ sediment sorting
☐ scour
☐ multiple observed or predicted flow events
☐ abrupt change in plant community

☐ Discontinuous OHWM.[7] Explain:

If factors other than the OHWM were used to determine lateral extent of CWA jurisdiction (check all that apply):

☐ High Tide Line indicated by:
☐ oil or scum line along shore objects
☐ fine shell or debris deposits (foreshore)
☐ physical markings/characteristics
☐ tidal gauges
☐ other (list):

☐ Mean High Water Mark indicated by:
☐ survey to available datum;
☐ physical markings;
☐ vegetation lines/changes in vegetation types.

(iii) Chemical Characteristics:
Characterize tributary (e.g., water color is clear, discolored, oily film; water quality; general watershed characteristics, etc.).
Explain: Watershed contains some development.
Identify specific pollutants, if known: Hydrocarbons, sediment.

---

[6]A natural or man-made discontinuity in the OHWM does not necessarily sever jurisdiction (e.g., where the stream temporarily flows underground, or where the OHWM has been removed by development or agricultural practices). Where there is a break in the OHWM that is unrelated to the waterbody's flow regime (e.g., flow over a rock outcrop or through a culvert), the agencies will look for indicators of flow above and below the break.
[7]Ibid.

(iv) **Biological Characteristics. Channel supports (check all that apply):**

- ☒ Riparian corridor. Characteristics (type, average width): willow riparian, avg width approx 23 ft.
- ☐ Wetland fringe. Characteristics: .
- ☐ Habitat for:
  - ☐ Federally Listed species. Explain findings: .
  - ☐ Fish/spawn areas. Explain findings: .
  - ☐ Other environmentally-sensitive species. Explain findings: .
  - ☐ Aquatic/wildlife diversity. Explain findings: .

2. **Characteristics of wetlands adjacent to non-TNW that flow directly or indirectly into TNW**

(i) **Physical Characteristics:**

(a) General Wetland Characteristics:

Properties:

Wetland size: acres

Wetland type. Explain: .

Wetland quality. Explain: .

Project wetlands cross or serve as state boundaries. Explain: .

(b) General Flow Relationship with Non-TNW:

Flow is: **Pick List**. Explain: .

Surface flow is: **Pick List**

Characteristics: .

Subsurface flow: **Pick List**. Explain findings: .

- ☐ Dye (or other) test performed: .

(c) Wetland Adjacency Determination with Non-TNW:

- ☐ Directly abutting
- ☐ Not directly abutting
  - ☐ Discrete wetland hydrologic connection. Explain: .
  - ☐ Ecological connection. Explain: .
  - ☐ Separated by berm/barrier. Explain: .

(d) Proximity (Relationship) to TNW

Project wetlands are **Pick List** river miles from TNW.

Project waters are **Pick List** aerial (straight) miles from TNW.

Flow is from: **Pick List.**

Estimate approximate location of wetland as within the **Pick List** floodplain.

(ii) **Chemical Characteristics:**

Characterize wetland system (e.g., water color is clear, brown, oil film on surface; water quality; general watershed characteristics; etc.). Explain: .

Identify specific pollutants, if known: .

(iii) **Biological Characteristics. Wetland supports (check all that apply):**

- ☐ Riparian buffer. Characteristics (type, average width): .
- ☐ Vegetation type/percent cover. Explain: .
- ☐ Habitat for:
  - ☐ Federally Listed species. Explain findings: .
  - ☐ Fish/spawn areas. Explain findings: .
  - ☐ Other environmentally-sensitive species. Explain findings: .
  - ☐ Aquatic/wildlife diversity. Explain findings: .

3. **Characteristics of all wetlands adjacent to the tributary (if any)**

All wetland(s) being considered in the cumulative analysis: **Pick List**

Approximately ( ) acres in total are being considered in the cumulative analysis.

For each wetland, specify the following:

Directly abuts? (Y/N)	Size (in acres)	Directly abuts? (Y/N)	Size (in acres)

Summarize overall biological, chemical and physical functions being performed:

C. SIGNIFICANT NEXUS DETERMINATION

A significant nexus analysis will assess the flow characteristics and functions of the tributary itself and the functions performed by any wetlands adjacent to the tributary to determine if they significantly affect the chemical, physical, and biological integrity of a TNW. For each of the following situations, a significant nexus exists if the tributary, in combination with all of its adjacent wetlands, has more than a speculative or insubstantial effect on the chemical, physical and/or biological integrity of a TNW. Considerations when evaluating significant nexus include, but are not limited to the volume, duration, and frequency of the flow of water in the tributary and its proximity to a TNW, and the functions performed by the tributary and all its adjacent wetlands. It is not appropriate to determine significant nexus based solely on any specific threshold of distance (e.g. between a tributary and its adjacent wetland or between a tributary and the TNW). Similarly, the fact an adjacent wetland lies within or outside of a floodplain is not solely determinative of significant nexus.

Draw connections between the features documented and the effects on the TNW, as identified in the *Rapanos* Guidance and discussed in the Instructional Guidebook. Factors to consider include, for example:

- Does the tributary, in combination with its adjacent wetlands (if any), have the capacity to carry pollutants or flood waters to TNWs, or to reduce the amount of pollutants or flood waters reaching a TNW?
- Does the tributary, in combination with its adjacent wetlands (if any), provide habitat and lifecycle support functions for fish and other species, such as feeding, nesting, spawning, or rearing young for species that are present in the TNW?
- Does the tributary, in combination with its adjacent wetlands (if any), have the capacity to transfer nutrients and organic carbon that support downstream foodwebs?
- Does the tributary, in combination with its adjacent wetlands (if any), have other relationships to the physical, chemical, or biological integrity of the TNW?

Note: the above list of considerations is not inclusive and other functions observed or known to occur should be documented below:

1. **Significant nexus findings for non-RPW that has no adjacent wetlands and flows directly or indirectly into TNWs.** Explain findings of presence or absence of significant nexus below, based on the tributary itself, then go to Section III.D: Please see Jurisdictional Delineation repot for significant nexus evaluation.

2. **Significant nexus findings for non-RPW and its adjacent wetlands, where the non-RPW flows directly or indirectly into TNWs.** Explain findings of presence or absence of significant nexus below, based on the tributary in combination with all of its adjacent wetlands, then go to Section III.D:

3. **Significant nexus findings for wetlands adjacent to an RPW but that do not directly abut the RPW.** Explain findings of presence or absence of significant nexus below, based on the tributary in combination with all of its adjacent wetlands, then go to Section III.D:

D. DETERMINATIONS OF JURISDICTIONAL FINDINGS. THE SUBJECT WATERS/WETLANDS ARE (CHECK ALL THAT APPLY):

1. **TNWs and Adjacent Wetlands.** Check all that apply and provide size estimates in review area:
   - ☐ TNWs: linear feet width (ft), Or, acres.
   - ☐ Wetlands adjacent to TNWs: acres.

2. **RPWs that flow directly or indirectly into TNWs.**
   - ☐ Tributaries of TNWs where tributaries typically flow year-round are jurisdictional. Provide data and rationale indicating that tributary is perennial:
   - ☐ Tributaries of TNW where tributaries have continuous flow "seasonally" (e.g., typically three months each year) are jurisdictional. Data supporting this conclusion is provided at Section III.B. Provide rationale indicating that tributary flows seasonally:

Provide estimates for jurisdictional waters in the review area (check all that apply):
☐ Tributary waters: linear feet width (ft).
☐ Other non-wetland waters: acres.
Identify type(s) of waters: .

3. **Non-RPWs[8] that flow directly or indirectly into TNWs.**
☒ Waterbody that is not a TNW or an RPW, but flows directly or indirectly into a TNW, and it has a significant nexus with a TNW is jurisdictional. Data supporting this conclusion is provided at Section III.C.

Provide estimates for jurisdictional waters within the review area (check all that apply):
☒ Tributary waters: 23,980 linear feet 3 width (ft).
☐ Other non-wetland waters: acres.
Identify type(s) of waters: .

4. **Wetlands directly abutting an RPW that flow directly or indirectly into TNWs.**
☐ Wetlands directly abut RPW and thus are jurisdictional as adjacent wetlands.
☐ Wetlands directly abutting an RPW where tributaries typically flow year-round. Provide data and rationale indicating that tributary is perennial in Section III.D.2, above. Provide rationale indicating that wetland is directly abutting an RPW: .

☐ Wetlands directly abutting an RPW where tributaries typically flow "seasonally." Provide data indicating that tributary is seasonal in Section III.B and rationale in Section III.D.2, above. Provide rationale indicating that wetland is directly abutting an RPW: .

Provide acreage estimates for jurisdictional wetlands in the review area: acres.

5. **Wetlands adjacent to but not directly abutting an RPW that flow directly or indirectly into TNWs.**
☐ Wetlands that do not directly abut an RPW, but when considered in combination with the tributary to which they are adjacent and with similarly situated adjacent wetlands, have a significant nexus with a TNW are jurisidictional. Data supporting this conclusion is provided at Section III.C.

Provide acreage estimates for jurisdictional wetlands in the review area: acres.

6. **Wetlands adjacent to non-RPWs that flow directly or indirectly into TNWs.**
☐ Wetlands adjacent to such waters, and have when considered in combination with the tributary to which they are adjacent and with similarly situated adjacent wetlands, have a significant nexus with a TNW are jurisdictional. Data supporting this conclusion is provided at Section III.C.

Provide estimates for jurisdictional wetlands in the review area: acres.

7. **Impoundments of jurisdictional waters.[9]**
As a general rule, the impoundment of a jurisdictional tributary remains jurisdictional.
☐ Demonstrate that impoundment was created from "waters of the U.S.," or
☐ Demonstrate that water meets the criteria for one of the categories presented above (1-6), or
☐ Demonstrate that water is isolated with a nexus to commerce (see E below).

E. **ISOLATED [INTERSTATE OR INTRA-STATE] WATERS, INCLUDING ISOLATED WETLANDS, THE USE, DEGRADATION OR DESTRUCTION OF WHICH COULD AFFECT INTERSTATE COMMERCE, INCLUDING ANY SUCH WATERS (CHECK ALL THAT APPLY):[10]**
☐ which are or could be used by interstate or foreign travelers for recreational or other purposes.
☐ from which fish or shellfish are or could be taken and sold in interstate or foreign commerce.
☐ which are or could be used for industrial purposes by industries in interstate commerce.
☐ Interstate isolated waters. Explain: .
☐ Other factors. Explain: .

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[8] See Footnote # 3.
[9] To complete the analysis refer to the key in Section III.D.6 of the Instructional Guidebook.
[10] **Prior to asserting or declining CWA jurisdiction based solely on this category, Corps Districts will elevate the action to Corps and EPA HQ for review consistent with the process described in the Corps/EPA *Memorandum Regarding CWA Act Jurisdiction Following Rapanos.***

Identify water body and summarize rationale supporting determination:

Provide estimates for jurisdictional waters in the review area (check all that apply):
- ☐ Tributary waters: linear feet width (ft).
- ☐ Other non-wetland waters: acres.
  - Identify type(s) of waters:
- ☐ Wetlands: acres.

F. NON-JURISDICTIONAL WATERS, INCLUDING WETLANDS (CHECK ALL THAT APPLY):
- ☐ If potential wetlands were assessed within the review area, these areas did not meet the criteria in the 1987 Corps of Engineers Wetland Delineation Manual and/or appropriate Regional Supplements.
- ☐ Review area included isolated waters with no substantial nexus to interstate (or foreign) commerce.
  - ☐ Prior to the Jan 2001 Supreme Court decision in "*SWANCC*," the review area would have been regulated based solely on the "Migratory Bird Rule" (MBR).
- ☐ Waters do not meet the "Significant Nexus" standard, where such a finding is required for jurisdiction. Explain:
- ☐ Other: (explain, if not covered above):

Provide acreage estimates for non-jurisdictional waters in the review area, where the sole potential basis of jurisdiction is the MBR factors (i.e., presence of migratory birds, presence of endangered species, use of water for irrigated agriculture), using best professional judgment (check all that apply):
- ☐ Non-wetland waters (i.e., rivers, streams): linear feet width (ft).
- ☐ Lakes/ponds: acres.
- ☐ Other non-wetland waters: acres. List type of aquatic resource:
- ☐ Wetlands: acres.

Provide acreage estimates for non-jurisdictional waters in the review area that do not meet the "Significant Nexus" standard, where such a finding is required for jurisdiction (check all that apply):
- ☐ Non-wetland waters (i.e., rivers, streams): linear feet, width (ft).
- ☐ Lakes/ponds: acres.
- ☐ Other non-wetland waters: acres. List type of aquatic resource:
- ☐ Wetlands: acres.

SECTION IV: DATA SOURCES.

A. SUPPORTING DATA. **Data reviewed for JD (check all that apply** - checked items shall be included in case file and, where checked and requested, appropriately reference sources below):
- ☒ Maps, plans, plots or plat submitted by or on behalf of the applicant/consultant:
- ☒ Data sheets prepared/submitted by or on behalf of the applicant/consultant.
  - ☐ Office concurs with data sheets/delineation report.
  - ☐ Office does not concur with data sheets/delineation report.
- ☐ Data sheets prepared by the Corps:
- ☐ Corps navigable waters' study:
- ☒ U.S. Geological Survey Hydrologic Atlas:
  - ☐ USGS NHD data.
  - ☒ USGS 8 and 12 digit HUC maps.
- ☒ U.S. Geological Survey map(s). Cite scale & quad name:7.5 Minute Devore & San Bernardino North, CA.
- ☒ USDA Natural Resources Conservation Service Soil Survey. Citation:www.websoilsurvey.nrcs.usda.gov/app/WebSoilSurvey.aspx.
- ☒ National wetlands inventory map(s). Cite name:www.wetlandsfws.er.usgs.gov/NWI/index.html.
- ☐ State/Local wetland inventory map(s):
- ☒ FEMA/FIRM maps: 06071C7910F: Zone X - Areas determined to be outside of 500-year floodplain.
- ☒ 100-year Floodplain Elevation is: Approximate elevation is 2,000 feet above Mean Sea Level (National Geodectic Vertical Datum of 1929)
- ☒ Photographs: ☒ Aerial (Name & Date): Google Earth 2007.
  or ☒ Other (Name & Date): Site Photographs 12/03/06.
- ☐ Previous determination(s). File no. and date of response letter:
- ☐ Applicable/supporting case law:
- ☐ Applicable/supporting scientific literature:
- ☐ Other information (please specify):

B. ADDITIONAL COMMENTS TO SUPPORT JD:

APPENDIX B

Wetland Delineation Data Sheets

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WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Lytle Creek - Lytle Creek City/County: Rialto/San Bernardino Sampling Date: 6/21/07

Applicant/Owner: Hewitt & O'neal State: CA Sampling Point: #1

Investigator(s): JM, SA, MR Section, Township, Range: 17, 1N, 5W

Landform (hillslope, terrace, etc.): Impoundment Local relief (concave, convex, none): Concave Slope (%): _____

Subregion (LRR): C Lat: _____ Long: _____ Datum: _____

Soil Map Unit Name: Psamnents & Fulvents NWI classification: N/A

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? No Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? No (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No _____	Is the Sampled Area within a Wetland? Yes _____ No ✓
Hydric Soil Present?	Yes _____	No ✓	
Wetland Hydrology Present?	Yes ✓	No _____	

Remarks:

VEGETATION

Tree Stratum (Use scientific names.)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
Total Cover:			
Sapling/Shrub Stratum			
1. *Baccharis salicifolia*	55	Yes	FACW
2.			
3.			
4.			
5.			
Total Cover:	55		
Herb Stratum			
1. *Ambrosia acanthacorpa*	30	Yes	FAC
2. *Hirschfeldia incara*	5	No	UPL
3. *Ricinus communis*	3	No	FACU
4. *Artemisia douglasiana*	2	No	FACW
5.			
6.			
7.			
8.			
Total Cover:	40		
Woody Vine Stratum			
1.			
2.			
Total Cover:	95		

% Bare Ground in Herb Stratum 60 % Cover of Biotic Crust _____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species _____	x 1 = _____
FACW species _____	x 2 = _____
FAC species _____	x 3 = _____
FACU species _____	x 4 = _____
UPL species _____	x 5 = _____
Column Totals: _____ (A)	_____ (B)

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators:

___ Dominance Test is >50%

___ Prevalence Index is ≤3.0[1]

___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present.

Hydrophytic Vegetation Present? Yes ✓ No _____

Remarks:

SOIL

Sampling Point: #1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-20	2.5Y 3/1	100					Sandy	Silty sand

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix. [2]Location: PL=Pore Lining, RC=Root Channel, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (LRR C)
- ___ 1 cm Muck (A9) (LRR D)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) (LRR C)
- ___ 2 cm Muck (A10) (LRR B)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present.

Restrictive Layer (if present):

Type: ___

Depth (inches): ___

Hydric Soil Present? Yes ___ No ✓

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one indicator is sufficient)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1) (Nonriverine)
- ___ Sediment Deposits (B2) (Nonriverine)
- ___ Drift Deposits (B3) (Nonriverine)
- ✓ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Plowed Soils (C6)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) (Riverine)
- ___ Sediment Deposits (B2) (Riverine)
- ___ Drift Deposits (B3) (Riverine)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Thin Muck Surface (C7)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ___ No ___ Depth (inches): ___

Water Table Present? Yes ___ No ___ Depth (inches): ___

Saturation Present? (includes capillary fringe) Yes ___ No ___ Depth (inches): ___

Wetland Hydrology Present? Yes ✓ No ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Lytle Creek - Lytle Creek City/County: Rialto/San Bernardino Sampling Date: 6/28/07

Applicant/Owner: Hewitt & O'neal State: CA Sampling Point: #2

Investigator(s): JM, SA Section, Township, Range: 4, 1N, 5W

Landform (hillslope, terrace, etc.): Impoundment Local relief (concave, convex, none): Concave Slope (%): 0-9%

Subregion (LRR): C Lat: _____ Long: _____ Datum: _____

Soil Map Unit Name: Psamments & Fluvents, Frequently Flooded NWI classification: N/A

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? No Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? No (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No _____	Is the Sampled Area within a Wetland? Yes _____ No ✓
Hydric Soil Present?	Yes _____	No ✓	
Wetland Hydrology Present?	Yes ✓	No _____	

Remarks:

VEGETATION

Tree Stratum (Use scientific names.)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
Total Cover:			
Sapling/Shrub Stratum			
1. *Baccharis salicifolia*	20	Y	FACW
2. *Nicotiana glauca*	15	Y	FAC
3.			
4.			
5.			
Total Cover:	35		
Herb Stratum			
1. *Hirschfeldia icana*	100	Y	UPL
2.			
3.			
4.			
5.			
6.			
7.			
8.			
Total Cover:	100		
Woody Vine Stratum			
1.			
2.			
Total Cover:	135		

% Bare Ground in Herb Stratum 0 % Cover of Biotic Crust _____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 66 (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species _____	x 1 = _____
FACW species _____	x 2 = _____
FAC species _____	x 3 = _____
FACU species _____	x 4 = _____
UPL species _____	x 5 = _____
Column Totals: _____ (A)	_____ (B)

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators:

___ Dominance Test is >50%

___ Prevalence Index is ≤3.0[1]

___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present.

Hydrophytic Vegetation Present? Yes ✓ No _____

Remarks:

SOIL

Sampling Point: #2

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-14	5Y 4/2						Silt Loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix. [2]Location: PL=Pore Lining, RC=Root Channel, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (LRR C)
- ___ 1 cm Muck (A9) (LRR D)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) (LRR C)
- ___ 2 cm Muck (A10) (LRR B)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present.

Restrictive Layer (if present):

Type: ___

Depth (inches): ___

Hydric Soil Present? Yes ___ No ✓

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one indicator is sufficient)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1) (Nonriverine)
- ___ Sediment Deposits (B2) (Nonriverine)
- ___ Drift Deposits (B3) (Nonriverine)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Plowed Soils (C6)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) (Riverine)
- ___ Sediment Deposits (B2) (Riverine)
- ✓ Drift Deposits (B3) (Riverine)
- ✓ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Thin Muck Surface (C7)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ___ No ___ Depth (inches): ___

Water Table Present? Yes ___ No ___ Depth (inches): ___

Saturation Present? (Includes capillary fringe) Yes ___ No ___ Depth (inches): ___

Wetland Hydrology Present? Yes ✓ No ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Lytle Creek - Lytle Creek City/County: Rialto/San Bernardino Sampling Date: 6/28/07

Applicant/Owner: Hewitt & O'neal State: CA Sampling Point: #3

Investigator(s): JM, SA Section, Township, Range: 4, 1N, 5W

Landform (hillslope, terrace, etc.): Impoundment Local relief (concave, convex, none): Concave Slope (%): 0-9%

Subregion (LRR): C Lat: _____ Long: _____ Datum: _____

Soil Map Unit Name: Psamments & Fluvents, Frequently Flooded NWI classification: N/A

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? No Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? No (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No _____	Is the Sampled Area within a Wetland? Yes _____ No ✓
Hydric Soil Present?	Yes _____	No ✓	
Wetland Hydrology Present?	Yes ✓	No _____	

Remarks:

VEGETATION

Tree Stratum (Use scientific names.)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
Total Cover:			
Sapling/Shrub Stratum			
1. *Baccharis salicifolia*	20	Y	FACW
2. *Nicotiana glauca*	5	Y	FAC
3.			
4.			
5.			
Total Cover:	25		
Herb Stratum			
1. *Hirschfeldia icana*	100	Y	UPL
2. *Cenyza canalensis*	2	N	FAC
3.			
4.			
5.			
6.			
7.			
8.			
Total Cover:	102		
Woody Vine Stratum			
1.			
2.			
Total Cover:	127		

% Bare Ground in Herb Stratum 0 % Cover of Biotic Crust _____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 66 (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species _____	x 1 = _____
FACW species _____	x 2 = _____
FAC species _____	x 3 = _____
FACU species _____	x 4 = _____
UPL species _____	x 5 = _____
Column Totals: _____ (A)	_____ (B)

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators:

__ Dominance Test is >50%

__ Prevalence Index is ≤3.0[1]

__ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

__ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present.

Hydrophytic Vegetation Present? Yes ✓ No _____

Remarks:

SOIL

Sampling Point: #3

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-5	5Y 4/2	100					Silty Loam	
5-14								Sand

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix. [2]Location: PL=Pore Lining, RC=Root Channel, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (LRR C)
- ___ 1 cm Muck (A9) (LRR D)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) (LRR C)
- ___ 2 cm Muck (A10) (LRR B)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present.

Restrictive Layer (if present):

Type: ___

Depth (inches): ___

Hydric Soil Present? Yes ___ No ✓

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one indicator is sufficient)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1) (Nonriverine)
- ___ Sediment Deposits (B2) (Nonriverine)
- ___ Drift Deposits (B3) (Nonriverine)
- ✓ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Plowed Soils (C6)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) (Riverine)
- ___ Sediment Deposits (B2) (Riverine)
- ___ Drift Deposits (B3) (Riverine)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Thin Muck Surface (C7)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ___ No ✓ Depth (inches): ___

Water Table Present? Yes ___ No ✓ Depth (inches): ___

Saturation Present? (includes capillary fringe) Yes ___ No ✓ Depth (inches): ___

Wetland Hydrology Present? Yes ✓ No ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Lytle Creek - Lytle Creek City/County: Rialto/San Bernardino Sampling Date: 6/28/07

Applicant/Owner: Hewitt & O'neal State: CA Sampling Point: #4

Investigator(s): JM, SA Section, Township, Range: No Section, 1N, 5W

Landform (hillslope, terrace, etc.): Impoundment Local relief (concave, convex, none): Concave Slope (%): ____

Subregion (LRR): C Lat: ____ Long: ____ Datum: ____

Soil Map Unit Name: Psamments & Fluvents, Frequently flooded NWI classification: N/A

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? No Are "Normal Circumstances" present? Yes ✓ No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? No (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No ____	Is the Sampled Area within a Wetland? Yes ____ No ✓
Hydric Soil Present?	Yes ____	No ✓	
Wetland Hydrology Present?	Yes ✓	No ____	

Remarks:

VEGETATION

Tree Stratum (Use scientific names.)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
Total Cover:			
Sapling/Shrub Stratum			
1. *Baccharis salicifolia*	30	Y	FACW
2. *Nicotiana glanca*	25	Y	FAC
3.			
4.			
5.			
Total Cover:	55		
Herb Stratum			
1. *Hirschfeldia incana*	100	Y	UPL
2.			
3.			
4.			
5.			
6.			
7.			
8.			
Total Cover:	100		
Woody Vine Stratum			
1.			
2.			
Total Cover:	155		

% Bare Ground in Herb Stratum 0 % Cover of Biotic Crust ____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 66 (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species ____	x 1 = ____
FACW species ____	x 2 = ____
FAC species ____	x 3 = ____
FACU species ____	x 4 = ____
UPL species ____	x 5 = ____
Column Totals: ____ (A)	____ (B)

Prevalence Index = B/A = ____

Hydrophytic Vegetation Indicators:

- ___ Dominance Test is >50%
- ___ Prevalence Index is ≤3.0[1]
- ___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present.

Hydrophytic Vegetation Present? Yes ✓ No ____

Remarks:

SOIL

Sampling Point: #4

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix. [2]Location: PL=Pore Lining, RC=Root Channel, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (LRR C)
- ___ 1 cm Muck (A9) (LRR D)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) (LRR C)
- ___ 2 cm Muck (A10) (LRR B)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present.

Restrictive Layer (if present):

Type: ___

Depth (inches): ___

Hydric Soil Present? Yes ___ No ✓

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one indicator is sufficient)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1) (Nonriverine)
- ___ Sediment Deposits (B2) (Nonriverine)
- ___ Drift Deposits (B3) (Nonriverine)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Plowed Soils (C6)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) (Riverine)
- ___ Sediment Deposits (B2) (Riverine)
- ___ Drift Deposits (B3) (Riverine)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Thin Muck Surface (C7)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ___ No ___ Depth (inches): ___

Water Table Present? Yes ___ No ___ Depth (inches): ___

Saturation Present? (includes capillary fringe) Yes ___ No ___ Depth (inches): ___

Wetland Hydrology Present? Yes ✓ No ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Lytle Creek - Lytle Creek City/County: Rialto/San Bernardino Sampling Date: 5/18/07

Applicant/Owner: Hewitt & O'neal State: CA Sampling Point: #5

Investigator(s): JM, SA, MR Section, Township, Range: _____

Landform (hillslope, terrace, etc.): Channel Local relief (concave, convex, none): Concave Slope (%): _____

Subregion (LRR): C Lat: _____ Long: _____ Datum: _____

Soil Map Unit Name: _____ NWI classification: N/A

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? No Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? No (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓ No _____	Is the Sampled Area within a Wetland? Yes ✓ No _____
Hydric Soil Present?	Yes ✓ No _____	
Wetland Hydrology Present?	Yes ✓ No _____	

Remarks:

VEGETATION

Tree Stratum (Use scientific names.)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Salix goodingii*	5	Yes	OBL
2.			
3.			
4.			
Total Cover:			
Sapling/Shrub Stratum			
1. *Baccharis salicfolia*	15	No	FACW
2. *Scirpus calif.*	80	Yes	OBL
3.			
4.			
5.			
Total Cover:	95		
Herb Stratum			
1. *Cyperus eragrostis*	5	Yes	FACW
2.			
3.			
4.			
5.			
6.			
7.			
8.			
Total Cover:	5		
Woody Vine Stratum			
1.			
2.			
Total Cover:	105		

% Bare Ground in Herb Stratum 80 % Cover of Biotic Crust _____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species _____	x 1 = _____
FACW species _____	x 2 = _____
FAC species _____	x 3 = _____
FACU species _____	x 4 = _____
UPL species _____	x 5 = _____
Column Totals: _____ (A)	_____ (B)

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators:

✓ Dominance Test is >50%

___ Prevalence Index is ≤3.0[1]

___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present.

Hydrophytic Vegetation Present? Yes ✓ No _____

Remarks:

Sampling Point: #5

SOIL

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix. [2]Location: PL=Pore Lining, RC=Root Channel, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (LRR C)
- ___ 1 cm Muck (A9) (LRR D)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) (LRR C)
- ___ 2 cm Muck (A10) (LRR B)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ✓ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present.

Restrictive Layer (if present):

Type: ___

Depth (inches): ___

Hydric Soil Present? Yes ✓ No ___

Remarks:

Surface water of14"; ponded or saturate for more than 16 days during the growing season.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one indicator is sufficient)

- ✓ Surface Water (A1)
- ___ High Water Table (A2)
- ✓ Saturation (A3)
- ___ Water Marks (B1) (Nonriverine)
- ___ Sediment Deposits (B2) (Nonriverine)
- ___ Drift Deposits (B3) (Nonriverine)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Plowed Soils (C6)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) (Riverine)
- ___ Sediment Deposits (B2) (Riverine)
- ___ Drift Deposits (B3) (Riverine)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Thin Muck Surface (C7)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ✓ No ___ Depth (inches): ___

Water Table Present? Yes ✓ No ___ Depth (inches): ___

Saturation Present? (includes capillary fringe) Yes ✓ No ___ Depth (inches): ___

Wetland Hydrology Present? Yes ✓ No ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Lytle Creek - Lytle Creek City/County: Rialto/San Bernardino Sampling Date: 5/18/07

Applicant/Owner: Hewitt & O'neal State: CA Sampling Point: #6

Investigator(s): JM, SA, MR Section, Township, Range: 22, 1N, 5W

Landform (hillslope, terrace, etc.): Channel Local relief (concave, convex, none): Concave Slope (%): ____

Subregion (LRR): C Lat: ____ Long: ____ Datum: ____

Soil Map Unit Name: Psamments & Fluvents, frequently flooded NWI classification: N/A

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? No Are "Normal Circumstances" present? Yes ✓ No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? No (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No ____	Is the Sampled Area within a Wetland? Yes ____ No ✓
Hydric Soil Present?	Yes ____	No ✓	
Wetland Hydrology Present?	Yes ✓	No ____	

Remarks:

VEGETATION

Tree Stratum (Use scientific names.)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Salix laiolepis*	75	Yes	FACW
2.			
3.			
4.			
Total Cover:	75		
Sapling/Shrub Stratum			
1. *Baccharis salicifolia*	100	Yes	FACW
2.			
3.			
4.			
5.			
Total Cover:			
Herb Stratum			
1. *Artemisia douglasiana*	15	Yes	FACW
2.			
3.			
4.			
5.			
6.			
7.			
8.			
Total Cover:	15		
Woody Vine Stratum			
1.			
2.			
Total Cover:	115		

% Bare Ground in Herb Stratum 75 % Cover of Biotic Crust ____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species ____	x 1 = ____
FACW species ____	x 2 = ____
FAC species ____	x 3 = ____
FACU species ____	x 4 = ____
UPL species ____	x 5 = ____
Column Totals: ____ (A)	____ (B)

Prevalence Index = B/A = ____

Hydrophytic Vegetation Indicators:

✓ Dominance Test is >50%

___ Prevalence Index is ≤3.0[1]

___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present.

Hydrophytic Vegetation Present? Yes ✓ No ____

Remarks:

SOIL

Sampling Point: #6

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-16	2.5Y 3/1	100					Sandy Clay	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix. [2]Location: PL=Pore Lining, RC=Root Channel, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (LRR C)
- ___ 1 cm Muck (A9) (LRR D)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) (LRR C)
- ___ 2 cm Muck (A10) (LRR B)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present.

Restrictive Layer (if present):

Type: ___

Depth (inches): ___

Hydric Soil Present? Yes ___ No ✓

Remarks:

Sulfide odor 16", does not meet the 12" criteria in A-4 criteria (hydrogen sulfide)

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one indicator is sufficient)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ✓ Water Marks (B1) (Nonriverine)
- ✓ Sediment Deposits (B2) (Nonriverine)
- ✓ Drift Deposits (B3) (Nonriverine)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Plowed Soils (C6)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) (Riverine)
- ___ Sediment Deposits (B2) (Riverine)
- ___ Drift Deposits (B3) (Riverine)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Thin Muck Surface (C7)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ___ No ✓ Depth (inches): ___

Water Table Present? Yes ___ No ✓ Depth (inches): ___

Saturation Present? (includes capillary fringe) Yes ___ No ✓ Depth (inches): ___

Wetland Hydrology Present? Yes ✓ No ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Lytle Creek - Lytle Creek City/County: Rialto/San Bernardino Sampling Date: 5/18/07

Applicant/Owner: Hewitt & O'neal State: CA Sampling Point: #7

Investigator(s): JM, SA, MR Section, Township, Range: 22, 1N, 5W

Landform (hillslope, terrace, etc.): Depression Local relief (concave, convex, none): Concave Slope (%): ____

Subregion (LRR): C Lat: ____ Long: ____ Datum: ____

Soil Map Unit Name: Psamments & Fluvents, Frequently Flooded NWI classification: N/A

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? No Are "Normal Circumstances" present? Yes ✓ No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? No (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No ____	Is the Sampled Area within a Wetland? Yes ____ No ✓
Hydric Soil Present?	Yes ____	No ✓	
Wetland Hydrology Present?	Yes ✓	No ____	

Remarks:

Area not a wetland. Low area used to drain access road

VEGETATION

Tree Stratum (Use scientific names.)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
Total Cover:			
Sapling/Shrub Stratum			
1. *Baccharis salicifolia*	35	Yes	FACW
2.			
3.			
4.			
5.			
Total Cover:	35		
Herb Stratum			
1. *Typha doningenis*	15	No	OBL
2. *Cyperus Eragrostis*	60	Yes	FACW
3. *Polypogon monspeliensis*	60	Yes	FACW
4.			
5.			
6.			
7.			
8.			
Total Cover:	135		
Woody Vine Stratum			
1.			
2.			
Total Cover:	170		

% Bare Ground in Herb Stratum ____ % Cover of Biotic Crust ____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species ____	x 1 = ____
FACW species ____	x 2 = ____
FAC species ____	x 3 = ____
FACU species ____	x 4 = ____
UPL species ____	x 5 = ____
Column Totals: ____ (A)	____ (B)

Prevalence Index = B/A = ____

Hydrophytic Vegetation Indicators:

✓ Dominance Test is >50%

__ Prevalence Index is ≤3.0[1]

__ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

__ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present.

Hydrophytic Vegetation Present? Yes ✓ No ____

Remarks:

SOIL

Sampling Point: #7

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-12	5y 5/2						Sandy Clay	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix. [2]Location: PL=Pore Lining, RC=Root Channel, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (LRR C)
- ___ 1 cm Muck (A9) (LRR D)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) (LRR C)
- ___ 2 cm Muck (A10) (LRR B)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present.

Restrictive Layer (if present):

Type: ___

Depth (inches): ___

Hydric Soil Present? Yes ___ No ✓

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one indicator is sufficient)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1) (Nonriverine)
- ___ Sediment Deposits (B2) (Nonriverine)
- ___ Drift Deposits (B3) (Nonriverine)
- ✓ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Plowed Soils (C6)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) (Riverine)
- ___ Sediment Deposits (B2) (Riverine)
- ___ Drift Deposits (B3) (Riverine)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Thin Muck Surface (C7)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ___ No ___ Depth (inches): ___

Water Table Present? Yes ___ No ___ Depth (inches): ___

Saturation Present? (includes capillary fringe) Yes ___ No ___ Depth (inches): ___

Wetland Hydrology Present? Yes ✓ No ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Lytle Creek - Lytle Creek City/County: Rialto/San Bernardino Sampling Date: 5/18/07

Applicant/Owner: Hewitt & O'neal State: CA Sampling Point: #8

Investigator(s): JM, SA, MR Section, Township, Range: 22, 1N, 5W

Landform (hillslope, terrace, etc.): Channel Local relief (concave, convex, none): Concave Slope (%): ____

Subregion (LRR): C Lat: ____ Long: ____ Datum: ____

Soil Map Unit Name: Psamments & Fluvents, Frequently Flooded NWI classification: N/A

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? No Are "Normal Circumstances" present? Yes ✓ No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? No (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No ____	Is the Sampled Area within a Wetland? Yes ____ No ✓
Hydric Soil Present?	Yes ____	No ✓	
Wetland Hydrology Present?	Yes ✓	No ____	

Remarks:

VEGETATION

Tree Stratum (Use scientific names.)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
Total Cover:			
Sapling/Shrub Stratum			
1. *Baccharis salicifolia*	75	Yes	FACW
2.			
3.			
4.			
5.			
Total Cover:			
Herb Stratum			
1. *Typha domingensis*	15	Yes	OBL
2. *Cyperus eragrostis*	30	Yes	FACW
3.			
4.			
5.			
6.			
7.			
8.			
Total Cover:	45		
Woody Vine Stratum			
1.			
2.			
Total Cover:	115		

% Bare Ground in Herb Stratum 50 % Cover of Biotic Crust ____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: ____ (A)

Total Number of Dominant Species Across All Strata: ____ (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: ____ (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species ____	x 1 = ____
FACW species ____	x 2 = ____
FAC species ____	x 3 = ____
FACU species ____	x 4 = ____
UPL species ____	x 5 = ____
Column Totals: ____ (A)	____ (B)

Prevalence Index = B/A = ____

Hydrophytic Vegetation Indicators:

- ___ Dominance Test is >50%
- ___ Prevalence Index is ≤3.0[1]
- ___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present.

Hydrophytic Vegetation Present? Yes ✓ No ____

Remarks:

SOIL

Sampling Point: #8

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-10	2.5Y 3/2	100					Silty Loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix. [2]Location: PL=Pore Lining, RC=Root Channel, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (LRR C)
- ___ 1 cm Muck (A9) (LRR D)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) (LRR C)
- ___ 2 cm Muck (A10) (LRR B)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present.

Restrictive Layer (if present):

Type: ___

Depth (inches): ___

Hydric Soil Present? Yes ___ No ✓

Remarks:

Isolated depression supported by road runoff. No hydric characteristics.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one indicator is sufficient)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1) (Nonriverine)
- ___ Sediment Deposits (B2) (Nonriverine)
- ___ Drift Deposits (B3) (Nonriverine)
- ✓ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Plowed Soils (C6)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) (Riverine)
- ___ Sediment Deposits (B2) (Riverine)
- ___ Drift Deposits (B3) (Riverine)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Thin Muck Surface (C7)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ___ No ✓ Depth (inches): ___

Water Table Present? Yes ___ No ✓ Depth (inches): ___

Saturation Present? (includes capillary fringe) Yes ___ No ✓ Depth (inches): ___

Wetland Hydrology Present? Yes ✓ No ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Lytle Creek - Lytle Creek City/County: Rialto/San Bernardino Sampling Date: 5/18/07

Applicant/Owner: Hewitt & O'neal State: CA Sampling Point: #9

Investigator(s): JM, SA Section, Township, Range: 22, 1N, 5W

Landform (hillslope, terrace, etc.): Impoundment Local relief (concave, convex, none): Concave Slope (%): 0-9%

Subregion (LRR): C Lat: Long: Datum:

Soil Map Unit Name: Psamments & Fluvents, Frequently Flooded NWI classification: N/A

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No (If no, explain in Remarks.)

Are Vegetation, Soil, or Hydrology significantly disturbed? No Are "Normal Circumstances" present? Yes ✓ No

Are Vegetation, Soil, or Hydrology naturally problematic? No (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓ No	Is the Sampled Area within a Wetland? Yes No
Hydric Soil Present?	Yes No ✓	
Wetland Hydrology Present?	Yes ✓ No	

Remarks:

VEGETATION

Tree Stratum (Use scientific names.)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
Total Cover:			
Sapling/Shrub Stratum			
1. *Baccharis salicifolia*	50	Y	FACW
2.			
3.			
4.			
5.			
Total Cover:	50		
Herb Stratum			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
Total Cover:			
Woody Vine Stratum			
1.			
2.			
Total Cover:	50		

% Bare Ground in Herb Stratum _____ % Cover of Biotic Crust _____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species	x 1 =
FACW species	x 2 =
FAC species	x 3 =
FACU species	x 4 =
UPL species	x 5 =
Column Totals: (A)	(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

- ___ Dominance Test is >50%
- ___ Prevalence Index is ≤3.0[1]
- ___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present.

Hydrophytic Vegetation Present? Yes ✓ No

Remarks:

SOIL

Sampling Point: #9

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-6	2.5Y 4/2	100					Sandy Clay	Fill Material

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix. [2]Location: PL=Pore Lining, RC=Root Channel, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (LRR C)
- ___ 1 cm Muck (A9) (LRR D)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) (LRR C)
- ___ 2 cm Muck (A10) (LRR B)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present.

Restrictive Layer (if present):

Type: Rock, large cobbles

Depth (inches): 6"

Hydric Soil Present? Yes ___ No ✓

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one indicator is sufficient)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1) (Nonriverine)
- ___ Sediment Deposits (B2) (Nonriverine)
- ___ Drift Deposits (B3) (Nonriverine)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Plowed Soils (C6)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ✓ Water Marks (B1) (Riverine)
- ___ Sediment Deposits (B2) (Riverine)
- ___ Drift Deposits (B3) (Riverine)
- ✓ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Thin Muck Surface (C7)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- ✓ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ___ No ✓ Depth (inches): ___

Water Table Present? Yes ___ No ✓ Depth (inches): ___

Saturation Present? (includes capillary fringe) Yes ___ No ✓ Depth (inches): ___

Wetland Hydrology Present? Yes ✓ No ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Lytle Creek - Sycamore East City/County: Rialto/San Bernardino Sampling Date: 6/28/07

Applicant/Owner: Hewitt & O'neal State: CA Sampling Point: #1

Investigator(s): JM, SA Section, Township, Range: 4, 1N, 5W

Landform (hillslope, terrace, etc.): Channel Local relief (concave, convex, none): Concave Slope (%): 0-9%

Subregion (LRR): C Lat: ____ Long: ____ Datum: ____

Soil Map Unit Name: Cieneba Cock Outcrop Complex NWI classification: N/A

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? No Are "Normal Circumstances" present? Yes ✓ No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? No (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No ____	Is the Sampled Area within a Wetland? Yes ____ No ✓
Hydric Soil Present?	Yes ____	No ✓	
Wetland Hydrology Present?	Yes ✓	No ____	

Remarks:

VEGETATION

Tree Stratum (Use scientific names.)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
Total Cover:			
Sapling/Shrub Stratum			
1. *Baccharis salicifolia*	80	Y	FACW
2. *Artemesia californica*	10	N	UPL
3.			
4.			
5.			
Total Cover: 90			
Herb Stratum			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
Total Cover:			
Woody Vine Stratum			
1.			
2.			
Total Cover: 90			

% Bare Ground in Herb Stratum 10 % Cover of Biotic Crust ____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species ____	x 1 = ____
FACW species ____	x 2 = ____
FAC species ____	x 3 = ____
FACU species ____	x 4 = ____
UPL species ____	x 5 = ____
Column Totals: ____ (A)	____ (B)

Prevalence Index = B/A = ____

Hydrophytic Vegetation Indicators:

- ___ Dominance Test is >50%
- ___ Prevalence Index is ≤3.0[1]
- ___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present.

Hydrophytic Vegetation Present? Yes ✓ No ____

Remarks:

SOIL

Sampling Point: #1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-12	10YR 4/3	100					Coarse Sand	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix. [2]Location: PL=Pore Lining, RC=Root Channel, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (LRR C)
- ___ 1 cm Muck (A9) (LRR D)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) (LRR C)
- ___ 2 cm Muck (A10) (LRR B)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present.

Restrictive Layer (if present):

Type: ___

Depth (inches): ___

Hydric Soil Present? Yes ___ No ✓

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one indicator is sufficient)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1) (Nonriverine)
- ___ Sediment Deposits (B2) (Nonriverine)
- ___ Drift Deposits (B3) (Nonriverine)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Plowed Soils (C6)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) (Riverine)
- ✓ Sediment Deposits (B2) (Riverine)
- ✓ Drift Deposits (B3) (Riverine)
- ✓ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Thin Muck Surface (C7)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ___ No ✓ Depth (inches): ___

Water Table Present? Yes ___ No ✓ Depth (inches): ___

Saturation Present? (includes capillary fringe) Yes ___ No ✓ Depth (inches): ___

Wetland Hydrology Present? Yes ✓ No ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Lytle Creek - Sycamore East City/County: Rialto/San Bernardino Sampling Date: 6/28/07

Applicant/Owner: Hewitt & O'neal State: CA Sampling Point: #2

Investigator(s): JM, SA Section, Township, Range: 4, 1N, 5W

Landform (hillslope, terrace, etc.): Cahnnel Local relief (concave, convex, none): Concave Slope (%): 9-15

Subregion (LRR): C Lat: Long: Datum:

Soil Map Unit Name: Cieneba Sandy Loam NWI classification: N/A

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? No Are "Normal Circumstances" present? Yes ✓ No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? No (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No ____	Is the Sampled Area within a Wetland? Yes ____ No ✓
Hydric Soil Present?	Yes ____	No ✓	
Wetland Hydrology Present?	Yes ✓	No ____	

Remarks:

VEGETATION

Tree Stratum (Use scientific names.)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Platanus racemosa*	10	Y	FACW
2.			
3.			
4.			
Total Cover:	10		
Sapling/Shrub Stratum			
1. *Baccharis salicifolia*	100	Y	FACW
2. *Nicotiana glauca*	5	N	FAC
3.			
4.			
5.			
Total Cover:	105		
Herb Stratum			
1. *Phacelia cicutania*	5	Y	NI
2.			
3.			
4.			
5.			
6.			
7.			
8.			
Total Cover:	5		
Woody Vine Stratum			
1.			
2.			
Total Cover:	115		

% Bare Ground in Herb Stratum ____ % Cover of Biotic Crust ____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 66 (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species ____	x 1 = ____
FACW species ____	x 2 = ____
FAC species ____	x 3 = ____
FACU species ____	x 4 = ____
UPL species ____	x 5 = ____
Column Totals: ____ (A)	____ (B)

Prevalence Index = B/A = ____

Hydrophytic Vegetation Indicators:

- ___ Dominance Test is >50%
- ___ Prevalence Index is ≤3.0[1]
- ___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present.

Hydrophytic Vegetation Present? Yes ✓ No ____

Remarks:

SOIL

Sampling Point: #2

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-6	10YR 3/2	100					Sand	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix. [2]Location: PL=Pore Lining, RC=Root Channel, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (LRR C)
- ___ 1 cm Muck (A9) (LRR D)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) (LRR C)
- ___ 2 cm Muck (A10) (LRR B)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present.

Restrictive Layer (if present):
Type: Rock, large cobbles
Depth (inches): 6"

Hydric Soil Present? Yes ___ No ✓

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one indicator is sufficient)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1) (Nonriverine)
- ___ Sediment Deposits (B2) (Nonriverine)
- ___ Drift Deposits (B3) (Nonriverine)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Plowed Soils (C6)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) (Riverine)
- ✓ Sediment Deposits (B2) (Riverine)
- ✓ Drift Deposits (B3) (Riverine)
- ✓ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Thin Muck Surface (C7)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ___ No ___ Depth (inches): ___
Water Table Present? Yes ___ No ___ Depth (inches): ___
Saturation Present? (includes capillary fringe) Yes ___ No ___ Depth (inches): ___

Wetland Hydrology Present? Yes ✓ No ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Lytle Creek - Sycamore East City/County: Rialto/San Bernardino Sampling Date: 6/28/07

Applicant/Owner: Hewitt & O'neal State: CA Sampling Point: #3

Investigator(s): JM, SA Section, Township, Range: 4, 1N, 5W

Landform (hillslope, terrace, etc.): Hillslope Local relief (concave, convex, none): None Slope (%): 0-9%

Subregion (LRR): C Lat: _____ Long: _____ Datum: _____

Soil Map Unit Name: Tujunga Gravelly Loamy Sand NWI classification: N/A

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? No Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? No (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓ No _____	Is the Sampled Area within a Wetland? Yes _____ No ✓
Hydric Soil Present?	Yes _____ No ✓	
Wetland Hydrology Present?	Yes _____ No ✓	

Remarks:

VEGETATION

Tree Stratum (Use scientific names.)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
Total Cover:			
Sapling/Shrub Stratum			
1. *Artemisia californica*	15	Y	NI
2.			
3.			
4.			
5.			
Total Cover:			
Herb Stratum			
1. *Juncus mexicanus*	100	Y	FACW
2. *Amsinkia menziesii*	10	N	NI
3. *Hirschfeldia incana*	15	N	NI
4.			
5.			
6.			
7.			
8.			
Total Cover:			
Woody Vine Stratum			
1.			
2.			
Total Cover:			

% Bare Ground in Herb Stratum _____ % Cover of Biotic Crust _____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species _____	x 1 = _____
FACW species _____	x 2 = _____
FAC species _____	x 3 = _____
FACU species _____	x 4 = _____
UPL species _____	x 5 = _____
Column Totals: _____ (A)	_____ (B)

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators:

___ Dominance Test is >50%

___ Prevalence Index is ≤3.0[1]

___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present.

Hydrophytic Vegetation Present? Yes ✓ No _____

Remarks:

SOIL

Sampling Point: #3

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-16	10YR 3/2	100					Loamy Sand	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix. [2]Location: PL=Pore Lining, RC=Root Channel, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (LRR C)
- ___ 1 cm Muck (A9) (LRR D)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) (LRR C)
- ___ 2 cm Muck (A10) (LRR B)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present.

Restrictive Layer (if present):

Type: ___

Depth (inches): ___

Hydric Soil Present? Yes ___ No ✓

Remarks:

Slope of adjacent depression

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one indicator is sufficient)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1) (Nonriverine)
- ___ Sediment Deposits (B2) (Nonriverine)
- ___ Drift Deposits (B3) (Nonriverine)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Plowed Soils (C6)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) (Riverine)
- ___ Sediment Deposits (B2) (Riverine)
- ___ Drift Deposits (B3) (Riverine)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Thin Muck Surface (C7)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ___ No ___ Depth (inches): ___

Water Table Present? Yes ___ No ___ Depth (inches): ___

Saturation Present? (includes capillary fringe) Yes ___ No ___ Depth (inches): ___

Wetland Hydrology Present? Yes ___ No ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

No hydrology present

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Lytle Creek - Sycamore East City/County: Rialto/San Bernardino Sampling Date: 6/28/07

Applicant/Owner: Hewitt & O'neal State: CA Sampling Point: #4

Investigator(s): JM, SA Section, Township, Range: 4, 1N, 5W

Landform (hillslope, terrace, etc.): Depression Local relief (concave, convex, none): Concave Slope (%): 0-9%

Subregion (LRR): C Lat: _____ Long: _____ Datum: _____

Soil Map Unit Name: Tujunga Gravelly Loamy Sand NWI classification: N/A

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? No Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? No (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No _____	Is the Sampled Area within a Wetland? Yes ✓ No _____
Hydric Soil Present?	Yes ✓	No _____	
Wetland Hydrology Present?	Yes ✓	No _____	

Remarks:

VEGETATION

Tree Stratum (Use scientific names.)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Salix goodingii*	45	Yes	OBL
2.			
3.			
4.			
Total Cover:	45		
Sapling/Shrub Stratum			
1.			
2.			
3.			
4.			
5.			
Total Cover:			
Herb Stratum			
1. *Juncus mexicanus*	100	Yes	FACW
2. *Gnathalium californicum*	5	No	NI
3. *Urtica dioica*	5	No	FACW
4.			
5.			
6.			
7.			
8.			
Total Cover:	110		
Woody Vine Stratum			
1.			
2.			
Total Cover:	155		

% Bare Ground in Herb Stratum 0 % Cover of Biotic Crust _____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: _____ (A)

Total Number of Dominant Species Across All Strata: _____ (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: _____ (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species _____	x 1 = _____
FACW species _____	x 2 = _____
FAC species _____	x 3 = _____
FACU species _____	x 4 = _____
UPL species _____	x 5 = _____
Column Totals: _____ (A)	_____ (B)

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators:

__ Dominance Test is >50%

__ Prevalence Index is ≤3.0[1]

__ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

__ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present.

Hydrophytic Vegetation Present? Yes ✓ No _____

Remarks:

SOIL

Sampling Point: #4

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-16	2.5Y 4/2	100						Sandy Gravelly Loam -Fill Mat

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix. [2]Location: PL=Pore Lining, RC=Root Channel, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (LRR C)
- ___ 1 cm Muck (A9) (LRR D)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) (LRR C)
- ___ 2 cm Muck (A10) (LRR B)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ✓ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present.

Restrictive Layer (if present):

Type: ___

Depth (inches): ___

Hydric Soil Present? Yes ✓ No ___

Remarks:

7-8 foot deep depression, concave surface, floodplain;
5"-6" standing water in June during drought year, a least 14 days inundation

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one indicator is sufficient)

- ✓ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1) (Nonriverine)
- ___ Sediment Deposits (B2) (Nonriverine)
- ___ Drift Deposits (B3) (Nonriverine)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Plowed Soils (C6)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) (Riverine)
- ___ Sediment Deposits (B2) (Riverine)
- ___ Drift Deposits (B3) (Riverine)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Thin Muck Surface (C7)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ✓ No ___ Depth (inches): ___

Water Table Present? Yes ✓ No ___ Depth (inches): ___

Saturation Present? (includes capillary fringe) Yes ✓ No ___ Depth (inches): ___

Wetland Hydrology Present? Yes ✓ No ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Lytle Creek - Sycamore East City/County: Rialto/San Bernardino Sampling Date: 6/28/07

Applicant/Owner: Hewitt & O'neal State: CA Sampling Point: #5

Investigator(s): JM, SA Section, Township, Range: 4, 1N, 5W

Landform (hillslope, terrace, etc.): Depression Local relief (concave, convex, none): Concave Slope (%): 0-9%

Subregion (LRR): C Lat: ____ Long: ____ Datum: ____

Soil Map Unit Name: Tujunga Gravelly Loamy Sand NWI classification: N/A

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? No Are "Normal Circumstances" present? Yes ✓ No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? No (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓ No ____	Is the Sampled Area within a Wetland? Yes ✓ No ____
Hydric Soil Present?	Yes ✓ No ____	
Wetland Hydrology Present?	Yes ✓ No ____	

Remarks:

VEGETATION

Tree Stratum (Use scientific names.)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
Total Cover:			
Sapling/Shrub Stratum			
1.			
2.			
3.			
4.			
5.			
Total Cover:			
Herb Stratum			
1. *Typha domingensis*	60	Y	OBL
2. *Urtica dioca*	2	N	FACW
3. *Oenethera elatia*	2	N	FACW
4. *Cardus pychyro cephalus*	3	N	UPL
5. *Ambrosia psilostachya*	1	N	FAC
6. *Hirschfeldia ineana*	50	Y	UPL
7.			
8.			
Total Cover: 118			
Woody Vine Stratum			
1.			
2.			
Total Cover:			

% Bare Ground in Herb Stratum 0 % Cover of Biotic Crust ____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 50 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species	60	x 1 = 60
FACW species	4	x 2 = 8
FAC species	1	x 3 = 3
FACU species	0	x 4 = 0
UPL species	53	x 5 = 265
Column Totals:	118 (A)	336 (B)

Prevalence Index = B/A = 2.85

Hydrophytic Vegetation Indicators:

- ____ Dominance Test is >50%
- ✓ Prevalence Index is ≤3.0[1]
- ____ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present.

Hydrophytic Vegetation Present? Yes ✓ No ____

Remarks:

SOIL

Sampling Point: #5

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-4	2.5Y 3/1 100						Sandy Loam	
4-16	2.5Y 4/2	90	5YR 4/6	10	C	PL	Silty Loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix. [2]Location: PL=Pore Lining, RC=Root Channel, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (LRR C)
- ___ 1 cm Muck (A9) (LRR D)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ✓ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) (LRR C)
- ___ 2 cm Muck (A10) (LRR B)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present.

Restrictive Layer (if present):

Type: ___

Depth (inches): ___

Hydric Soil Present? Yes ✓ No ___

Remarks:

Redox features within 6" of surface and a chroma of 2 or less.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one indicator is sufficient)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1) (Nonriverine)
- ___ Sediment Deposits (B2) (Nonriverine)
- ___ Drift Deposits (B3) (Nonriverine)
- ✓ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Plowed Soils (C6)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) (Riverine)
- ✓ Sediment Deposits (B2) (Riverine)
- ___ Drift Deposits (B3) (Riverine)
- ✓ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Thin Muck Surface (C7)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ___ No ✓ Depth (inches): ___

Water Table Present? Yes ___ No ✓ Depth (inches): ___

Saturation Present? (includes capillary fringe) Yes ___ No ✓ Depth (inches): ___

Wetland Hydrology Present? Yes ✓ No ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Depressional area next to drainage and gas line road. Wetland hydrology present.

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Lytle Creek - Sycamore East City/County: Rialto/San Bernardino Sampling Date: 6/28/07

Applicant/Owner: Hewitt & O'neal State: CA Sampling Point: #6

Investigator(s): JM, SA Section, Township, Range: 4, 1N, 5W

Landform (hillslope, terrace, etc.): Channel Local relief (concave, convex, none): Concave Slope (%): 0-9%

Subregion (LRR): C Lat: Long: Datum:

Soil Map Unit Name: Tujunga Gravelly Loamy Sand NWI classification: N/A

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? No Are "Normal Circumstances" present? Yes ✓ No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? No (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓ No ____	Is the Sampled Area within a Wetland?	Yes ____ No ✓
Hydric Soil Present?	Yes ____ No ✓		
Wetland Hydrology Present?	Yes ✓ No ____		

Remarks:

VEGETATION

Tree Stratum (Use scientific names.)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Salix laerigata*	30	Y	FACW
2.			
3.			
4.			
Total Cover:	30		
Sapling/Shrub Stratum			
1. *Baccharis salicifolia*	25	Y	FACW
2.			
3.			
4.			
5.			
Total Cover:	25		
Herb Stratum			
1. *Typha domingenis*	5	N	OBL
2. *Oenethera electa hookeri*	10	Y	FACW
3. *Cyperus eregrostis*	30	Y	FACW
4. *Cardus pynchnocephalu*	1	N	NI
5.			
6.			
7.			
8.			
Total Cover:	46		
Woody Vine Stratum			
1.			
2.			
Total Cover:	101		

% Bare Ground in Herb Stratum 50 % Cover of Biotic Crust ____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 4 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species ____	x 1 = ____
FACW species ____	x 2 = ____
FAC species ____	x 3 = ____
FACU species ____	x 4 = ____
UPL species ____	x 5 = ____
Column Totals: ____ (A)	____ (B)

Prevalence Index = B/A = ____

Hydrophytic Vegetation Indicators:

✓ Dominance Test is >50%

___ Prevalence Index is ≤3.0[1]

___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present.

Hydrophytic Vegetation Present? Yes ✓ No ____

Remarks:

SOIL

Sampling Point: #6

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-4	2.5Y 3/2	100					Coarse Sand	Fill Material?
4-16								Sand (no color)

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix. [2]Location: PL=Pore Lining, RC=Root Channel, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (LRR C)
- ___ 1 cm Muck (A9) (LRR D)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) (LRR C)
- ___ 2 cm Muck (A10) (LRR B)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present.

Restrictive Layer (if present):

Type: ___

Depth (inches): ___

Hydric Soil Present? Yes ___ No ✓

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one indicator is sufficient)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1) (Nonriverine)
- ___ Sediment Deposits (B2) (Nonriverine)
- ___ Drift Deposits (B3) (Nonriverine)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Plowed Soils (C6)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) (Riverine)
- ✓ Sediment Deposits (B2) (Riverine)
- ✓ Drift Deposits (B3) (Riverine)
- ✓ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Thin Muck Surface (C7)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ___ No ___ Depth (inches): ___

Water Table Present? Yes ___ No ___ Depth (inches): ___

Saturation Present? (includes capillary fringe) Yes ___ No ___ Depth (inches): ___

Wetland Hydrology Present? Yes ✓ No ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Lytle Creek - Sycamore East City/County: Rialto/San Bernardino Sampling Date: 6/28/07

Applicant/Owner: Hewitt & O'neal State: CA Sampling Point: #7

Investigator(s): JM, SA Section, Township, Range: 4, 1N, 5W

Landform (hillslope, terrace, etc.): Channel Local relief (concave, convex, none): Concave Slope (%): 0-9%

Subregion (LRR): C Lat: _____ Long: _____ Datum: _____

Soil Map Unit Name: Tujunga Gravelly Loamy Sand NWI classification: N/A

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? No Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? No (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓ No _____	Is the Sampled Area within a Wetland?	Yes _____ No ✓
Hydric Soil Present?	Yes _____ No ✓		
Wetland Hydrology Present?	Yes ✓ No _____		

Remarks:

VEGETATION

Tree Stratum (Use scientific names.)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Salix goodinig ii*	5	Y	OBL
2. *Salix laevigata*	10	Y	FACW
3.			
4.			
Total Cover:	15		
Sapling/Shrub Stratum			
1. *Baccharia salicifolia*	30	Y	FACW
2.			
3.			
4.			
5.			
Total Cover:	30		
Herb Stratum			
1. *Cyparus erorgrostis*	25	Y	FACW
2. *Bromes rubens*	5	N	NI
3. *Centanea melitensis*	2	N	NI
4. *Amsinkia menzesii*	1	N	NI
5.			
6.			
7.			
8.			
Total Cover:	33		
Woody Vine Stratum			
1.			
2.			
Total Cover:	78		

% Bare Ground in Herb Stratum 50 % Cover of Biotic Crust _____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 4 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species _____	x 1 = _____
FACW species _____	x 2 = _____
FAC species _____	x 3 = _____
FACU species _____	x 4 = _____
UPL species _____	x 5 = _____
Column Totals: _____ (A)	_____ (B)

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators:

___ Dominance Test is >50%

___ Prevalence Index is ≤3.0[1]

___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present.

Hydrophytic Vegetation Present? Yes ✓ No _____

Remarks:

SOIL

Sampling Point: #7

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-6	2.5Y 3/2	100					Sandy Loam	Coarse Sand

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix. [2]Location: PL=Pore Lining, RC=Root Channel, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (LRR C)
- ___ 1 cm Muck (A9) (LRR D)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) (LRR C)
- ___ 2 cm Muck (A10) (LRR B)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present.

Restrictive Layer (if present):

Type: Rock, large cobbles

Depth (inches): 6"

Hydric Soil Present? Yes ___ No ✓

Remarks:

Hydric soils not present

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one indicator is sufficient)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1) (Nonriverine)
- ___ Sediment Deposits (B2) (Nonriverine)
- ___ Drift Deposits (B3) (Nonriverine)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Plowed Soils (C6)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) (Riverine)
- ✓ Sediment Deposits (B2) (Riverine)
- ✓ Drift Deposits (B3) (Riverine)
- ✓ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Thin Muck Surface (C7)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ___ No ___ Depth (inches): ___

Water Table Present? Yes ___ No ___ Depth (inches): ___

Saturation Present? (includes capillary fringe) Yes ___ No ___ Depth (inches): ___

Wetland Hydrology Present? Yes ✓ No ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Lytle Creek - Sycamore East City/County: Rialto/San Bernardino Sampling Date: 6/28/07

Applicant/Owner: Hewitt & O'neal State: CA Sampling Point: #8

Investigator(s): JM, SA Section, Township, Range: 4, 1N, 5W

Landform (hillslope, terrace, etc.): Depression Local relief (concave, convex, none): Concave Slope (%): 0-9%

Subregion (LRR): C Lat: _____ Long: _____ Datum: _____

Soil Map Unit Name: Tujunga Gravelly Loamy Sand NWI classification: N/A

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? No Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? No (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No _____	Is the Sampled Area within a Wetland? Yes ✓ No _____
Hydric Soil Present?	Yes ✓	No _____	
Wetland Hydrology Present?	Yes ✓	No _____	

Remarks:

VEGETATION

Tree Stratum (Use scientific names.)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Salix goodingii*	5	Y	OBL
2.			
3.			
4.			
Total Cover:	5		
Sapling/Shrub Stratum			
1. *Baccharis salicifolia*	10	Y	FACW
2.			
3.			
4.			
5.			
Total Cover:	10		
Herb Stratum			
1. *Typha domingenis*	70	Y	OBL
2. *Amsinkia menziesii*	3	N	NI
3. *Hirschfeldia incana*	50	Y	NI
4. *Urtica dioca*	5	N	FACW
5.			
6.			
7.			
8.			
Total Cover:	128		
Woody Vine Stratum			
1.			
2.			
Total Cover:	143		

% Bare Ground in Herb Stratum 0 % Cover of Biotic Crust _____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 75 (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species _____	x 1 = _____
FACW species _____	x 2 = _____
FAC species _____	x 3 = _____
FACU species _____	x 4 = _____
UPL species _____	x 5 = _____
Column Totals: _____ (A)	_____ (B)

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators:

___ Dominance Test is >50%

___ Prevalence Index is ≤3.0[1]

___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present.

Hydrophytic Vegetation Present? Yes ✓ No _____

Remarks:

SOIL

Sampling Point: #8

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-4	2.5Y 4/2	100					Sand	
4-12	2.5Y 4/2	93	7.5YR 4/6	7	C	RC	Sandy clay	
12-16	2.5 Y4/2	100					Sandy Clay	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix. [2]Location: PL=Pore Lining, RC=Root Channel, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (LRR C)
- ___ 1 cm Muck (A9) (LRR D)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ✓ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) (LRR C)
- ___ 2 cm Muck (A10) (LRR B)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present.

Restrictive Layer (if present):

Type: ___

Depth (inches): ___

Hydric Soil Present? Yes ✓ No ___

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one indicator is sufficient)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1) (Nonriverine)
- ___ Sediment Deposits (B2) (Nonriverine)
- ___ Drift Deposits (B3) (Nonriverine)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Plowed Soils (C6)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) (Riverine)
- ✓ Sediment Deposits (B2) (Riverine)
- ___ Drift Deposits (B3) (Riverine)
- ✓ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Thin Muck Surface (C7)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ___ No ✓ Depth (inches): ___

Water Table Present? Yes ___ No ✓ Depth (inches): ___

Saturation Present? (includes capillary fringe) Yes ___ No ✓ Depth (inches): ___

Wetland Hydrology Present? Yes ✓ No ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Lytle Creek - Sycamore East City/County: Rialto/San Bernardino Sampling Date: 6/28/07

Applicant/Owner: Hewitt & O'neal State: CA Sampling Point: #9

Investigator(s): JM, SA Section, Township, Range: 4, 1N, 5W

Landform (hillslope, terrace, etc.): Depression Local relief (concave, convex, none): Concave Slope (%): 0-9%

Subregion (LRR): C Lat: _____ Long: _____ Datum: _____

Soil Map Unit Name: Tujunga Gravelly Loamy Sand NWI classification: N/A

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? No Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? No (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓ No _____	Is the Sampled Area within a Wetland? Yes ✓ No _____
Hydric Soil Present?	Yes ✓ No _____	
Wetland Hydrology Present?	Yes ✓ No _____	

Remarks:

VEGETATION

Tree Stratum (Use scientific names.)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
Total Cover:			
Sapling/Shrub Stratum			
1.			
2.			
3.			
4.			
5.			
Total Cover:			
Herb Stratum			
1. *Typha donigenus*	50	Y	OBL
2. *Distichlis spicota*	100	Y	FACW
3.			
4.			
5.			
6.			
7.			
8.			
Total Cover: 150			
Woody Vine Stratum			
1.			
2.			
Total Cover:			

% Bare Ground in Herb Stratum 0 % Cover of Biotic Crust _____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species _____	x 1 = _____
FACW species _____	x 2 = _____
FAC species _____	x 3 = _____
FACU species _____	x 4 = _____
UPL species _____	x 5 = _____
Column Totals: _____ (A)	_____ (B)

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators:

___ Dominance Test is >50%

___ Prevalence Index is ≤3.0[1]

___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present.

Hydrophytic Vegetation Present? Yes ✓ No _____

Remarks:

SOIL

Sampling Point: #9

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-2	2.5Y 2.5/1	100					Silty Clay	
2-8	2.5Y 4/2	80	5YR 4/6	20	C	PL,RC		Root zone
8-16	5Y 4/1	100					Course Sa	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix. [2]Location: PL=Pore Lining, RC=Root Channel, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (LRR C)
- ___ 1 cm Muck (A9) (LRR D)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ✓ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) (LRR C)
- ___ 2 cm Muck (A10) (LRR B)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present.

Restrictive Layer (if present):

Type: ___

Depth (inches): ___

Hydric Soil Present? Yes ✓ No ___

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one indicator is sufficient)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1) (Nonriverine)
- ___ Sediment Deposits (B2) (Nonriverine)
- ___ Drift Deposits (B3) (Nonriverine)
- ✓ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Plowed Soils (C6)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) (Riverine)
- ___ Sediment Deposits (B2) (Riverine)
- ___ Drift Deposits (B3) (Riverine)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Thin Muck Surface (C7)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ___ No ✓ Depth (inches): ___

Water Table Present? Yes ___ No ✓ Depth (inches): ___

Saturation Present? (includes capillary fringe) Yes ___ No ✓ Depth (inches): ___

Wetland Hydrology Present? Yes ✓ No ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Lytle Creek - Sycamore East City/County: Rialto/San Bernardino Sampling Date: 6/25/07

Applicant/Owner: Hewitt & O'neal State: CA Sampling Point: Syc. East H

Investigator(s): JM, SA, MR Section, Township, Range: 4, 1N, 5W

Landform (hillslope, terrace, etc.): Channel Local relief (concave, convex, none): Concave Slope (%): 0-9

Subregion (LRR): C Lat: _____ Long: _____ Datum: _____

Soil Map Unit Name: Tujunga Gravelly Loamy Sand NWI classification: N/A

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? No Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? No (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No _____	Is the Sampled Area within a Wetland? Yes _____ No ✓
Hydric Soil Present?	Yes _____	No ✓	
Wetland Hydrology Present?	Yes ✓	No _____	

Remarks:

VEGETATION

Tree Stratum (Use scientific names.)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
Total Cover:			
Sapling/Shrub Stratum			
1. *Salix goodingii*	20	Yes	OBL
2. *Salix laevigata*	10	No	FACW
3. *Baccharis salicifolia*	3	No	FACW
4.			
5.			
Total Cover:	33		
Herb Stratum			
1. *Polypogon monspelensis*	30	No	FACW
2. *Cyperus erigrastus*	20	No	FACW
3. *Typhus domengensis*	50	Yes	OBL
4.			
5.			
6.			
7.			
8.			
Total Cover:	100		
Woody Vine Stratum			
1.			
2.			
Total Cover:	133		

% Bare Ground in Herb Stratum 5 % Cover of Biotic Crust _____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 4 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species _____	x 1 = _____
FACW species _____	x 2 = _____
FAC species _____	x 3 = _____
FACU species _____	x 4 = _____
UPL species _____	x 5 = _____
Column Totals: _____ (A)	_____ (B)

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators:

___ Dominance Test is >50%

___ Prevalence Index is ≤3.0[1]

___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a seperate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present.

Hydrophytic Vegetation Present? Yes ✓ No _____

Remarks:

SOIL

Sampling Point: Syc. East

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-16	2.5Y 4/2	100%					Silty Sand	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix. [2]Location: PL=Pore Lining, RC=Root Channel, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (LRR C)
- ___ 1 cm Muck (A9) (LRR D)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) (LRR C)
- ___ 2 cm Muck (A10) (LRR B)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present.

Restrictive Layer (if present):

Type: ___

Depth (inches): ___

Hydric Soil Present? Yes ___ No ✓

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one indicator is sufficient)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1) (Nonriverine)
- ___ Sediment Deposits (B2) (Nonriverine)
- ___ Drift Deposits (B3) (Nonriverine)
- ✓ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Plowed Soils (C6)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) (Riverine)
- ✓ Sediment Deposits (B2) (Riverine)
- ✓ Drift Deposits (B3) (Riverine)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Thin Muck Surface (C7)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ___ No ✓ Depth (inches): ___

Water Table Present? Yes ___ No ✓ Depth (inches): ___

Saturation Present? (includes capillary fringe) Yes ___ No ✓ Depth (inches): ___

Wetland Hydrology Present? Yes ✓ No ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Lytle Creek - Sycamore East City/County: Rialto/San Bernardino Sampling Date: 6-25-07

Applicant/Owner: Hewitt & O'neal State: CA Sampling Point: Syc East 11

Investigator(s): JM, SA, MR Section, Township, Range: 4, 1N, 5W

Landform (hillslope, terrace, etc.): Channel Local relief (concave, convex, none): Concave Slope (%): 0-9

Subregion (LRR): C Lat: _____ Long: _____ Datum: _____

Soil Map Unit Name: Tujunga Gravelly Loamy Sand NWI classification: N/A

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? No Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? No (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓ No _____	Is the Sampled Area within a Wetland? Yes ✓ No _____
Hydric Soil Present?	Yes ✓ No _____	
Wetland Hydrology Present?	Yes ✓ No _____	

Remarks:

VEGETATION

Tree Stratum (Use scientific names.)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
Total Cover:			
Sapling/Shrub Stratum			
1. *Salix goodingii*	50	Yes	OBL
2. *Baccharus salicifolia*	3	No	FACW
3. *Salix laevigata*	5	No	FACW
4.			
5.			
Total Cover: 58%			
Herb Stratum			
1. *Typha domengensis*	90	Yes	OBL
2. *Gnafalium sp.*	3	No	FACU
3. *Epilobium sp.*	45	Yes	FACW
4. *Cyperus sp.*	15	No	FACW
5. *Polypogn sp.*	5	No	FACW
6.			
7.			
8.			
Total Cover: 158			
Woody Vine Stratum			
1.			
2.			
Total Cover: 216%			

% Bare Ground in Herb Stratum 0 % Cover of Biotic Crust _____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species _____	x 1 = _____
FACW species _____	x 2 = _____
FAC species _____	x 3 = _____
FACU species _____	x 4 = _____
UPL species _____	x 5 = _____
Column Totals: _____ (A)	_____ (B)

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators:

✓ Dominance Test is >50%

___ Prevalence Index is ≤3.0[1]

___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present.

Hydrophytic Vegetation Present? Yes ✓ No _____

Remarks:

SOIL

Sampling Point: Syc East

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-6	2.5Y 4/2	100					Silty Sand	
6-16	2.5Y 4/2	50	7.5YR 4/4	50	C	PL/RC	Silty Sand	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix. [2]Location: PL=Pore Lining, RC=Root Channel, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (LRR C)
- ___ 1 cm Muck (A9) (LRR D)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ✓ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) (LRR C)
- ___ 2 cm Muck (A10) (LRR B)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present.

Restrictive Layer (if present):

Type: ___

Depth (inches): ___

Hydric Soil Present? Yes ✓ No ___

Remarks:

70% redox in soil sample, however would meet under 87 Manual

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one indicator is sufficient)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1) (Nonriverine)
- ___ Sediment Deposits (B2) (Nonriverine)
- ___ Drift Deposits (B3) (Nonriverine)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ✓ Oxidized Rhizospheres along Living Roots (C3)
- ✓ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Plowed Soils (C6)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) (Riverine)
- ✓ Sediment Deposits (B2) (Riverine)
- ✓ Drift Deposits (B3) (Riverine)
- ✓ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Thin Muck Surface (C7)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ___ No ✓ Depth (inches): ___

Water Table Present? Yes ___ No ✓ Depth (inches): ___

Saturation Present? (includes capillary fringe) Yes ___ No ✓ Depth (inches): ___

Wetland Hydrology Present? Yes ✓ No ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Lytle Creek - Sycamore West City/County: Rialto/San Bernardino Sampling Date: 5/18/07

Applicant/Owner: Hewitt & O'neal State: CA Sampling Point: Syc. West1

Investigator(s): JM, SA, MR Section, Township, Range: 5, 1N, 5W`

Landform (hillslope, terrace, etc.): Channel Local relief (concave, convex, none): Concave Slope (%): _____

Subregion (LRR): C Lat: _____ Long: _____ Datum: _____

Soil Map Unit Name: Not Mapped NWI classification: N/A

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? No Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? No (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓ No _____	Is the Sampled Area within a Wetland? Yes ✓ No _____
Hydric Soil Present?	Yes ✓ No _____	
Wetland Hydrology Present?	Yes ✓ No _____	

Remarks:

VEGETATION

Tree Stratum (Use scientific names.)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Salix Lasiolepis*	100	Yes	FACW
2. *Sambucus Mexicana*	15	No	FAC
3.			
4.			
Total Cover:	115		
Sapling/Shrub Stratum			
1. *Nicotiana Gianuca*	10	Yes	FAC
2.			
3.			
4.			
5.			
Total Cover:	10		
Herb Stratum			
1. *Mimulus Guttatus*	5	No	OBL
2. *Epilobium Ciuatum*	2	No	FACW
3. *Artemesia Douglasiana*	2	No	FACW
4. *Toxicodendron Diversilobum*	75	Yes	NI
5.			
6.			
7.			
8.			
Total Cover:	84		
Woody Vine Stratum			
1.			
2.			
Total Cover:			

% Bare Ground in Herb Stratum 0 % Cover of Biotic Crust _____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 66 (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species _____	x 1 = _____
FACW species _____	x 2 = _____
FAC species _____	x 3 = _____
FACU species _____	x 4 = _____
UPL species _____	x 5 = _____
Column Totals: _____ (A)	_____ (B)

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators:

✓ Dominance Test is >50%

___ Prevalence Index is ≤3.0[1]

___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present.

Hydrophytic Vegetation Present? Yes ✓ No _____

Remarks:

SOIL

Sampling Point: Syc. We

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-6	10YR 2/2	100	N/A				Gravely S	Saturated

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix. [2]Location: PL=Pore Lining, RC=Root Channel, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (LRR C)
- ___ 1 cm Muck (A9) (LRR D)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) (LRR C)
- ___ 2 cm Muck (A10) (LRR B)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ✓ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present.

Restrictive Layer (if present):
Type: Rock and Large Cobbles
Depth (inches): 6"

Hydric Soil Present? Yes ✓ No ___

Remarks:
Saturated soil, 1" of surface water indicating more than 14 consecutive days of inundation

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one indicator is sufficient)

- ✓ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1) (Nonriverine)
- ___ Sediment Deposits (B2) (Nonriverine)
- ___ Drift Deposits (B3) (Nonriverine)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Plowed Soils (C6)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) (Riverine)
- ___ Sediment Deposits (B2) (Riverine)
- ___ Drift Deposits (B3) (Riverine)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Thin Muck Surface (C7)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ✓ No ___ Depth (inches): 1
Water Table Present? Yes ✓ No ___ Depth (inches): ___
Saturation Present? (includes capillary fringe) Yes ✓ No ___ Depth (inches): ___

Wetland Hydrology Present? Yes ✓ No ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Appendix III-F

AIR QUALITY ANALYSIS

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AIR QUALITY ASSESSMENT TECHNICAL REPORT

Lytle Creek Ranch Specific Plan
San Bernardino County

Prepared by:

PCR SERVICES CORPORATION

June 2008

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1.0 EXECUTIVE SUMMARY

FINDINGS

This report provides an analysis of potential air quality impacts related to the proposed Lytle Creek Ranch Specific Plan (Project) located within the City of Rialto and County of San Bernardino in California. All analyses have been conducted to comply with the requirements of the South Coast Air Quality Management District's (SCAQMD) Air Quality Management Plan and the air quality assessments for California Environmental Quality Act (CEQA) documentation. The findings of the analysis are as follows:

- Project development would cause an exceedance of temporary short-term SCAQMD daily regional emission significance thresholds for PM_{10}, $PM_{2.5}$, VOC, NOx and CO during construction activities even with incorporation of mitigation measures. As such, development of the project would result in a significant and unavoidable regional air quality impact during the construction period.

- Project development would cause an exceedance of temporary short-term SCAQMD localized significance thresholds for PM_{10} and $PM_{2.5}$ at residential uses near the Project site even with incorporation of mitigation measures. However, localized CO and NOx impacts would be less than significant. As such, development of the project would result in a significant and unavoidable localized air quality impact during the construction period.

- Project operations would cause an exceedance of long-term SCAQMD daily regional emission significance thresholds for PM_{10}, $PM_{2.5}$, VOC, NOx and CO even with incorporation of mitigation measures.

- Project operations would not have a significant impact upon 1-hour or 8-hour local CO concentrations due to mobile source emissions. As significant impacts would not occur at the intersections with the highest traffic volumes that are located adjacent to sensitive receptors, no significant impacts are anticipated to occur at any other locations in the study area as the conditions yielding CO hotspots would not be worse than those occurring at the analyzed intersections. Consequently, on- and off-site sensitive receptors would not be significantly affected by CO emissions generated by the net increase in traffic which would occur under the proposed project.

- The project would be consistent with air quality policies set forth by the SCAQMD, the Southern California Association of Governments, County of San Bernardino, and the City of Rialto.

- As the project exceeds the SCAQMD daily emission thresholds during construction and operation of the proposed project, the project would also contribute to a significant cumulative air quality impact.

- Cancer risk for on-site residential uses would be a maximum of 224 in one million and would exceed the 10 in a million threshold. The cancer risk is predominately related to diesel exhaust from the proximity of the project site to the I-15 freeway. The cancer risk can be reduced by approximately 80 percent with incorporation of mitigation measures, but would still exceed the SCAQMD significance threshold. The existing conditions for the vast majority of the San Bernardino County is in an area between 250 and 750 cancers per million, which is less than the average cancer risk in the South Coast Air Basin (1,400 per million).[1] The health risk assessment performed for the project site demonstrates that the project site is slightly less than this range; however, there is an inherent health risk associated with living in urbanized areas of San Bernardino County based upon existing conditions and land uses not caused by this project. Nevertheless, the project would result in locating sensitive receptors within an area of cancer risk in excess of the SCAQMD significance threshold of 10 in one million and, therefore, the project would result in a significant impact even with incorporation of mitigation measures.

[1] *http://www.arb.ca.gov/toxics/cti/hlthrisk/cncrinhl/riskmapviewfull.htm.*

2.0 PROJECT DESCRIPTION

The Lytle Creek Ranch Specific Plan proposes to develop a 2,447.3 acre master planned mixed-use community located in the City of Rialto and unincorporated San Bernardino County. This study was prepared to assess potential air quality impacts that may occur as a result of the proposed project. Emissions of air pollutants associated with both construction and operation of the mixed-use development were analyzed, as required under CEQA.

The proposed project would include 8,407 residential units, 849,420 square feet of retail space, an elementary school and middle school, as well as both a golf course and a park spanning over 2,400 acres. The proposed development is expected to be **f**ully operational by 2030, while some individual phases would become operational prior to that date.

During operation, the elementary school and middle school would be comprised of 1,950 students. The golf course and the park would cover approximately 318 acres. The closest sensitive receptors are located approximately 200 feet from the nearest project area boundary, across Whites Canyon Road to the west. The site plan illustrating the layout of the project is provided in Figure 1 on page 6.

The proposed project contains sustainable design features that would reduce energy usage and automobile usage, while promoting alternative forms of transportation. Some of these project features are listed below. For a complete list of project features, see the Global Climate Change Technical Report.

- All residential and non-residential buildings shall exceed the Title 24 Energy Efficiency standards by at least 5 percent.

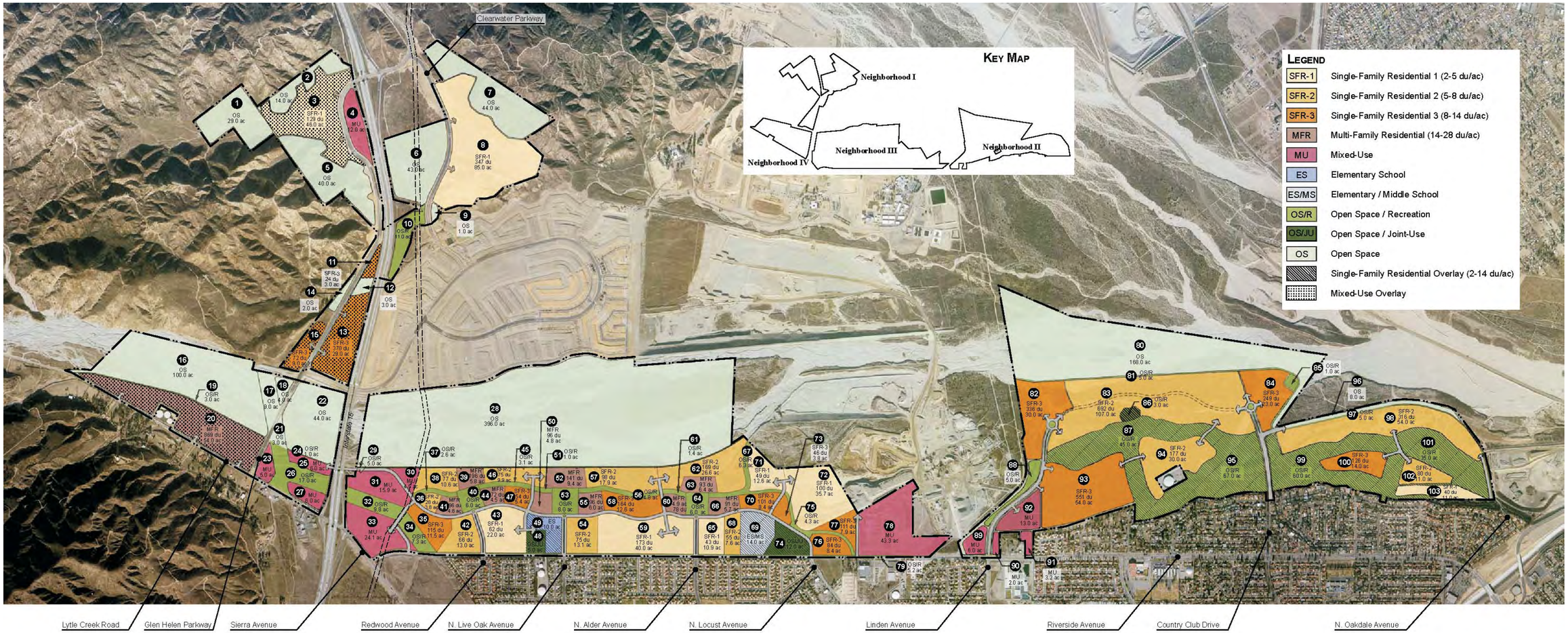
- All fixtures used for lighting of exterior common areas shall be regulated by automatic devices to turn off lights when they are not needed, but a minimum level of lighting should be provided for safety.

- The Applicant shall provide bicycle lanes by providing physical linkages between land uses within the project site.

- The Applicant shall provide convenient pedestrian access throughout the project site.

Potential air quality impacts were evaluated by predicting air quality emissions utilizing SCAQMD methodologies, and comparing such levels to applicable air quality standards and impact criteria. This report is divided into the following sections:

- Section 1.0, Executive Summary;
- Section 2.0, Introduction;
- Section 3.0, Regulatory Framework;
- Section 4.0, Existing Conditions;
- Section 5.0, Methodology and Significance Criteria;
- Section 6.0, Impact Analysis and Mitigation Measures;
- Section 7.0, Conclusions



PCR

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0 1600 Feet

Source: KTGY Group, January 2008

Figure 1
Lytle Creek Ranch Land Use Plan

PRELIMINARY WORKING DRAFT-Work-in-Progress

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3.0 REGULATORY FRAMEWORK

A number of statutes, regulations, plans and policies have been adopted which address air quality issues. The proposed Project Site and vicinity is subject to air quality regulations developed and implemented at the federal, State, and local levels. At the federal level, the United States Environmental Protection Agency (USEPA) is responsible for implementation of the Federal Clean Air Act (CAA). Some portions of the CAA (e.g., certain mobile source and other requirements) are implemented directly by the USEPA. Other portions of the CAA (e.g., stationary source requirements) are implemented by State and local agencies.

3.1 AUTHORITY FOR CURRENT AIR QUALITY PLANNING

A number of plans and policies have been adopted by various agencies that address air quality issues. The plans and policies, applicable to the proposed Project, are discussed below.

3.1.1 Federal Clean Air Act

The CAA was first enacted in 1955 and has been amended numerous times in subsequent years, with the most recent amendments in 1990. The CAA establishes federal air quality standards, known as National Ambient Air Quality Standards (NAAQS) and specifies future dates for achieving compliance. The CAA also mandates that the state submit and implement a State Implementation Plan (SIP) for areas not meeting these standards. These plans must include pollution control measures that demonstrate how the standards will be met. The project site is within the South Coast Air Basin (Basin), which is an area designated as non-attainment as the area does not meet NAAQS for certain pollutants regulated under the CAA.

The 1990 amendments to the CAA identify specific emission reduction goals for areas not meeting the NAAQS. These amendments require both a demonstration of reasonable further progress toward attainment and incorporation of additional sanctions for failure to attain or to meet interim milestones. The sections of the CAA which are most applicable to the proposed project include Title I (Nonattainment Provisions) and Title II (Mobile Source Provisions).

Title I requirements are implemented for the purpose of attaining NAAQS for the following criteria pollutants: (1) ozone (O_3); (2) nitrogen dioxide (NO_2); (3) sulfur dioxide (SO_2); (4) particulate patter (PM_{10} and $PM_{2.5}$); (5) carbon monoxide (CO); and (6) lead (Pb). Table 1 on pages 8 and 9 shows the NAAQS currently in effect for each criteria pollutant. The NAAQS were amended in July 1997 to include an 8-hour standard for O_3 and to adopt a NAAQS

Table 1

Ambient Air Quality Standards [a]

Pollutant	Averaging Time	California Standards [a]		Federal Standards [b]		
		Concentration [c]	Method [d]	Primary [c,e]	Secondary [c,f]	Method [g]
Ozone ($O^{3)}$	1 Hour	0.09 ppm (180 µg/m^3)	Ultraviolet Photometry	—[j]	Same as Primary Standard	Ultraviolet Photometry
	8 Hour	0.070 ppm (137 µg/m^3)		0.08 ppm (157 µg/m^3)[h]		
Respirable Particulate Matter (PM_{10})	24 Hour	50 µg/m^3	Gravimetric or Beta Attenuation	150 µg/m^3	Same as Primary Standard	Inertial Separation and Gravimetric Analysis
	Annual Arithmetic Mean	20 µg/m^3		—[j]		
Fine Particulate Matter ($PM_{2.5}$)	24 Hour	No Separate State Standard		35[j] µg/m^3	Same as Primary Standard	Inertial Separation and Gravimetric Analysis
	Annual Arithmetic Mean	12 µg/m^3	Gravimetric or Beta Attenuation	15 µg/m^3		
Carbon Monoxide (CO)	8 Hour	9.0 ppm (10mg/m^3)	Non-Dispersive Infrared Photometry (NDIR)	9 ppm (10 mg/m^3)	None	Non-Dispersive Infrared Photometry (NDIR)
	1 Hour	20 ppm (23 mg/m^3)		35 ppm (40 mg/m^3)		
	8 Hour (Lake Tahoe)	6 ppm (7 mg/m^3)		—	—	—
Nitrogen Dioxide (NO_2)[k]	Annual Arithmetic Mean	0.030 ppm (56 µg/m^3)	Gas Phase Chemiluminescence	0.053 ppm (100 µg/m^3)	Same as Primary Standard	Gas Phase Chemiluminescence
	1 Hour	0.18 ppm (338 µg/m^3)		—		
Sulfur Dioxide (SO_2)	Annual Arithmetic Mean	—	Ultraviolet Fluorescence	0.030 ppm (80 µg/m^3)	—	Spectrophotometry (Pararosaniline Method)
	24 Hour	0.04 ppm (105 µg/m^3)		0.14 ppm (365 µg/m^3)	—	
	3 Hour	—		—	0.5 ppm (1300 µg/m^3)	
	1 Hour	0.25 ppm (655 µg/m^3)		—	—	—
Lead (Pb)	30 Day Average	1.5 µg/m^3	Atomic Absorption	—	—	—
	Calendar Quarter	—		1.5 µg/m^3	Same as Primary Standard	High Volume Sampler and Atomic Absorption

Table 1 (Continued)

Ambient Air Quality Standards [a]

Pollutant	Averaging Time	California Standards [a]		Federal Standards [b]		
		Concentration [c]	Method [d]	Primary [c,e]	Secondary [c,f]	Method [g]
Visibility Reducing Particles	8 Hour	Extinction coefficient of 0.23 per kilometer — visibility of ten miles or more (0.07 — 30 miles or more for Lake Tahoe) due to particles when relative humidity is less than 70 percent. Method: Beta Attenuation and Transmittance through Filter Tape.		**No Federal Standards**		
Sulfates (SO_4)	24 Hour	25 µg/m^3	Ion Chromatography			
Hydrogen Sulfide	1 Hour	0.03 ppm (42 µg/m^3)	Ultraviolet Fluorescence			
Vinyl Chloride [i]	24 Hour	0.01 ppm (26 µg/m^3)	Gas Chromatography			

[a] *California standards for ozone, carbon monoxide (except Lake Tahoe), sulfur dioxide (1 and 24 hour), nitrogen dioxide, suspended particulate matter (PM_{10}, and $PM_{2.5}$) and visibility reducing particles, are values that are not to be exceeded. All others are not to be equaled or exceeded. California ambient air quality standards are listed in the Table of Standards in Section 70200 of Title 17 of the California Code of Regulations.*

[b] *National standards (other than ozone, particulate matter, and those based on annual averages or annual arithmetic mean) are not to be exceeded more than once a year. The ozone standard is attained when the fourth highest eight hour concentration in a year, averaged over three years, is equal to or less than the standard. For PM_{10}, the 24 hour standard is attained when the expected number of days per calendar year with a 24-hour average concentration above 150 µg/m^3 is equal to or less than one. For $PM_{2.5}$, the 24 hour standard is attained when 98 percent of the daily concentrations, averaged over three years, are equal to or less than the standard. Contact USEPA for further clarification and current federal policies.*

[c] *Concentration expressed first in units in which it was promulgated. Equivalent units given in parentheses are based upon a reference temperature of 25°C and a reference pressure of 760 torr. Most measurements of air quality are to be corrected to a reference temperature of 25°C and a reference pressure of 760 torr; ppm in this table refers to ppm by volume, or micromoles of pollutant per mole of gas.*

[d] *Any equivalent procedure which can be shown to the satisfaction of the CARB to give equivalent results at or near the level of the air quality standard may be used.*

[e] *National Primary Standards: The levels of air quality necessary, with an adequate margin of safety to protect the public health.*

[f] *National Secondary Standards: The levels of air quality necessary to protect the public welfare from any known or anticipated adverse effects of a pollutant.*

[g] *Reference method as described by the EPA. An "equivalent method" of measurement may be used but must have a "consistent relationship to the reference method" and must be approved by the EPA.*

[h] *New federal 8-hour ozone and fine particulate matter standards were promulgated by USEPA on July 18, 1997. Contact USEPA for further clarification and current federal policies.*

[i] *The CARB has identified lead and vinyl chloride as 'toxic air contaminants' with no threshold level of exposure for adverse health effects determined. These actions allow for the implementation of control measures at levels below the ambient concentrations specified for these pollutants.*

[j] *This table includes updated PM_{10}, $PM_{2.5}$, and O_3 standards that were adopted in September of 2006.*

[k] *The NO_2 standard was amended on February 22, 2007, to lower the 1-hr standard to 0.18 ppm and establish a new annual standard of 0.030 ppm..*

Source: California Air Resources Board, February 22, 2007.

for $PM_{2.5}$. The NAAQSs were amended again in September 2006 to include an established methodology for calculating $PM_{2.5,}$ strengthening the 24-hour $PM_{2.5}$ standard, and revoking the annual PM_{10} standard. The Basin fails to meet national standards for O_3, PM_{10}, and $PM_{2.5}$ and therefore is considered a federal "non-attainment" area for these pollutants. The CAA sets certain deadlines for meeting the NAAQS within the Basin including the following: (1) 1-hour O_3 by the year 2010; (2) 8-hour O_3 by the year 2024; (3) PM_{10} by the year 2006; and (4) $PM_{2.5}$ by the year 2015. Nonattainment designations are categorized into seven levels of severity: (1) basic, (2) marginal, (3) moderate, (4) serious, (5) severe-15, (6) severe-17, and (7) extreme.[2] On June 11, 2007, the USEPA reclassified the Basin as a federal "attainment" area for CO and approved the Basin's CO maintenance plan.[3] It should be noted that the Basin met the PM_{10} standards in 2006 at all stations except for western Riverside.[4] Table 2 on page 11 lists the criteria pollutants and their relative attainment status.

Title II of the CAA pertains to mobile sources, such as cars, trucks, buses, and planes. Reformulated gasoline, automobile pollution control devices, and vapor recovery nozzles on gas pumps are a few of the mechanisms the USEPA uses to regulate mobile air emission sources. The provisions of Title II have resulted in tailpipe emission standards for vehicles, which have strengthened in recent years to improve air quality. For example, the standards for NO_X emissions have lowered substantially and the specification requirements for cleaner burning gasoline are more stringent.

3.1.2 California Clean Air Act

The California Clean Air Act (CCAA), signed into law in 1988, requires all areas of the state to achieve and maintain the California Ambient Air Quality Standards (CAAQS) by the earliest practical date. Table 1 shows the CAAQS currently in effect for each of the criteria pollutants as well as the other pollutants recognized by the state. As shown in Table 1, the CAAQS include more stringent standards than the NAAQS for most of the criteria air pollutants. In addition, the CAAQS have established standards for other pollutants recognized by the state. In general, the California standards are more health protective than the corresponding NAAQS. California has set standards for $PM_{2.5}$, sulfates, hydrogen sulfide, vinyl chloride, and visibility-reducing particles. Table 2 provides the Basin's attainment status with respect to criteria pollutants which have both federal and state standards. The Basin complies with the CAAQS for sulfates, hydrogen sulfide, and vinyl chloride, but does not meet the California standard for visibility-reducing particles.

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[2] *The "-15" and "-17" designations reflect the number of years within which attainment must be achieved.*

[3] *"Approval and Promulgation of Implementation Plans and Designation of Areas for Air Quality Planning Purposes: California, Final Rule."* Federal Register *72 (11 May 2007):26718-26721.*

[4] *South Coast Air Quality Management District, 2007 AQMP.*

Table 2

South Coast Air Basin Attainment Status

Pollutant	National Standards	California Standards
Ozone (1-hour standard)	N/A [a]	Non-attainment
Ozone (8-hour standard)	Extreme	N/A
Carbon Monoxide	Attainment [b]	Attainment [c]
Nitrogen Dioxide	Attainment [c]	Attainment [c]
Sulfur Dioxide	Attainment [c]	Attainment [c]
PM_{10} (24-hour standard)	Serious	Non-attainment
PM_{10} (annual standard)	N/A [d]	Non-attainment
$PM_{2.5}$	Serious	Non-attainment
Lead	Attainment [c]	Attainment [c]
Visibility Reducing Particles	N/A	Unclassified
Sulfates	N/A	Attainment [c]
Hydrogen Sulfide	N/A	Unclassified
Vinyl Chloride	N/A	N/A [e]

N/A = not applicable

[a] *The NAAQS for 1-hour ozone was revoked on June 15, 2005 for all areas except Early Action Compact areas.*

[b] *The Basin was officially reclassified by the USEPA on June 11, 2007. "Approval and Promulgation of Implementation Plans and Designation of Areas for Air Quality Planning Purposes: California, Final Rule." Federal Register 72 (11 May 2007):26718-26721*

[c] *An air basin is designated as being in attainment for a pollutant if the standard for that pollutant was not violated at any site in that air basin during a three year period.*

[d] *The NAAQS for annual PM_{10} was revoked on September 21, 2006.*

[e] *In 1990 the CARB identified vinyl chloride as a toxic air contaminant and determined that it does not have an identifiable threshold. Therefore, the CARB does not monitor or make status designations for this pollutant.*

Source: USEPA Region 9 and California Air Resources Board, 2007.

3.1.3 California Air Resources Board Air Quality and Land Use Handbook

The California Air Resources Board (ARB) published the *Air Quality and Land Use Handbook: A Community Health Perspective* in April 2005, to serve as a general guide for considering impacts to sensitive receptors from facilities that emit toxic air contaminants (TAC). The recommendations provided therein are voluntary and do not constitute a requirement or mandate for either land use agencies or local air districts. The goal of the guidance document is to protect sensitive receptors, such as children, the elderly, acutely ill, and chronically ill persons, from exposure to TAC emissions. Some examples of ARB's citing recommendations include the following: (1) avoid citing sensitive receptors within 500 feet of freeways and high-traffic roads (i.e., roads within urbanized areas carrying more than 100,000 vehicles per day); (2) avoid citing sensitive receptors within 1,000 feet of a distribution center; and (3) avoid citing sensitive receptors within 300 feet of a dry cleaning facility that uses perchloroethylene (PCE).

3.1.4 California Air Resources Board Airborne Toxic Control Measures (ATCM)

In 2004, CARB adopted an Airborne Toxic Control Measure (ATCM) to limit heavy duty diesel motor vehicle idling in order to reduce public exposure to diesel PM and other TACs and air pollutants. The measure applies to diesel-fueled commercial vehicles with gross vehicle weight ratings greater than 10,000 pounds which are licensed to operate on highways, regardless of where they are registered. This measure does not allow diesel fueled commercial vehicles to idle for more than 5 minutes at any given time.

In addition to limiting exhaust from idling trucks, CARB recently promulgated emission standards for off-road diesel construction equipment such as bulldozers, loaders, backhoes and forklifts, as well as many other self-propelled off-road diesel vehicles. The regulation adopted by the California Air Resources Board on July 26, 2007 aims to reduce emissions by installation of diesel soot filters and encouraging the replacement of older, dirtier engines with newer emission controlled models. Implementation is staggered based on fleet size, with the largest operators to begin compliance in 2010. By 2020, the CARB estimates that diesel particulate matter will be reduced by 74 percent and smog forming oxides of nitrogen by 32 percent, compared to what emissions would be without the regulation.

3.1.5 South Coast Air Quality Management District (SCAQMD)

The SCAQMD has jurisdiction over an area of approximately 10,743 square miles. This area includes all of Orange County, Los Angeles County except for the Antelope Valley, the nondesert portion of western San Bernardino County, and the western and Coachella Valley portions of Riverside County. The Basin is a subregion of the SCAQMD jurisdiction. While air quality in this area has improved, the Basin requires continued diligence to meet air quality standards.

The SCAQMD has adopted a series of Air Quality Management Plans (AQMP) to meet the CAAQS and NAAQS. The 2007 AQMP employs the most up-to-date science, primarily in the form of updated emissions inventories, ambient measurements, new meteorological episodes and new air quality modeling tools. Policies and measures currently contemplated by responsible agencies to achieve federal standards for healthful air quality in the Basin are built upon in the 2007 AQMP Plan. It also incorporates a comprehensive strategy aimed at controlling pollution from all sources, including stationary sources, on-road and off-road mobile sources and area sources.

The 2007 AQMP Plan builds upon improvements accomplished from previous plans, and aims to incorporate all feasible control measures while balancing costs and socioeconomic impacts for the attainment of air quality standards. However, it highlights the significant amount

of reductions needed and the urgent need to identify additional strategies, especially in the area of mobile sources, to meet all federal criteria pollutant standards within the timeframes allowed under federal Clean Air Act.

The 2007 AQMP relies on a comprehensive and integrated control approach aimed at achieving the $PM_{2.5}$ standard by 2015 through implementation of short-term and mid-term control measures and achieving the 8-hour ozone standard by 2024 based on implementation of additional long-term measures. These reductions are expected to be achieved through implementation of new and advanced control technologies as well as improvement of existing control technologies. Control techniques requiring substantial levels of committed funding for implementation would also fall under this category of long-term emission reductions. The 2007 AQMP control measures consist of four components: 1) the District's Stationary and Mobile Source Control Measures; 2) CARB's Proposed State Strategy; 3) the District Staff's Proposed Policy Options to Supplement CARB's Control Strategy; and 4) Regional Transportation Strategy and Control Measures provided by SCAG. Overall, the Plan includes 31 stationary and 30 mobile source measures. The District's control strategy for stationary and mobile sources is based on the following approaches: 1) facility modernization; 2) energy efficiency and conservation; 3) good management practices; 4) market incentives/compliance flexibility; 5) area source programs; 6) emission growth management; and 7) mobile source programs.

The SCAQMD adopts rules and regulations to implement portions of the AQMP. Several of these rules may apply to construction or operation of the project. For example, SCAQMD Rule 403 requires the implementation of best available fugitive dust control measures during active construction periods capable of generating fugitive dust emissions from on-site earth-moving activities, construction/demolition activities, and construction equipment travel on paved and unpaved roads. The full text of SCAQMD Rule 403 is included in Appendix A of this EIR.

The SCAQMD published the *CEQA Air Quality Handbook* (the Handbook) in November 1993 to provide local governments with guidance for analyzing and mitigating project-specific air quality impacts. The Handbook provides standards, methodologies, and procedures for conducting air quality analyses in EIRs and was used extensively in the preparation of this analysis. However, the SCAQMD is currently in the process of replacing the Handbook with the Air Quality Analysis Guidance Handbook. While this process is underway, the SCAQMD recommends that the lead agency avoid using the screening tables in the Handbook's Chapter 6, because the tables were derived using an obsolete version of CARB's mobile source emission factor inventory, and the trip generation characteristic of the land uses identified in these screening tables were based on the fifth edition of the ITE Trip Generation Manual, instead of the most current seventh edition. Additionally, the lead agency should avoid using the on-road mobile source emission factors in Table A9-5-J1 through A9-5-L. The

SCAQMD instead recommends using other approved models to calculate emissions from land use projects, such as the URBEMIS 2007 model.[5]

In addition, the SCAQMD has published a guidance document called the Localized Significance Threshold Methodology for CEQA Evaluations (June 2003) that is intended to provide guidance in evaluating localized effects from mass emissions during construction. This document was also used in the preparation of this analysis. Recently, the SCAQMD adopted additional guidance regarding $PM_{2.5}$ in a document called *Final-methodology to Calculate Particulate Matter ($PM_{2.5}$) and $PM_{2.5}$ Significance Thresholds* (October 2006).

The SCAQMD has also adopted land use planning guidelines in the Guidance Document for Addressing Air Quality Issues in General Plans and Local Planning (May 2005), which also considers impacts to sensitive receptors from facilities that emit TAC emissions. SCAQMD's distance recommendations are the same as those provided by CARB (e.g. a 500-foot siting distance for sensitive land uses proposed in proximity of freeways and high-traffic roads, and the same siting criteria for distribution centers and dry cleaning facilities). The SCAQMD's document introduces land use related policies that rely on design and distance parameters to minimize emissions and lower potential health risk. SCAQMD's guidelines are voluntary initiatives recommended for consideration by local planning agencies.

3.1.6 Regional Comprehensive Plan and Guide

The Southern California Association of Governments (SCAG) is the regional planning agency for Los Angeles, Orange, Ventura, Riverside, San Bernardino, and Imperial Counties and addresses regional issues relating to transportation, the economy, community development, and the environment. SCAG is the federally designated metropolitan planning organization (MPO) for the majority of the southern California region and is the largest MPO in the nation. As the designated MPO, SCAG is mandated by the federal government to develop and implement regional plans that address transportation, growth management, hazardous waste management, and air quality issues. With respect to air quality planning, SCAG has prepared the Regional Comprehensive Plan and Guide (RCPG) for the SCAG region, which includes Growth Management and Regional Mobility chapters that form the basis for the land use and transportation components of the AQMP and are utilized in the preparation of air quality forecasts and the consistency analysis that is included in the AQMP.

[5] http://www.aqmd.gov/ceqa/oldhdbk.html.

3.1.7 County of San Bernardino and City of Rialto General Plans

Local jurisdictions, such as the County of San Bernardino and City of Rialto, have the authority and responsibility to reduce air pollution through its police power and decision-making authority. Specifically, the County of San Bernardino and the City of Rialto are responsible for the assessment and mitigation of air emissions resulting from its land use decisions. The County of San Bernardino and the City of Rialto are also responsible for the implementation of transportation control measures as outlined in the AQMP. Examples of such measures include bus turnouts, energy-efficient streetlights, and synchronized traffic signals. In accordance with CEQA requirements and the CEQA review process, the County and City assess the air quality impacts of new development Projects, require mitigation of potentially significant air quality impacts by conditioning discretionary permits and monitor and enforce implementation of such mitigation measures.

4.0 EXISTING CONDITIONS

4.1 REGIONAL CONTEXT

The Project Site is located within the South Coast Air Basin, an approximately 6,745-square-mile area bounded by the Pacific Ocean to the west and the San Gabriel, San Bernardino, and San Jacinto Mountains to the north and east. The Basin includes all of Orange County and the non-desert portions of Los Angeles, Riverside, and San Bernardino Counties, in addition to the San Gorgonio Pass area in Riverside County. Its terrain and geographical location determine this distinctive climate of the Basin, as the Basin is a coastal plain with connecting broad valleys and low hills.

The southern California region lies in the semi-permanent high-pressure zone of the eastern Pacific. As a result, the climate is mild, tempered by cool sea breezes. The usually mild climatological pattern is interrupted infrequently by periods of extremely hot weather, winter storms, or Santa Ana winds. The extent and severity of the air pollution problem in the Basin is a function of the area's natural physical characteristics (weather and topography), as well as man-made influences (development patterns and lifestyle). Factors such as wind, sunlight, temperature, humidity, rainfall, and topography all affect the accumulation and dispersion of pollutants throughout the Basin making it an area of high pollution potential.

The greatest air pollution impacts throughout the Basin occur from June through September. This condition is generally attributed to the large amount of pollutant emissions, light winds and shallow vertical atmospheric mixing. This frequently reduces pollutant dispersion, thus causing elevated air pollution levels. Pollutant concentrations in the Basin vary with location, season, and time of day. Ozone concentrations, for example, tend to be lower along the coast, higher in the near inland valleys, and lower in the far inland areas of the Basin and adjacent desert. Over the past 30 years, substantial progress has been made in reducing air pollution levels in southern California.

The SCAQMD has published a Basin-wide air toxics study (MATES II, Multiple Air Toxics Exposure Study, March 2000). The MATES II Study represents one of the most comprehensive air toxics studies ever conducted in an urban environment. The Study was aimed at determining the cancer risk from toxic air emissions throughout the Basin by conducting a comprehensive monitoring program, an updated emissions inventory of toxic air contaminants, and a modeling effort to fully characterize health risks for those living in the Basin. The Study concluded that the average carcinogenic risk in the Basin is approximately 1,400 in one million. Mobile sources (e.g., cars, trucks, trains, ships, aircraft, etc.) represent the greatest contributors. Approximately 70 percent of all of the risk is attributed to diesel particulate emissions,

approximately 20 percent to other toxics associated with mobile sources (including benzene, butadiene, and formaldehyde), and approximately 10 percent of all carcinogenic risk is attributed to stationary sources (which include industries and certain other businesses, such as dry cleaners and chrome plating operations). The SCAQMD is in the process of updating the MATES II Study with a MATES III Study. The MATES III Study was slated to end in April 2005. Due to the unusually high levels of rainfall during the Study period, air toxics monitoring data collected to-date indicate a much cleaner year than normal. As such, the SCAQMD has extended the MATES III air toxics monitoring element to April 2006, and is currently concluding the modeling aspect; the report should be released by the end of 2007.

The CARB prepares a series of maps that show regional trends in estimated outdoor inhalable cancer risk from air toxic emissions in an ongoing effort to provide insight as to the relative risk. These estimates represent the number of potential cancers per million people based on a lifetime of breathing air toxics (i.e., 24 hours per day outdoors for 70 years). The Year 2001 San Bernardino County map, which is the most recently available map to represent existing conditions, is provided in Figure 2 on page 18. As shown in Figure 2, the cancer risk ranges from 50 to 1,000 cancers per million, while the vast majority of the area is between 250 and 750 cancers per million.[6] Generally, the risk from air toxics is lower near the mountains and rural areas and increases within urban areas, with higher risks concentrated near large diesel sources (e.g., freeways, airports, and rail yards).

The data from the SCAQMD and CARB provide a slightly different range of risk. This difference is primarily related to the fact that the SCAQMD risk is based on monitored pollutant concentrations and the CARB risk is based on dispersion modeling and emission inventories. Regardless, the SCAQMD and CARB data shows that there is an inherent health risk associated with living in urbanized areas of the Basin, where mobile sources (e.g., cars, trucks, trains, aircraft, etc.) represent the greatest contributors to the overall risk.

4.2 LOCAL AREA CONDITIONS

4.2.1 Existing Pollutant Levels at Nearby Monitoring Stations

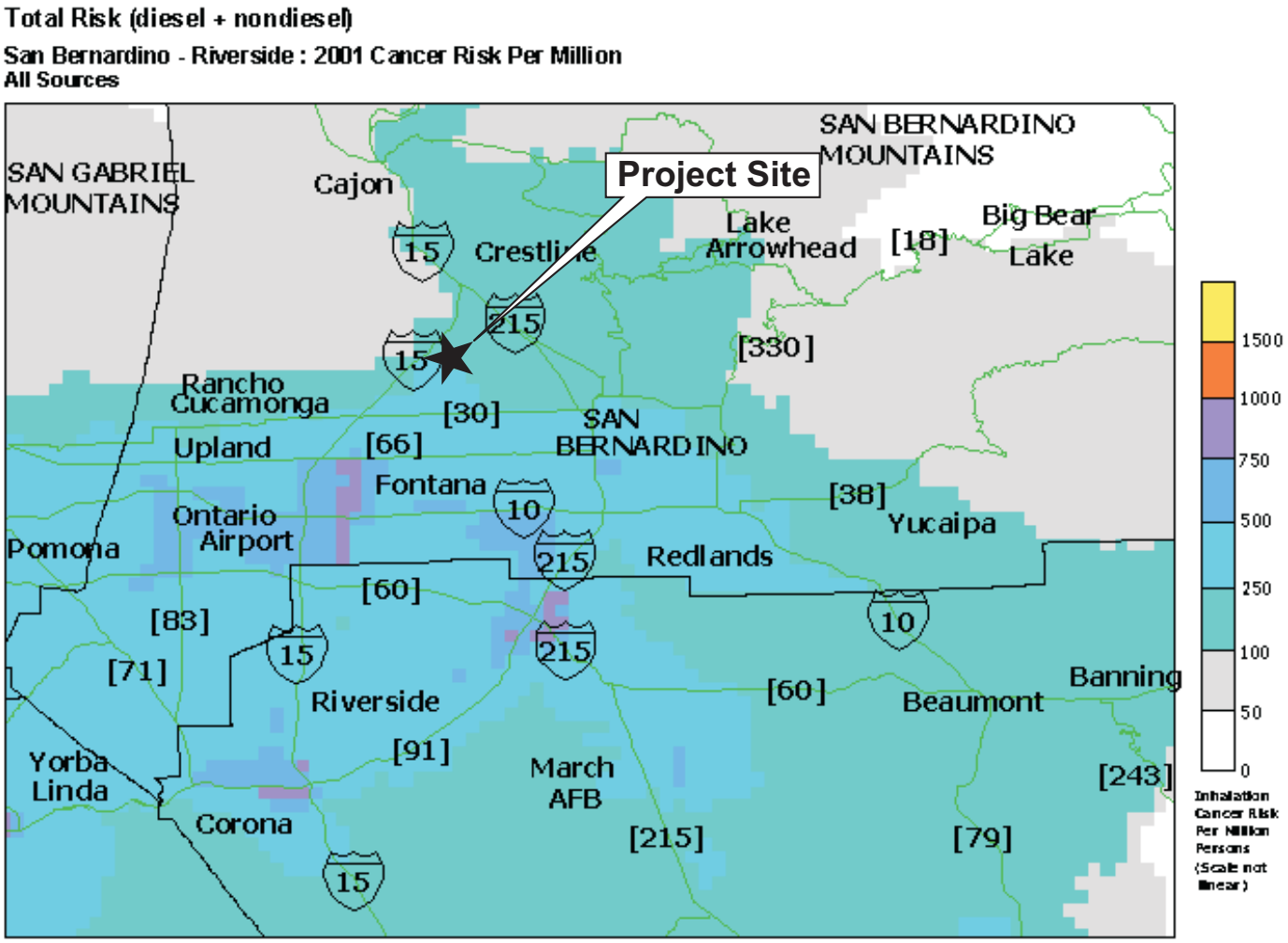
The SCAQMD maintains a network of air quality monitoring stations located throughout the Basin. The project site is located within Source Receptor Area Number 34 (Central San Bernardino Valley 1), which is served by the Fontana-Arrow Highway Monitoring Station, located approximately four miles southwest of the project site. Criteria pollutants including O_3, CO, NO_2, SO_2, PM_{10}, and $PM_{2.5}$ are monitored at this station. The most recent data available from this monitoring station encompass the years 2002 to 2006. The data, presented in Table 3 on page 19, show the following pollutant trends.

[6] *http://www.arb.ca.gov/toxics/cti/hlthrisk/cncrinhl/riskmapviewfull.htm.*

Table 3

Pollutant Standards and Ambient Air Quality Data

Pollutant/Standard	2002	2003	2004	2005	2006
Ozone					
O_3 (1-hour)					
Maximum Concentration (ppm)	0.16	0.18	0.15	0.15	0.16
Days > CAAQS (0.09 ppm)	37	65	48	49	47
Days > NAAQS (0.12 ppm)	8	26	7	9	12
O_3 (8-hour)					
Maximum Concentration (ppm)	0.12	0.15	0.12	0.13	0.12
4th High 8-hour Concentration (ppm)	0.12	0.13	0.11	0.11	0.17
Days > CAAQS (0.07 ppm)	N/A	N/A	54	47	49
Days > NAAQS (0.08 ppm)	22	48	28	23	29
Particulate Matter (PM_{10})					
PM_{10} (24-hour)					
Maximum Concentration ($\mu g/m^3$)	102	101	106	108	142
Days > CAAQS (50 $\mu g/m^3$)	32	27	29	29	31
Days > NAAQS (150 $\mu g/m^3$)	0	0	0	0	0
PM_{10} (Annual Average)					
Annual Arithmetic Mean (50 $\mu g/m^3$)	30.2	47.2	47.7	50.0	53.5
Annual Geometric Mean (20 $\mu g/m^3$)	45.9	N/A[c]	N/A[c]	N/A[c]	N/A[c]
Particulate Matter ($PM_{2.5}$)					
$PM_{2.5}$ (24-hour)					
Maximum Concentration ($\mu g/m^3$)	67	99	71	97	53
Days > NAAQS (65 $\mu g/m^3$)	1	1	1	1	0
Days > NAAQS (35 $\mu g/m^3$)	N/A[a]	N/A[a]	N/A[a]	N/A[a]	7
$PM_{2.5}$ (Annual)					
Annual Arithmetic Mean (15 $\mu g/m^3$)	24.3	21.8	20.0	18.9	17.6
Carbon Monoxide					
CO (1-hour)					
Maximum Concentration (ppm)	5	5	3	3	3
Days > CAAQS (20 ppm)	0	0	0	0	0
Days > NAAQS (35 ppm)	0	0	0	0	0
CO (8-hour)					
Maximum Concentration (ppm)	3.3	4.6	2.1	2.1	2.0
Days > CAAQS (9 ppm)	0	0	0	0	0
Days > NAAQS (9 ppm)	0	0	0	0	0



See ARB web site list of sources not yet included in risk.
ARB:EIB:SRF 6/20/2004

Source: Air Resource Board, 2006

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Figure 2
Total Cancer Risk for
San Bernardino - Riverside County

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Table 3 (Continued)

Pollutant Standards and Ambient Air Quality Data

Pollutant/Standard	2002	2003	2004	2005	2006
Nitrogen Dioxide					
NO_2 (1-hour)					
Maximum Concentration (ppm)	0.12	0.12	0.06	0.10	0.09
Days > CAAQS (0.25 ppm)	0	0	0	0	0
NO_2 (Annual)					
Annual Arithmetic Mean (0.053 ppm)	0.033	0.031	0.027	0.031	0.027
Sulfur Dioxide					
SO_2 (1-hour)					
Maximum Concentration (ppm)	0.03	0.01	0.01	0.01	0.01
Days > CAAQS (0.25 ppm)	0	0	0	0	0
SO_2 (24-hour)					
Maximum Concentration (ppm)	0.010	0.004	0.006	0.004	0.003
Days > CAAQS (0.04 ppm)	0	0	0	0	0
Days > **N**AAQS (0.14 ppm)	0	0	0	0	0
SO_2 (Annual)					
Annual Arithmetic Mean (0.03 ppm)	n/a	n/a	n/a	n/a	0.002
Lead					
Maximum 30-day average ($\mu g/m^3$)	--	--	--	--	--
Maximum calendar quarter ($\mu g/m^3$)	--	--	--	--	--

ppm = parts per million; $\mu g/m^3$= micrograms per cubic meter; AAM Annual Arithmetic Mean; n/a = not applicable; -- = Data not available

[a] *In September 2006, the 24-hr $PM_{2.5}$ standard was changed from 65 $\mu g/m^3$ to 35 $\mu g/m^3$. The data representing days above standard for 2002-2005 applies to the old standard. The data representing days above standard for 2006 applies to the new standard.*

Note: Ambient data for airborne lead is not included in this table since the Basin is currently in compliance with State and National standards for lead.

Source: California Air Resource Board, Ambient Air Data Summaries, 2002-2006.

Ozone – The maximum 1-hour O_3 concentration recorded during the 2002 to 2006 period was 0.18 parts per million (ppm), which was recorded in 2003. During this period, the California standard of 0.09 ppm was exceeded between 37 to 65 times annually, with the highest number of exceedances recorded in 2003. The national 1-hour O_3 standard of 0.12 ppm was exceeded between 7 to 26 times annually, with the highest number of exceedances recorded in 2003. The national 8-hour O_3 standard of 0.08 ppm was exceeded between 22 and 48 times annually, with the highest concentration of 0.15 and the largest number of exceedances recorded in 2003.

Particulate Matter (PM_{10}) – The highest recorded concentration during the period of 2002 to 2006 was 142 micrograms per cubic meter ($\mu g/m^3$), which was recorded in 2006. During this same time period, the California PM_{10} standard was exceeded between 27 and 32 times annually, with the highest number of exceedances in 2002. The national PM_{10} standard was not exceeded during this period. PM_{10} is monitored every six days coincident to a national schedule; thus, PM_{10} exceedances are based on the number of days that sampling occurred.

Fine Particulates ($PM_{2.5}$) – $PM_{2.5}$ maximum concentrations varied between 53 and 99 between 2002 and 2006. During these years the National standard was exceeded between 1 and 7 days per year with the maximum number of exceedances occurring in 2006.

Carbon Monoxide (CO) – The maximum recorded 1-hour concentration during the reporting period was 5 ppm recorded in both 2002 and 2003. The maximum recorded 8-hour CO concentration was 4.6 ppm, recorded in 2003. During this reporting period, there were no exceedances of the California or National 1-hour or 8-hour CO standards.

Nitrogen Dioxide (NO_2) – The highest recorded 1-hour concentration of NO_2 during the reporting period was 0.12 ppm recorded in both 2002 and 2003. The highest recorded annual arithmetic mean during the reporting period was 0.033 (2002). Neither the California nor National NO_2 standard was exceeded during the reporting period.

Sulfur Dioxide (SO_2) – The highest recorded 1-hour concentration of SO_2 during the reporting period 2002 to 2006 was 0.03 ppm (2002). The highest recorded 24-hour concentration was 0.010 ppm (2001). No violations of the California or National SO_2 standards were recorded during this reporting period. The highest annual arithmetic mean recorded was 0.002 ppm in 2006 which is well below the 0.03 ppm National standard.

Lead (Pb) – The Basin is currently in compliance with California and National standards for lead and, therefore, no ambient data for airborne lead is available from the Basin's monitoring stations.

4.2.2 Existing Health Risk in the Surrounding Area

The ARB publicly released a series of maps that show regional trends in estimated outdoor inhalable cancer risk from air toxic emissions in an ongoing effort to provide a picture of relative risk. The estimates represent the number of potential cancers per million people based on a lifetime of breathing air toxics (i.e., 24 hours per day outdoors for 70 years). The Year 2001 San Bernardino-Riverside map, which is the most recently available map to represent existing conditions, is provided in Figure 2 on page 18. As shown in Figure 2, the project area, Rialto area of San Bernardino County, is within a cancer risk zone of 250 to 500 in one million which is less than the average cancer risk in the Basin (1,400 per million).

4.2.3 Sensitive Receptor Locations

With regard to air quality, residential areas are considered to be sensitive to air pollution because residents (including children and the elderly) tend to be at home for extended periods of time, resulting in sustained exposure to pollutants. Places where children congregate (e.g., schools, daycares and play areas) are also considered especially sensitive to air pollution as children's lungs are not as fully developed as adult lungs. Recreational land uses are considered moderately sensitive to air pollution. Although exposure periods are generally short, exercise may place a high demand on respiratory functions, which can be impaired by air pollution. In addition, noticeable air pollution can detract from the enjoyment of recreation. Industrial and commercial areas are considered the least sensitive to air pollution. Exposure periods are relatively short and intermittent, as the majority of the workers tend to stay indoors most of the time. In addition, the working population is generally the healthiest segment of the public. The locations of sensitive receptors relative to the Project Site are displayed in Figure 3 on page 23.

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0 1600 Feet

Source: Google Earth, 2007; PCR Services Corporation, 2007.

Figure 3
Sensitive Receptor Locations

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5.0 METHODOLOGY AND SIGNIFICANCE CRITERIA

5.1 METHODOLOGY

5.1.1 Construction

Daily regional emissions during construction were forecasted by assuming a conservative estimate of construction (i.e., assuming all construction occurs at the earliest feasible date) and applying the mobile-source and fugitive dust emissions factors derived from URBEMIS 2007.[7] Details are presented in Appendix A of this Technical Report.

The SCAQMD has developed a set of mass emissions rate look-up tables that can be used to evaluate localized impacts that may result from construction-period emissions. The look-up tables are used to initially screen and determine if further dispersion modeling is warranted. The thresholds are based on several factors including the size of the project construction site, distance from construction site to sensitive receptor locations, and local meteorological conditions. The thresholds for Source Receptor Area (SRA) Number 34 (Central San Bernardino Valley), which represents conditions for the general project vicinity, are shown in the analysis below.

Emissions for the localized construction air quality analysis were compiled using the regional construction emissions less off-site emissions (e.g., construction worker, delivery, haul truck trips). Localized emissions were then compared to the localized screening tables promulgated by the SCAQMD.[8] Thresholds for CO and NO_2 were derived by adding the incremental emissions from the project to the peak background NO_2 and CO concentrations and by comparing the total concentration to the most stringent air quality standards. Construction PM_{10} thresholds were derived using a dispersion model to back-calculate the level of emissions necessary to exceed SCAQMD's Rule 403 concentration level (50 µg/m^3 over five hours) for requiring implementation of best management practices for control of fugitive dust.[9]

Where construction emissions exceeded the screening-level look-up table values, the localized effects from the on-site construction emissions were evaluated to determine potential pollutant concentrations at sensitive receptors. The analysis was conducted using the Industrial

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[7] *URBEMIS 2007, Version 9.2.4, is an emissions estimation/evaluation model developed by the CARB that is based, in part, on SCAQMD CEQA Air Quality Handbook guidelines and methodologies.*

[8] *SCAQMD developed thresholds based upon the size or total area of the emissions source, the ambient air quality in each source receptor area, and the distance to the sensitive receptor.*

[9] *The equivalent concentration for developing PM_{10} or $PM_{2.5}$ LSTs is 10.4 $\mu g/m^3$, which is a 24-hour average.*

Source Complex (ISCST3) dispersion model, a methodology that is consistent with the procedures outlined in the USEPA *1998 Guideline on Air Quality Models* and the SCAQMD *Localized Significance Threshold Methodology for CEQA Evaluations* guidance documents. A complete listing of the construction equipment by phase, duration, emissions estimation model and dispersion model input assumptions used in this analysis are included in the emissions calculation worksheets provided as Appendix A of this Technical Report.

The conservative estimate of maximum on-site daily emissions for CO, NO_X, PM_{10} and $PM_{2.5}$ was compiled for each of the individual construction activities within the site and compared to the applicable screening threshold based on construction site acreage and distance to closest sensitive receptor. Individual construction activities within the site that are expected to occur simultaneously and are adjacent to one another were considered collectively as well as individually.

5.1.2 Long-Term Operations

The URBEMIS 2007 software was used to forecast the daily regional emissions from mobile- and area-sources that would occur during long-term project operations. In calculating mobile-source emissions, the URBEMIS 2007 default trip length assumptions were applied to the average daily trip (ADT) estimates provided by the project's traffic consultant to arrive at vehicle miles traveled (VMT). Stationary-source emissions were compiled using procedures outlined in the SCAQMD's *CEQA Air Quality Handbook*.

Localized CO concentrations were evaluated by using the CALINE4 microscale dispersion model, developed by Caltrans, in combination with EMFAC2007 emission factors. Localized PM_{10} concentrations related to operation of proposed project stationary-source combustion equipment are evaluated by conducting a screening-level analysis followed by a more detailed analysis (i.e., dispersion modeling) as necessary. The screening-level analysis consists of reviewing the proposed project's site plan and related project description to identify any new or modified stationary-source combustion equipment sources. If it is determined that the proposed project would introduce a new stationary-source combustion equipment source, or modify an existing stationary-source combustion equipment source, then downwind sensitive receptor locations are identified and site-specific dispersion modeling is conducted to determine proposed project impacts. All emissions calculation worksheets and air quality modeling output files are provided in Appendix B of this Technical Report.

5.1.3 Toxic Air Contaminants (TAC) Impacts (Construction and Operation)

Potential TAC impacts are evaluated by conducting a screening-level analysis followed by a more detailed analysis (i.e., dispersion modeling), as necessary. The screening-level analysis consists of reviewing the proposed project's site plan and project description to identify

any new or modified TAC emissions sources. If it is determined that the proposed project would introduce a new source, or modify an existing TAC emissions source, then downwind sensitive receptor locations are identified and site-specific dispersion modeling is conducted to determine proposed project impacts.

5.1.4 Odor Impacts (Construction and Operation)

Potential odor impacts are evaluated by conducting a screening-level analysis followed by a more detailed analysis (i.e., dispersion modeling) as necessary. The screening-level analysis consists of reviewing the proposed project's site plan and project description to identify any new or modified odor sources. If it is determined that the proposed project would introduce a new odor source, or modify an existing odor source, then downwind sensitive receptor locations are identified and site-specific dispersion modeling is conducted to determine proposed project impacts.

5.2 SIGNIFICANCE CRITERIA

The County of San Bernardino and the City of Rialto have not adopted specific significance thresholds for air quality impacts. However, because of the SCAQMD's regulatory role in the Basin, the significance thresholds and analysis methodologies in the SCAQMD *CEQA Air Quality Handbook* guidance document will be used in evaluating Project impacts. Based on criteria set forth in the Handbook, the project would have a significant impact if any of the following would occur:

5.2.1 Construction

Based on criteria set forth in the SCAQMD *CEQA Air Quality Handbook*, the Project would have a significant impact with regard to construction emissions if any of the following would occur:

- Regional emissions from both direct and indirect sources would exceed any of the following SCAQMD prescribed threshold levels: (1) 75 pounds a day for VOC, (2) 100 pounds per day for NO_X, (3) 550 pounds per day for CO, and (4) 150 pounds per day for PM_{10} or SO_X. and (5) 55 pounds per day for $PM_{2.5}$[10]

[10] *South Coast Air Quality Management District, CEQA Air Quality Handbook, Chapter 6 (Determining the Air Quality Significance of a Project), 1993.*

- Project-related fugitive dust and construction equipment combustion emissions cause an incremental increase in localized PM_{10} or $PM_{2.5}$ concentrations of 10.4 µg/m^3 or cause a violation of NO_2 or CO ambient air quality standards.[11]

- The proposed Project creates objectionable odors affecting a substantial number of people.

5.2.2 Long-Term Operations

Based on criteria set forth in the SCAQMD *CEQA Air Quality Handbook*, the Project would have a significant impact with regard to operational emissions if any of the following would occur:

- Regional emissions from both direct and indirect sources would exceed any of the following SCAQMD prescribed threshold levels: (1) 55 pounds a day for VOC, NOx, or $PM_{2.5}$, (2) 550 pounds per day for CO, and (3) 150 pounds per day for PM_{10} or SO_X.[12]

- The Project causes an exceedance of the California 1-hour or 8-hour CO standards of 20 or 9.0 parts per million (ppm), respectively, at an intersection or roadway within one-quarter mile of a sensitive receptor.

- The proposed Project creates objectionable odors affecting a substantial number of people.

- The Project would not be compatible with County of San Bernardino, City of Rialto, SCAQMD and SCAG air quality policies.

5.2.3 Toxic Air Contaminants

The SCAQMD *CEQA Air Quality Handbook* states that the determination of the significance of toxic air contaminants shall be made on a case-by-case basis, considering the following factors:

- The regulatory framework for the toxic material(s) and process(es) involved;

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[11] *While the SCAQMD CEQA Air Quality Handbook (CEQA Handbook, 1993), does not provide any localized thresholds, the SCAQMD currently recommends localized significance thresholds (LST) for PM_{10}, NO_2, and CO in its draft document titled "SCAQMD Localized Significance Threshold Methodology for CEQA Evaluations (SCAQMD LST Guidelines)," June 19, 2003.*

[12] *Ibid.*

- The proximity of the toxic air contaminants to sensitive receptors;
- The quantity, volume and toxicity of the contaminants expected to be emitted;
- The likelihood and potential level of exposure; and
- The degree to which Project design will reduce the risk of exposure.

Based on these guidelines, the Project would have a significant impact from toxic air contaminants, if:

- On-site stationary sources emit carcinogenic or toxic air contaminants that individually or collectively exceed the maximum individual cancer risk of ten in one million or an acute or chronic hazard index of 1.0.[13]
- Hazardous materials associated with on-site stationary sources result in an accidental release of air toxic emissions or acutely hazardous materials posing a threat to public health and safety.
- The Project would be occupied primarily by sensitive individuals within 0.25 mile of any existing facility that emits air toxic contaminants which could result in a health risk for pollutants identified in District Rule 1401.[14]

[13] *SCAQMD Risk Assessment Procedures for Rules 1401 and 212, November 1998.*

[14] *SCAQMD, CEQA Air Quality Handbook, Chapter 6 (Determining the Air Quality Significance of a Project), 1993.*

6.0 IMPACT ANALYSIS AND MITIGATION MEASURES

6.1 IMPACT ANALYSIS

6.1.1 Construction-Period Impacts

Construction will be conducted in four phases each representing four distinct neighborhoods over 16 years. A breakdown of each phase, including duration, acreage, and amount and type of development, is included in Table 4 on page 30.

It is mandatory for all construction projects in the Basin to comply with SCAQMD Rule 403 for fugitive dust control. Specific requirements of the Rule 403 include, but are not limited to, applying water in sufficient quantities to prevent the generation of visible dust plumes, applying soil binders to uncovered areas, reestablishing ground cover as quickly as possible, utilizing a wheel washing system to remove bulk material from tires and vehicle undercarriages before vehicles exit the project site, and maintaining effective cover over exposed areas. These actions, and other best available control measures, are provided in Table 1 of the Rule 403. Mandatory compliance with dust control measures prescribed under SCAQMD Rule 403 would reduce particulate matter emissions associated with construction activities and was therefore assumed in the emissions calculation discussed below.

In addition, the Project construction site would qualify as a large site as there would be more than 50 acres of disturbed surface area. Therefore, the construction contractor must submit a Large Operation Notification to the SCAQMD (SCAQMD Form 403), and implement the applicable actions specified in Table 2 of Rule 403. These Actions specified include maintaining minimum required soil moisture content and various other dust suppression techniques. A full copy of SCAQMD Rule 403 is provided in the Appendix B of this Technical Report.

Construction activities would also comply with SCAQMD Rule 442[15] which requires use of solvents and coatings with low VOC content. Compliance with this rule is incorporated into the emission calculations discussed below.

[15] *SCAQMD Rule 442* *http://www.aqmd.gov/rules/reg/reg04/r442.pdf*.

6.1.1.1 Regional Air Quality Impacts

Construction of the proposed project has the potential to create air quality impacts through the use of heavy-duty construction equipment and through vehicle trips generated from construction workers traveling to and from the project site. In addition, fugitive dust emissions would result from demolition and construction activities. Mobile source emissions, primarily PM and NO_x, would result from the use of construction equipment such as dozers, loaders, and cranes. During the finishing phase, paving operations and the application of architectural coatings (i.e., paints) and other building materials would release VOCs. Construction emissions can vary substantially from day to day, depending on the level of activity, the specific type of operation and, for dust, the prevailing weather conditions. The assessment of construction air quality impacts considers each of these potential sources.

Table 4

Phasing Schedule

	Site Preparation / Grading			Building Construction				
Neighborhood	**Start Date**	**End Date**	**Grading (acres/day)**	**Start Date**	**End Date**	**Residential (DU)**	**School (acres)**	**Retail (KSF)**
I	1/1/2009	10/31/2012	50	6/1/2009	8/31/2015	924		19.0
II	6/1/2009	8/31/2015	50	4/1/2010	5/31/2018	2,430		39.5
III	6/1/2011	1/31/2025	50	3/1/2012	2/28/2020	2,691	24	764.1
IV	7/1/2017	9/30/2020	50	4/1/2018	6/30/2021	2,362		26.9
Total						**8,407**	**24**	**849.4**

Source: PCR Services, 2008.

In order to provide a conservative analysis, it is assumed that all construction activities would be completed in the minimum timeframe feasible. This is of particular importance as construction emissions are directly related to the intensity of construction activities, and significance criteria are established for emissions levels representing the "worst-case day". Actual construction may proceed at a less intensive pace, which would result in lower daily emissions.

The number of construction equipment used and the duration of construction activity could have a substantial effect upon construction emissions, pollutant concentrations and the potential for resulting impacts. As such, the emissions forecasts provided reflect a specific set of conservative assumptions based on the expected construction scenario wherein a relatively large amount of construction is occurring in a relatively intensive manner. As presented in Table 5 on page 31, maximum CO, NOx, PM_{10}, $PM_{2.5}$, and VOC construction-related daily (short-term) emissions would result in a significant impact without incorporation of mitigation measures.

Table 5

Unmitigated Proposed Project -
Estimate of Regional Construction Emissions [a]
(pounds per day)

	CO	NOx	PM_{10}[b]	$PM_{2.5}$[b]	VOC[c]	SOx
Regional Emissions (On-+ Off-Site)						
Neighborhood I	352	377	879	196	56	<1
Neighborhood II	1,036	563	893	207	103	1
Neighborhood III	608	406	883	199	83	<1
Neighborhood IV	194	215	870	189	39	<1
Max Overlapping[d]	**2,194**	**1,206**	**2,066**	**475**	**232**	**3**
SCAQMD Daily Significance Thresholds	550	100	150	55	75	150
Over/(Under)	1,644	1,106	1,916	420	157	(147)
Exceed Threshold?	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	No
Localized Emissions (On-Site Only)[e]						
Neighborhood I	163	340	876	195	48	<1
Neighborhood II	227	455	883	201	73	<1
Neighborhood IIIa	172	327	876	195	66	<1
Neighborhood IV	133	202	869	188	53	<1
Max Overlapping[c]	515	1,011	2,048	463	175	<1

[a] *Emission quantities are rounded to "whole number" values. As such, the "total" values presented herein may be one unit more or less than actual values. Exact values (i.e., non-rounded) are provided in the URBEMIS model printout sheets and/or calculations*

[b] *PM_{10} and $PM_{2.5}$ emissions estimates are based on compliance with SCAQMD Rule 403 requirements for fugitive dust suppression.*

[c] *VOC emissions estimates are based on compliance with SCAQMD Rule 442 requirements for low VOC solvents and coatings.*

[d] *Maximum regional NOx, PM_{10} and $PM_{2.5}$ emissions occur during combined site preparation and building construction of Neighborhood I, II, and III in 2012. Maximum regional CO and VOC emissions occur during combined construction of Neighborhood II and III in 2015.*

[e] *SCAQMD Localized Significance Mass Emission Threshold applies to projects less than 5 acres in size. Since the project is larger than 5 acres, the mass emission threshold would not apply. Please refer to Table 6 for localized significance determination*

Source: PCR Services Corporation, 2008.

6.1.1.2 Localized Air Quality Impacts

SCAQMD LST methodology provides screening level thresholds for project sites smaller than five acres. Since the construction phases may exceed 5 acres, the localized effects from the on-site construction emissions of CO, NOx (NO_2), PM_{10} and $PM_{2.5}$ were analyzed using the ISCST3 dispersion model. The results of the dispersion modeling are presented in Table 6 on page 32. As shown in Table 6, PM_{10} and $PM_{2.5}$ localized impacts would exceed the SCAQMD

Table 6

Unmitigated Proposed Project –
Localized Construction Dispersion Analysis

Pollutant and Averaging Period[a]	Residential Receptor (South)	Residential Receptor (East)
PM_{10} (24-hr) – (ug/m3)		
Project Incremental Concentration	80.2	29.5
LST Threshold	10.4	10.4
Over/(Under)	39.8	19.1
Exceed Threshold?	**Yes**	**Yes**
$PM_{2.5}$ (24-hr) - (ug/m3)		
Project Incremental Concentration	17.9	6.6
LST Threshold	10.4	10.4
Over/(Under)	1.4	(3.8)
Exceed Threshold?	**Yes**	**No**
CO (1-hr) - (ug/m3)		
Project Incremental Concentration	104	42
LST Threshold	19,550	19,550
Over/(Under)	(19,446)	(19,508)
Exceed Threshold?	**No**	**No**
CO (8-hr) - (ug/m3)		
Project Incremental Concentration	41	14
LST Threshold	7,921	7,921
Over/(Under)	(7,880)	(7,907)
Exceed Threshold?	**No**	**No**
NO_2 (1-hr) - (ug/m3)		
Project Incremental Concentration	20	8
LST Threshold	283	283
Over/(Under)	(262)	(274)
Exceed Threshold?	**No**	**No**

[a] *Maximum localized (on-site) construction CO, NOx, PM_{10} and $PM_{2.5}$ concentrations occur during combined site preparation and building construction of Neighborhood I, II, and III during Year 2012.*

Source: PCR Services Corporation, 2008.

recommended threshold. Localized CO and NO_2 concentrations would remain below thresholds. The maximum PM_{10} and $PM_{2.5}$ concentrations of 80.2 µg/m^3 and 17.9 µg/m^3 respectively, occur at residential uses south of the Project site. Maximum PM concentrations would occur primarily during site grading activities.

6.1.1.3 Toxic Air Contaminants

The greatest potential for toxic air contaminant (TAC) emissions would be related to diesel particulate emissions associated with heavy equipment operations during grading and excavation activities. According to SCAQMD methodology, health effects from carcinogenic air toxics are usually described in terms of individual cancer risk. "Individual Cancer Risk" is the likelihood that a person exposed to concentrations of TACs over a 70-year lifetime outdoors will contract cancer, based on the use of standard risk-assessment methodology. An assessment of diesel particulate emissions was conducted to assess this potential risk using the same assumptions used for the localized analysis discussed above. As such, this analysis includes all diesel exhaust emissions associated with on-site heavy equipment and haul trucks during the construction period. The results of this analysis for the construction of the project yield a maximum incremental increase in offsite individual cancer risk of 4.2 in a million over the duration of construction, where the maximum impact occurs at residential uses south of the project site. As the project will not emit carcinogenic or toxic air contaminants that individually or collectively exceed the maximum individual cancer risk of ten in one million, project-related toxic emission impacts from construction activities will be less than significant and no mitigation will be required. Neither the City nor the SCAQMD has established a criterion to assess the significance of cumulative health risks, such as those resulting from the exposure to project-related emissions combined with existing or contemplated future pollutant concentrations (background). The applicable criteria apply only to the incremental increase in risk.

6.1.1.4 Odors

Potential sources that may emit odors during construction activities include the use of architectural coatings and solvents. SCAQMD Rule 1113 limits the amount of volatile organic compounds from architectural coatings and solvents. Via mandatory compliance with SCAQMD Rules, no construction activities or materials are proposed which would create objectionable odors. Therefore, no impact would occur and no mitigation measures would be required.

6.1.2 Long-Term Operations

Stationary sources built and operated as a result of this project are subject to the applicable rules and regulations of the SCAQMD. Emission calculations associated with the operation of the proposed project assume mandatory compliance with applicable standards, prohibitions, and emission limits, such as the inclusion of Best Available Control Technology (BACT) and other measures to reduce pollutant emissions. For example, the SCAQMD has promulgated rules to lower emissions associated with the use of building materials, cleaning solvents, architectural coatings, and wood burning fireplaces. In addition the proposed development plans allow for businesses such as dry cleaners, retail gasoline stations, and

restaurant operations (charbroilers) which are subject to SCAQMD rules. The unmitigated regional operational emissions reported in Table 7 below are based on compliance with these standards.

6.1.2.1 Regional Air Quality Impacts

Regional air pollutant emissions associated with proposed project operations would be generated by the consumption of electricity and natural gas, and by the operation of on-road vehicles. Pollutant emissions associated with energy demand (i.e., electricity generation and natural gas consumption) are classified by the SCAQMD as regional stationary source emissions. Electricity is considered an area source since it is produced at various locations within, as well as outside of, the Basin. Since it is not possible to isolate where electricity is produced, these emissions are conservatively considered to occur within the Basin and are regional in nature. Criteria pollutant emissions associated with the production and consumption of energy were calculated using emission factors from the SCAQMD's *CEQA Air Quality Handbook* (Appendix to Chapter 9).

Operational emissions are primarily a function of vehicle trips. The increase in residential uses and the resultant increases in trip generation were analyzed. According to the traffic report generated by Crain and Associates, the daily traffic would result in an increase of 81,660 daily trips over existing conditions. Mobile-source emissions were calculated using the current URBEMIS 2007 emissions inventory model, Version 9.2.4, which multiplies an estimate of the increase in daily VMT by applicable EMFAC2007 emissions factors. The URBEMIS 2007 model output and worksheets for calculating regional operational daily emissions are provided in Appendix B of this Technical Report. As shown in Table 7 on page 35, the increase in regional emissions resulting from operation of the project are expected to exceed the SCAQMD thresholds for VOC, CO, PM_{10}, $PM_{2.5}$ and NOx.

6.1.2.2 Localized Air Quality Impacts

Within an urban setting, vehicle exhaust is the primary source of CO. Consequently, the highest CO concentrations are generally found within close proximity to congested intersection locations. Under typical meteorological conditions, CO concentrations tend to decrease as distance from the emissions source (i.e., congested intersection) increase. For purposes of providing a conservative, impact analysis, CO concentrations are typically analyzed at congested intersection locations, because if impacts are less than significant in close proximity of the congested intersections, impacts will also be less than significant at more distant sensitive receptor locations.

Table 7

Estimate of Unmitigated Project Operational Emissions [a]
(Pounds per Day)

Emission Source	VOC	NO_X	CO	SOx	PM_{10}	$PM_{2.5}$
On Road Mobile Sources [b]	394	436	3,755	10	1,596	311
Stationary Sources [c]	2	220	38	23	8	8
Area Source [d]	495	116	211	<1	<1	<1
Total Project	**395**	**657**	**3793**	**33**	**1604**	**319**
SCAQMD Daily Significance Threshold	55	55	550	150	150	55
Over (Under)	340	602	3,245	(117)	1,454	264
Significant?	**Yes**	**Yes**	**Yes**	**No**	**Yes**	**Yes**

[a] *All emission calculations include reductions associated with SCAQMD rules requiring BACT.*
[b] *Mobile emissions calculated using the URBEMIS 2007 emissions model and the project traffic study by Crain and Associates. Model output sheets are provided in the Appendix B to this Technical Assessment.*
[c] *Based on guidance provided in the SCAQMD CEQA Air Quality Handbook.*
[d] *Based on URBEMIS 2007 natural gas consumption, consumer product, and landscaping emissions.*

Sources: PCR Services Corporation, 2008.

Project traffic, during the operational phase of the proposed Project, would have the potential to create local area CO impacts. The SCAQMD recommends a hot-spot evaluation of potential localized CO impacts when volume-to-capacity ratios are increased by two percent at intersections with a level of service (LOS) of D or worse. The SCAQMD also recommends a CO hot-spot evaluation when an intersection decreases in LOS by one level beginning when LOS changes from an LOS of C to D. Intersections were selected for analysis based on information provided in the Traffic Impact Study prepared by Crain and Associates.

Local area CO concentrations were projected using the CALINE-4 traffic pollutant dispersion model. The analysis of CO impacts followed the protocol recommended by the California Department of Transportation and published in the document titled *Transportation Project-Level Carbon Monoxide Protocol*, December 1997. It is also consistent with procedures identified through the SCAQMD's CO modeling protocol, with all four corners of each intersection analyzed to determine whether proposed Project development would result in a CO concentration that exceeds federal or State CO standards. Pursuant to these guidelines, receptor locations for the 1-hour analysis were located 3 meters from each intersection corner and receptor locations for the 8-hour analysis were located 7 meters from each intersection corner.[16]

[16] *California Department of Transportation, Transportation Project-Level Carbon Monoxide Protocol, December 1997. "The U.C. Davis analysis of available scientific studies suggests that receptor locations for a 1-hour analysis should be 3m and receptor locations for an 8-hour analysis need not be located closer than 7m except in the case of sensitive receptors where added conservative concentration predictions are desirable." Since there are no discrete receptors identified closer than 7 meters, PCR performed the analyses in accordance with this guidance.*

Projected future ambient background CO concentrations were selected for the appropriate SRA from SCAQMD's recommended background concentrations tables.[17] The SCAQMD recommends use of these projected background levels for use in horizon year impact analyses, as they account for CO concentrations expected to result from future traffic volumes, which may be higher than current monitored pollutant levels.

The proposed project's CO concentrations for 1- and 8-hour CO levels during the A.M. and P.M. peak travel periods are presented Table 8 on page 37. As shown, the proposed Project would not have a significant impact upon 1-hour or 8-hour local CO concentrations due to mobile source emissions. As significant impacts would not occur at the intersections with the highest traffic volumes that are located adjacent to sensitive receptors, no significant impacts are anticipated to occur at any other locations in the study area as the conditions yielding CO hotspots would not be worse than those occurring at the analyzed intersections. Consequently, on- and off-site sensitive receptors would not be significantly affected by CO emissions generated by the net increase in traffic which would occur under the proposed project.

6.1.2.3 Toxic Air Contaminants

Toxic air contaminants are of particular concern with regard to sensitive receptors. For example, state law requires school districts to consider the impact of siting a new school close to existing facilities that emit toxic air contaminants. This same principle is applied in siting other sensitive receptors (e.g., residential uses) close to facilities that emit TAC (e.g., freeways, gasoline stations, etc.). It is also important when siting a new source of toxic air contaminants near existing sensitive receptors. As such, potential air toxic impacts were evaluated from on-site sources to off-site populations. In addition, the proposed project is introducing sensitive land uses (e.g., residential) into an area where potential off-site sources of air toxics may potentially impact proposed sensitive uses.

6.1.2.3.1 Operational Impacts from TACs to Off-Site Population

This section evaluates potential impacts to neighboring properties that may result from TAC emissions associated with long-term operation of the project. The primary sources of potential air toxics associated with proposed project operations include diesel PM_{10} from delivery trucks (e.g., truck traffic on local streets and on-site truck idling) and emergency backup generators. The SCAQMD recommends that health risk assessments be conducted for

[17] *SCAQMD CO Background Concentrations: http://www.aqmd.gov/ceqa/handbook/CO/CO.html, accessed February 2008.*

Table 8

Local Area Carbon Monoxide Dispersion Analysis

	Peak Period[a]	Maximum 1-Hour 2030 Base Concentration (ppm) [b]	Maximum 1-Hour 2030 w/ Project Concentration (ppm) [c]	Significant 1-Hour Impact [d]	Maximum 8-Hour 2030 Base Concentration (ppm) [e]	Maximum 8-Hour 2030 w/ Project Concentration (ppm) [f]	Significant 8-Hour Impact [d]
Glen Helen Parkway and Cajon Boulevard	AM	3.9	3.9	NO	3.04	3.04	NO
	PM	4.0	4.1	NO	3.11	3.11	NO
I-15 SB On/Off Ramps and Sierra Avenue	AM	4.1	4.2	NO	3.18	3.18	NO
	PM	4.1	4.2	NO	3.11	3.18	NO
I-215 NB On/Off Ramps and University Parkway	AM	3.9	4.2	NO	3.04	3.18	NO
	PM	4.2	4.5	NO	3.18	3.32	NO
I-215 SB On/Off Ramps and Palm Avenue	AM	4.4	4.4	NO	3.25	3.25	NO
	PM	4.6	4.6	NO	3.39	3.39	NO
Lytle Creek Road and Sierra Avenue	AM	4.2	4.4	NO	3.11	3.18	NO
	PM	4.3	4.4	NO	3.18	3.25	NO
Casmalia Street and Alder Avenue	AM	3.9	4.0	NO	3.04	3.11	NO
	PM	4.0	4.1	NO	3.11	3.11	NO
I-15 NB On/Off Ramps and Sierra Avenue	AM	4.0	4.2	NO	3.04	3.18	NO
	PM	4.2	4.5	NO	3.18	3.32	NO
I-15 SB On/Off Ramps and Summit Avenue	AM	4.0	4.0	NO	3.11	3.11	NO
	PM	4.1	4.1	NO	3.18	3.18	NO
Riverside Avenue and Linden Avenue	AM	4.0	4.2	NO	3.11	3.18	NO
	PM	3.9	4.3	NO	3.11	3.25	NO
Riverside Avenue and Sierra Avenue	AM	4.1	4.4	NO	3.11	3.32	NO
	PM	4.1	4.6	NO	3.11	3.39	NO
SR-210 Freeway EB On/Off Ramps and State Street	AM	4.0	4.0	NO	3.04	3.11	NO
	PM	4.2	4.2	NO	3.18	3.18	NO
Highland Avenue/Easton Street And Alder Avenue	AM	4.2	4.2	NO	3.18	3.18	NO
	PM	4.3	4.3	NO	3.25	3.25	NO
Highland Avenue And State Street	AM	4.3	4.5	NO	3.25	3.25	NO
	PM	4.3	4.4	NO	3.25	3.25	NO
SR-210 Freeway EB On/Off Ramps And Riverside Avenue	AM	4.3	4.3	NO	3.32	3.32	NO
	PM	4.4	4.5	NO	3.32	3.32	NO
SR-210 Freeway WB On/Off Ramps And Riverside Avenue	AM	3.9	4.0	NO	3.04	3.11	NO
	PM	4.0	4.1	NO	3.04	3.18	NO
Baseline Road And Alder Avenue	AM	4.0	4.0	NO	3.04	3.04	NO
	PM	4.2	4.2	NO	3.18	3.18	NO
Easton Street And Ayala Drive	AM	4.1	4.1	NO	3.11	3.11	NO
	PM	4.3	4.3	NO	3.25	3.25	NO
Easton Street And Riverside Avenue	AM	4.0	4.1	NO	3.11	3.11	NO
	PM	4.2	4.2	NO	3.18	3.18	NO

ppm = parts per million.

[a] *Peak hour traffic volumes are based on the Traffic Impact Study prepared for the Project by Crain and Associates, August 2007*

[b] *SCAQMD 2030 1-hour ambient background concentration (3.6 ppm) + 2030 Base traffic CO 1-hour contribution.*

[c] *SCAQMD 2030 1-hour ambient background concentration (3.6 ppm) + 2030 w/ Project traffic CO 1-hour contribution.*

[d] *The most restrictive standard for 1-hour CO concentrations is 20 ppm and for 8-hour concentrations is 9.0 ppm.*

[e] *SCAQMD 2030 8-hour ambient background concentration (2.9 ppm) + 2030 Base traffic CO 8-hour contribution.*

[f] *SCAQMD 2030 8-hour ambient background concentration (2.9 ppm) + 2030 w/ Project traffic CO 8-hour contribution.*

Source: PCR Services Corporation, 2008.

substantial sources of diesel PM_{10} (e.g., truck stops and warehouse distribution facilities) and has provided guidance for analyzing mobile source diesel emissions.[18] The proposed project zoning would allow for operation of a major distribution center or other industrial use that may be located within 1,000 feet of residential uses.

In 2004, CARB adopted an Airborne Toxic Control Measure (ATCM) to limit heavy duty diesel motor vehicle idling in order to reduce public exposure to diesel PM and other TACs and air pollutants. The measure applies to diesel-fueled commercial vehicles with gross vehicle weight ratings greater than 10,000 pounds which are licensed to operate on highways, regardless of where they are registered. This measure does not allow diesel fueled commercial vehicles to idle for more than 5 minutes at any given time.

In addition to ACTMs, CARB adopted various recommendations regarding the siting of new sensitive land uses near sources of air toxics. These advisory recommendations, discussed in more detail below, include siting sensitive land uses outside 1,000 feet of major distribution centers, which are defined as operating 100 or more truck trips per day, 40 or more daily truck trips with refrigeration transport units (RTU), or trucks operating RTUs that idle for a total of 300 hours per week or more.[19] The methodology for estimating potential health impacts from diesel truck idling was based on data from various locations within the state.[20] Using a worst-case scenario to create a conservative estimate, the study evaluated risk using an emission factor for diesel truck idling representative of the 2007 truck fleet. The study concluded that 100 hours of daily idle hours would create a health risk greater than 10 in a million within approximately 250 meters of the loading area. The threshold distance of 250 meters would increase approximately 50 meters with every 50 additional diesel idle hours.

Localized air toxic impacts from diesel particulate emissions associated with a potential distribution center may be substantial if it is located within 1,000 feet of sensitive land uses. Unlike a freeway, this determination is more speculative due to the low level of detail about future development (such as specific location of the distribution center, orientation of loading docks, and activity level) known at this time. However, based on the studies conducted by the CARB detailed above, a sensitive land use would be exposed to a cancer risk of 10 in a million or greater if located within 1,000 feet of a large distribution center. Since a distribution center may be located within this siting distance, and is anticipated to create a substantial increase in risk at nearby residences, impacts would be significant.

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[18] *SCAQMD, Health Risk Assessment Guidance for Analyzing Cancer Risks from Mobile Source Diesel Emissions, December 2002.*

[19] *CARB Land Use Hand Book Table 1-1: Recommendations for Siting New Sensitive Land Uses.*

[20] *Appendix C: Methodology for Estimating the Potential Health Impacts from Diesel Truck Idling Operations. http://www.arb.ca.gov/regact/idling/isorappc.pdf.*

The Specific Plan does not contemplate certain land uses, such as heavy manufacturing, which would allow facilities that use, store, or emit high levels of TACs or acutely hazardous materials (AHM). It is therefore unlikely that sources which pose significant risks would be sited within the Project Neighborhoods. However, specific retail and light industrial facilities which may be allowed under the proposed zoning may still pose serious risk to nearby sensitive receptors. For example, dry cleaners and gas stations routinely handle chemicals and products which in the regular course of business cause toxic air contaminants to be emitted into the atmosphere. CARB has prepared recommended siting guidelines, and all new sources of TACs and AHMs would be subject to permitting processes which include review and approval from responsible agencies such as the SCAQMD and Certified Unified Protection Agency (CUPA) (San Bernardino County Fire Department). These agencies would require demonstration of compliance with regulatory requirements (e.g., Toxic-Best Available Control Technology).

6.1.2.3.2 Operational Impacts from TACs to On-Site Population

The ARB's *Air Quality and Land Use Handbook: A Community Health Perspective (March 2005)* provides important air quality information about certain types of facilities (e.g., freeways, refineries, rail yards, ports, etc.) that should be considered when siting sensitive land uses (e.g., residences). A key air pollutant common to these sources is particulate matter from diesel engines. ARB identifies diesel particulate matter (DPM) as both a carcinogen and long-term chronic TAC. Gasoline exhaust also results in additional TAC emissions (e.g., 1,3 butadiene, benzene, formaldehyde, etc). Because living too close to such air pollution sources may increase both cancer and non-cancer health risks, ARB recommends that proximity be considered in the siting of new sensitive land uses. ARB's recommendations are based primarily on data showing that the air pollution exposure can be reduced as much as 80 percent with the recommended separation. The ARB recommends that site-specific project design improvements may help reduce air pollution exposures and should also be considered when siting new sensitive land uses. The recommendations are advisory and should not be interpreted as defined "buffer zones." In addition, the ARB recognizes that site-specific analysis is preferred over use of the recommended site distances which is similar to a screening level approach.

Where possible, ARB recommends a minimum separation between new sensitive land uses and existing sources. However, this is not always possible, particularly where there is an elevated health risk over large geographical areas (e.g. urbanized areas of Southern California). The ARB recommends avoiding new sensitive land uses within 500 feet of a freeway, urban roads with 100,000 vehicles/day, or rural roads with 50,000 vehicles per day. The basis for the recommended distance is a southern California study that showed measured concentrations of vehicle-related pollutants drop dramatically within approximately 300 feet of the I-710 and I-405

freeways.[21] Another study looked at the validity of using distance from a roadway as a measure of exposure to traffic related air pollution. This study showed that concentrations of traffic related pollutants declined by 70 percent at a distance of 500 feet.[22] ARB concluded that these findings were also consistent with air quality modeling and risk analyses done by ARB staff. The CARB siting recommendations also recommends that sensitive receptors should not be sited within 300 feet of a large gas station (defined as a facility with a throughput of 3.6 million gallons per year or greater), 50 feet for typical gas dispensing facilities or within 300 feet of a dry cleaning facility that uses perchloroethylene, among other siting recommendations.

According to a visual site survey and search on the AQMD Facility Information (FIND) database, three gasoline stations (Arco, Valero, and Tesoro) are located approximately 160 feet southwest of the project site boundary along Riverside Drive. These gasoline stations are not considered large (throughput greater than 3.6 million gallons per year) and are located greater than 50 feet from the closest sensitive use. The proposed project would not be located near any dry cleaning facilities or other industrial or warehousing land uses. However, the I-15 Freeway is located within the 500 feet recommended distance from residential receptors. The associated risk would be attributable to vehicle emissions from the freeway. In addition, Sunwest Materials operates an aggregate processing facility and concrete-batch plant along North Riverside Avenue. Heavy-duty diesel equipment and haul truck activity associated with these operations are located within close proximity of proposed residential uses. As the proposed project would introduce residential uses within the CARB siting distances for potential air toxic sources, on-site sensitive receptors may potentially be exposed to high levels of TACs. Additional analysis was therefore conducted based on CARB and SCAQMD guidance to assess the potential health risks that future residents may experience due to the proposed project site's proximity to the above mentioned air toxic sources.

Cancer risk is often expressed as the maximum number of new cases of cancer projected to occur in a population of one million people due to exposure to a specific cancer-causing substance after a 24-hour a day, 365 days a year exposure outdoors at the same concentration over a lifetime of 70 years. For purposes of this analysis, shorter periods of 9 and 30 years were also considered. These shorter periods correspond to the "central tendency" and "high-end estimates" for residency time at a single location and are recommended for analysis by USEPA study methodology. This probability is usually expressed in terms of the number of people who will develop cancer per one million people who are also exposed. It is important to understand that this cancer risk represents the probability that a person develops some form of cancer. The estimated risk does not represent mortality rates. It is also important to understand that the risk

[21] *Zhu, Y et al. "Study of Ultra-Fine Particles Near a Major Highway with Heavy Duty Diesel Traffic."* *Atmospheric Environment.* *2002; 26:4323-4335.*

[22] *Knape, M. "Traffic related air pollution in city districts near motorways."* *The Science of the Total Environment.* *1999: 235:339-341.*

described in these calculations reflects a level of exposure that would be virtually impossible to experience, and that for most individuals, exposure to a particular contaminant, such as DPM would be considerably less due to shorter duration of residence in the area, amount of time spent at the residence daily and throughout the year, and the split between time spent indoors versus outdoors.

The cancer risk from vehicular exhaust (e.g., DPM) occurs exclusively through inhalation and for this project was calculated using the EPA recommended Industrial Source Complex – Short Term (ISCST3) dispersion model. Output from the dispersion analysis was used to estimate the TAC concentrations. The cancer risk was then calculated based on those estimated DPM concentrations using the risk methodology derived from the California Office of Environmental Health Hazard Assessment (OEHHA). The specific calculations and assumptions used to determine the cancer risks are included in Appendix B of this Technical Report. The risk assessment guidelines established by SCAQMD and followed in this analysis are designed to produce conservative (high) estimates of the risk posed by TAC. The conservative nature of the analysis is due to the following factors:

- As a conservative measure, the SCAQMD does not recognize indoor adjustments for residents. However, studies have shown that the typical person spends approximately 87 percent of their time indoors, 5 percent of their time outdoors, and 7 percent of their time in vehicles. In addition, residences without an indoor source of diesel exhaust are expected to have lower levels of DPM. A DPM exposure assessment showed that the average indoor concentration is 2.0 $\mu g/m^3$, compared with an outdoor concentration of 3.0 $\mu g/m^3$.

- The exposure to DPM is assumed to be constant for the period analyzed. However, emissions of DPM are expected to decrease substantially in the future due to emission control programs and technological advancements and improvements.

- The ISCST3 air dispersion model as applied in this study is designed to provide conservative estimates of air pollutant concentrations.

The threshold for significance used to evaluate the exposure to TAC is 10 excess cancer cases per one million people. This is the threshold recommended by the SCAQMD and the CARB explicitly to determine impacts attributable to projects that introduce new sources of TAC emissions in an area. In contrast, the proposed project is a predominantly residential project that will not add new sources of TAC to the project vicinity and will not increase the cancer risk faced by people who already live in the project vicinity, but will introduce new sensitive receptors to the project site in the form of project residents. While it was not originally intended to evaluate projects which introduce new sensitive receptors to an area, and in the absence of a more applicable threshold for exposure, SCAQMD has recommended that the 10 excess cancer

cases per one million persons threshold also be used as a conservative measure of the potential risk to such new receptors.

The results of the mathematical calculations determining estimated cancer risks are listed in Table 9 on page 43, Estimated Cancer Risks (per million people). The cancer risks reported in Table 9 represent the range of potential cancer risks to residents of the proposed project and assume 24 hour a day exposure outdoors for 365 days a year. The additional exposure durations of 30 and nine years are useful since very few people can be expected to occupy the same residence for 70 consecutive years. Even the nine-year exposure assumes constant outdoor, on-site exposure 24 hours daily for nine straight years.

The cancer risk exceeds the 10 in one million threshold, with the freeway truck traffic being the major source (Appendix B). A constant 70-year exposure would result in a cancer risk as high as 224 cases in one million for the maximum on-site receptor. This high level declines to less than 13 cases in one million for the average on-site receptor with a constant nine-year exposure. Of course, both of these outcomes are likely overstated as reducing DPM is one of CARB's highest public health priorities and the focus of a comprehensive statewide control program that is reducing DPM emissions each year. CARB's long-term goal is to reduce DPM emissions 85 percent by 2020.

As discussed previously, the vast majority of the San Bernardino County is in an area between 250 and 750 cancers per million.[23] The health risk assessment performed for the project site demonstrates that the project site is also within this range. Therefore, there is an inherent health risk associated with living in urbanized areas of San Bernardino County. Nevertheless, the project would result in locating sensitive receptors within an area of localized cancer risk in excess of the SCAQMD significance threshold of 10 in one million and, therefore, the project would result in significant impact without incorporation of mitigation measures.

To quantify non-carcinogenic impacts, the hazard index approach was used. The approach assumes that chronic sub-threshold exposures adversely affect a specific organ or organ system (toxicological endpoint). For each discrete chemical exposure, target organs presented in regulatory guidance were utilized. To calculate the hazard index, each chemical's concentration or dose is divided by the appropriate toxicity value. For compounds affecting the same toxicological endpoint, this ratio is summed. Where the total is equal to or exceeds one, a health hazard is presumed to exist. The analysis for the proposed project resulted in a chronic hazard index for the maximum exposed receptors of 0.22, which is approximately 22 percent of the SCAQMD recommended threshold. Therefore, non-cancer health risks are not considered significant.

[23] *http://www.arb.ca.gov/toxics/cti/hlthrisk/cncrinhl/riskmapviewfull.htm.*

Table 9

Estimated Cancer Risks (per million people)

Receptor [a]	70-year Exposure	30-year Exposure	9-year Exposure
Maximum On-Site Residence	224	96	29
Average On-Site Residence	102	44	13

[a] *Maximum on-site residence represents the highest concentration (closest to freeway). Average on-site residence represents average concentration throughout project site.*

Source: PCR Services Corporation, 2008.

The Project includes plans for two new public schools, one elementary and one middle school, to be located in Neighborhood 3. The State of California Education Code Section 17213 requires all new schools to perform a detailed HRA before the selection of a site and final design are approved. At this stage in the planning process, details needed to perform a refined HRA are not known, and it is most appropriate for these studies to be performed under future separate environmental reviews. However, according to Figure 1 of the Technical Report, the proposed school sites are consistent with ARB's siting recommendations regarding compatible adjacent and nearby land-uses.

6.1.2.4 Odors

According to the SCAQMD *CEQA Air Quality Handbook*, land uses associated with odor complaints typically include agricultural uses, wastewater treatment plants, food processing plants, chemical plants, composting, refineries, landfills, dairies, and fiberglass molding. The proposed Project does not include any uses identified by the SCAQMD as being associated with odors. Therefore, the proposed Project would not create adverse odors as discussed above and would have no impact related to objectionable odors.

6.1.2.5 SCAQMD Handbook Policy Analysis

The proposed project encompasses a relatively large geographic area that spans across both unincorporated areas of San Bernardino County and the City of Rialto. In accordance with the procedures established in the SCAQMD CEQA Air Quality Handbook, the following criteria are required to be addressed in order to determine the proposed project's consistency with air quality policies:

1. Will the project result in any of the following:

    - An increase in the frequency or severity of existing air quality violations; or

- Cause or contribute to new air quality violations; or
- Delay timely attainment of air quality standards or the interim emission reductions specified in the AQMP.

2. Will the project exceed the assumptions utilized in preparing the AQMP?

With respect to the first criterion, SCAQMD methodologies require that an air quality analysis for a project include forecasts of project emissions in a regional context during construction and project occupancy. These forecasts are provided earlier in this section. Since the consistency criteria identified under the first criterion pertain to pollutant concentrations, rather than to total regional emissions, an analysis of the project's pollutant emissions relative to localized pollutant concentrations is used as the basis for evaluating project consistency.[24] As discussed in the preceding sections, localized concentrations of PM_{10}, $PM_{2.5}$, CO, and NO_2 have been analyzed for the project. SO_2 emissions would be negligible during construction and long-term operations, and therefore would not have potential to cause or affect a violation of the SO_2 ambient air quality standard. Because VOCs are not a criteria pollutant, there is no ambient standard or localized threshold for VOC. Due to the role VOC plays in ozone formation, it is classified as a precursor pollutant and only a regional emissions threshold has been established.

Particulate matter is the primary pollutant of concern during construction activities, and therefore, the project's PM_{10} and $PM_{2.5}$ emissions during construction were analyzed (1) to ascertain potential effects on localized concentrations and (2) to determine if there is a potential for such emissions to cause or affect a violation of the ambient air quality standards for PM_{10} and $PM_{2.5}$. Both PM_{10} and $PM_{2.5}$ emissions during construction would exceed the SCAQMD-recommended significance threshold at sensitive receptors in close proximity to the project site. It should be noted that the potential for this impact would be short-term and would not have a long-term impact on the region's ability to meet State and federal air quality standards. In addition, the project would be required to comply with SCAQMD Rule 403 and would implement all feasible mitigation measures for control of PM_{10}. Nevertheless, the project would have significant temporary localized impacts on PM_{10} and $PM_{2.5}$ concentrations.

The project's maximum potential NO_X and CO daily emissions during construction were analyzed to ascertain potential effects on localized concentrations and to determine if there is a potential for such emissions to cause or affect a violation of an applicable ambient air quality standard. As shown in Table 6, the maximum estimate of localized emissions for these two criteria pollutants would remain below their respective SCAQMD LST Significance Thresholds. As such, localized impacts (i.e. potential to violate either the NAAQS or the CAAQS at sensitive

[24] *South Coast Air Quality Management District, CEQA Air Quality Handbook, p. 12-3, 1993.*

receptor locations) that may result from construction-period air pollutant emissions would be less than significant.[25]

Because this project does not introduce any substantial stationary sources of emissions, CO is the preferred benchmark pollutant for assessing local area air quality impacts from post-construction motor vehicle operations. Based on methodologies set forth by the SCAQMD, one measure of local area air quality impacts that can indicate whether the proposed project would cause or affect a violation of an air quality standard would be based on the estimated CO concentrations at selected receptor locations located in close proximity to the project site. As indicated earlier, CO emissions were analyzed using the CALINE-4 model. No violations of the State and federal carbon monoxide standards are projected to occur.

Overall, the project would result in less than significant impacts with regard to SO_2 concentrations during project construction and operations. While PM_{10} and $PM_{2.5}$ concentrations during construction would exceed the SCAQMD localized significance thresholds, the impact would be primarily during grading activities and would not have a long-term impact on the region's ability to meet State and federal air quality standards. As such, the project would meet the first AQMP consistency criterion.

With respect to the second criterion for determining consistency with all applicable air quality policies, it is important to recognize that air quality planning within the Basin focuses on the attainment of ambient air quality standards at the earliest feasible date. Projections for achieving air quality goals are based on assumptions regarding population, housing and growth trends. Thus, the SCAQMD's second criterion for determining project consistency focuses on whether or not the proposed project exceeds the assumptions utilized in preparing the forecasts presented in the AQMP. Determining whether or not a project exceeds the assumptions reflected in the AQMP involves the evaluation of three criteria: (1) consistency with the population and employment growth projections; (2) project mitigation measures; and (3) appropriate incorporation of AQMP land use planning strategies. The following discussion provides an analysis of each of these three criteria.

- Is the project consistent with the population and employment growth projections upon which AQMP forecasted emission levels are based?

A project is consistent with the AQMP in part if it is consistent with the population, housing, and employment assumptions that were used in the development of the AQMP. In the case of the 2007 AQMP, three sources of data form the basis for the projections of air pollutant

[25] *Please note that NO_x is used when describing emissions of nitrogen oxides, but that the AAQS is in terms of NO_2 (pollutant concentration). The same applies for SO_x (emissions) versus SO_2 (AAQS concentration).*

emissions: the City of Rialto General Plan, SCAG's Growth Management Chapter of the *Regional Comprehensive Plan and Guide* (RCPG), and SCAG's 2001 Regional Transportation Plan (RTP), and the SANBAG Congestion Management Plan (CMP). The RTP also provides socioeconomic forecast projections of regional population growth. The project is consistent with the types, intensity and patterns of land use envisioned for the site vicinity in the RCPG. The population, housing, and employment forecasts which are adopted by SCAG's Regional Council are based on the local plans and policies applicable to the specific area; these are used by SCAG in all phases of implementation and review.

The proposed Project Site encompasses areas within the City of Rialto as well as unincorporated portions of San Bernardino County. However, the entire area of the proposed project is within the SANBAG subregion (which includes both the cities and unincorporated county communities located in San Bernardino County). Based on the 2004 Regional Transportation Plan San Bernardino County forecast, from 2009 to 2025, the population growth would be 527,350 people, while employment growth over the same 16-year period is predicted to be 324,353.[26] The proposed development Project would generate an additional 21,740 people and 4,472 employees upon buildout in 2025. These numbers represent approximately 4.1 and 1.4 percent of the growth predicted in the 2004 RTP, respectively. Such levels of growth are consistent with the forecasts for the subregion as adopted by both SCAG and SANBAG. Because the SCAQMD has incorporated these same projections into the AQMP, it can be concluded that the proposed Project would be consistent with the projections in the AQMP.

- Does the project implement all feasible air quality mitigation measures?

Implementation of all feasible mitigation measures is recommended to reduce air quality impacts to the extent feasible. The proposed project would incorporate a number of key control measures identified by the SCAQMD, as summarized below. As such, the proposed project meets this AQMP consistency criterion since all feasible mitigation measures would be implemented.

- To what extent is project development consistent with the land use policies set forth in the AQMP?

With regard to land use developments, such as the proposed project, air quality policies focus on both locating residential development close to major transit corridors/nodes and the reducing vehicles miles traveled. The proposed project, by virtue of its location, exhibits many attributes that have a positive direct and indirect benefit with regard to the reduction of vehicle trips and vehicles miles traveled. Specifically, the proposed project develops 7,056 residential

[26] *SCAG 2004 RTP; Population and employment forecasts for SANBAG-City of Rialto sub-region. Population and employment estimates for 2009 were interpolated using 2005 and 2010 data.*

units along a major transportation corridor. Additionally, this mixed-use project develops retail, local schools, and leisure land uses as part of a primarily residential development. Thus, the project is notably increasing the population and housing supply in close proximity to employment and education centers, thereby providing opportunities to create linkages between employment and residential centers that directly translate to reductions in vehicle trips and vehicle miles traveled. As the project is consistent with the SCAQMD's objective of reducing vehicle miles traveled and their related vehicular air emissions, the proposed project would be consistent with the AQMP land use policy.

In conclusion, the determination of AQMP consistency is primarily concerned with the long-term influence of the project on air quality in the Basin. While development of the project would result in short-term regional impacts, project development would not have a long-term impact on the region's ability to meet State and federal air quality standards. The project would comply with SCAQMD Rule 403 and would implement all feasible mitigation measures for control of PM_{10} and $PM_{2.5}$. Overall, the proposed Project is found to be consistent with the AQMP, as the proposed Project would not cause or worsen an exceedance of an ambient air quality standard, would not delay the attainment of an air quality standard, is consistent with the AQMP's growth projections, implements all feasible air quality mitigation measures, and would be consistent with the AQMP's land use policies.

6.1.3 CUMULATIVE IMPACTS

6.1.3.1 Construction Impacts

There are 104 related projects identified within the proposed Project study area. Since the Applicant has no control over the timing or sequencing of the related projects, any quantitative analysis to ascertain daily construction emissions that assumes multiple, concurrent construction projects would be speculative. As discussed above, any proposed project that would individually have a significant air quality impact would also be considered to have a significant cumulative air quality impact, because its cumulative contribution is considerable. Therefore, as the project would exceed SCAQMD regional emission thresholds during construction with incorporation of mitigation measures, the proposed project would contribute to a significant cumulative air quality impact. As stated previously, there are no established criteria to assess the significance of cumulative health risks. Due to the variable nature of construction with respect to activity level, duration, and location, it would be far too speculative to analyze potential health impacts resulting from possible concurrent construction.

6.1.3.2 Operational Impacts

The SCAQMD's approach for assessing cumulative impacts related to operations is based on attainment of ambient air quality standards in accordance with the requirements of the

Federal and State Clean Air Acts. As discussed earlier, the SCAQMD has developed a comprehensive plan, the 2007 AQMP, which addresses the region's cumulative air quality condition.

A significant impact may occur if a project would add a cumulatively considerable contribution of a federal or state non-attainment pollutant. Because the Basin is currently in nonattainment for ozone, PM_{10} and $PM_{2.5}$, related projects could exceed an air quality standard or contribute to an existing or projected air quality exceedance. Cumulative impacts to air quality are evaluated under two sets of thresholds for CEQA and the SCAQMD. In particular, CEQA Guidelines Sections 15064(h)(3) provides guidance in determining the significance of cumulative impacts. Specifically, Section 15064(h)(3) states in part that:

> "A lead agency may determine that a project's incremental contribution to a cumulative effect is not cumulatively considerable if the project will comply with the requirements in a previously approved plan or mitigation program which provides specific requirements that will avoid or substantially lessen the cumulative problem (e.g., water quality control plan, air quality plan, integrated waste management plan) within the geographic area in which the project is located. Such plans or programs must be specified in law or adopted by the public agency with jurisdiction over the affected resources through a public review process to implement, interpret, or make specific the law enforced or administered by the public agency…"

For purposes of the cumulative air quality analysis with respect to CEQA Guidelines Section 15064(h)(3), the project's incremental contribution to cumulative air quality impacts is determined based on compliance with the South Coast Air Quality Management District's (SCAQMD) adopted 2007 Air Quality Management Plan (AQMP).

The proposed project would not conflict with or obstruct implementation of the applicable air quality plan, which in this case is the AQMP. A project is deemed inconsistent with air quality plans if it results in population and/or employment growth that exceeds growth estimates in the applicable air quality plan. In turn, the AQMP relies upon growth projections adopted by the SCAG, which in turn, relies upon cities' adopted General Plan growth projections. Consequently, compliance with the City's General Plan typically results in compliance with the AQMP.

As discussed above in Section 6.1.2.5, the project would not result in population and/or employment growth that exceeds growth estimates in the AQMP. The project would comply with all rules and regulations as implemented by the SCAQMD and the California Air Resources Board (ARB), and would conform to the standards and guidelines of the County of San Bernardino and the City of Rialto General Plan. Therefore, it was determined that the proposed project was consistent with the AQMP. Thus, given the project's consistency with the AQMP,

the project's incremental contribution to cumulative air quality effects is not cumulatively considerable, per CEQA Section 15064(h)(3).

SCAQMD no longer recommends relying solely upon consistency with the AQMP as an appropriate methodology for assessing cumulative air quality impacts. Instead, SCAQMD's approach to determining cumulative air quality impacts for criteria air pollutants is to first determine whether or not the proposed project would result in a significant project-level impact to regional air quality based on SCAQMD significance thresholds. If not, then the lead agency needs to consider the additive effects of related projects only if the proposed project is part of an ongoing regulatory program or is contemplated in a Program EIR, and the related projects are located within approximately one mile of the proposed project site. If there are related projects within the vicinity (one-mile radius) of the proposed project site, (i.e., that are part of an ongoing regulatory program or are contemplated in a Program EIR) then additive effects of the related projects should be considered.

As the proposed project is not part of an ongoing regulatory program, the SCAQMD recommends that project specific air quality impacts be used to determine the potential cumulative impacts to regional air quality. As discussed in Section 6.1.2, peak daily emissions of operation-related pollutants would exceed SCAQMD regional significance thresholds. By applying SCAQMD's cumulative air quality impact methodology, implementation of the proposed project would result in an addition of criteria pollutants such that cumulative impacts, in conjunction with related projects in the region, would occur. Therefore, the emissions generated by project operation would also be cumulatively considerable.

6.2 MITIGATION MEASURES

6.2.1 Construction Activities

The following mitigation measures set forth a program of air pollution control strategies designed to reduce the proposed project's air quality impacts to the extent feasible during construction.

Mitigation Measure 1: General contractors shall water active grading areas three times per day.

Mitigation Measure 2: All construction equipment shall be properly tuned and maintained in accordance with manufacturer's specifications.

Mitigation Measure 3: General contractors shall maintain and operate construction equipment so as to minimize exhaust emissions. During construction, trucks and vehicles in loading and unloading queues would turn their engines off

when not in use to reduce vehicle emissions. Construction emissions should be phased and scheduled to avoid emissions peaks and discontinued during second-stage smog alerts.

Mitigation Measure 4: Electricity from power poles rather than temporary diesel- or gasoline-powered generators shall be used to the extent feasible.

Mitigation Measure 5: All construction vehicles shall be prohibited from idling in excess of five minutes, both on- and off-site.

Mitigation Measure 6: Grading activities shall be limited to 10 acres per day or less when grading within 1,000 feet of residential receptors.

Mitigation Measure 7: The project applicant shall implement measures to reduce the emissions of pollutants generated by heavy-duty diesel-powered equipment operating at the project site throughout the project construction. The project applicant shall include in construction contracts the control measures required and recommended by the SCAQMD at the time of development. These measures include the following:

- Use Tier II (2001 or later) heavy-duty diesel-powered equipment at the project site
- Apply NOx control technologies, such as fuel injection timing retard for diesel engines and air-to-air cooling, and diesel oxidation catalysts as feasible. Feasibility shall be determined by using the cost-effectiveness formula developed by the Carl Moyer Program.
- General contractors shall maintain and operate construction equipment so as to minimize exhaust emissions and keep all construction equipment in proper tune in accordance with manufacturer's specifications.

Mitigation Measure 8: The project applicant shall ensure that the construction contractors utilize architectural coatings that contain a VOC rating of 75 grams/liter of VOC or less.

6.2.2 Operational Activities

During the operational phase, the proposed Project would result in regional emissions that exceed regional SCAQMD significance thresholds for CO, NOx, PM_{10}, $PM_{2.5}$, and VOC. Emission control measures are specified for the following four sources of operational emissions: (1) service and support facilities; (2) natural gas consumption and electricity production; (3) building materials, architectural coatings, and cleaning solvents; and (4) transportation systems management and demand management.

6.2.2.1 Transportation System Management and Demand Management

Mitigation Measure 9: The Applicant shall, to the extent feasible, schedule deliveries during off-peak traffic periods to encourage the reduction of trips during the most congested periods.

Mitigation Measure 10: During site plan review, consideration shall be given regarding the provision of safe and convenient access to bus stops and public transportation facilities.

As on-site sensitive receptors could be exposed to off-site air toxic emissions (e.g. diesel exhaust from the I-15 freeway and Sunwest Materials) in excess of the SCAQMD significance threshold, the following mitigation measure is recommended.

Mitigation Measure 11: The Project shall include air filtration systems designed to have a minimum efficiency reporting value (MERV) of 12 as indicated by the American Society of Heating Refrigerating and Air Conditioning Engineers (ASHRAE) Standard 52.2 for residential dwelling units within 500 feet of Sunwest Materials and the Interstate-15 right-of-way.

6.3 LEVEL OF SIGNIFICANCE AFTER MITIGATION

6.3.1 Construction Activities

With implementation of the above mitigation measures, heavy-duty construction equipment emissions of CO, NOx, PM_{10}, $PM_{2.5}$, and VOC would be reduced by a minimum of 5 percent. However, regional construction activities would still exceed the SCAQMD daily emission thresholds for regional CO, NOx, PM_{10}, $PM_{2.5}$, and VOC after implementation of all feasible mitigation measures. Therefore, construction of the Project would have a significant and unavoidable impact on regional air quality.

Implementation of the mitigation measures described above would reduce localized PM_{10} emissions by 15 percent and $PM_{2.5}$ emissions by 14 percent. Offsite construction PM_{10} concentrations would be reduced from 80.2 $\mu g/m^3$ to 69.0 $\mu g/m^3$. The maximum offsite unmitigated $PM_{2.5}$ concentration of 17.9 $\mu g/m^3$ would be reduced to 15.2 $\mu g/m^3$. Even with incorporation of mitigation measures, the project impacts are predicted to exceed the SCAQMD LST threshold for $PM_{2.5}$ and PM_{10}.

Actual construction activities would on average occur at a somewhat reduced level compared to the maximum predicted day and would have a corresponding reduction in pollutant emissions. Therefore, the modeled set of conservative assumptions likely overstates the potential

localized impacts. However, the conclusion remains that project impacts during construction would be significant and unavoidable even with incorporation of feasible mitigation measures.

No notable impacts related to TAC emissions during construction are anticipated to occur for the proposed Project. As such, potential impacts would be less than significant.

The proposed Project is not anticipated to generate a substantial amount of objectionable odor emissions during construction. Via mandatory compliance with SCAQMD Rules, no construction activities or materials are proposed that would create objectionable odors. As such, potential impacts would be less than significant.

6.3.2 Operation Activities

Regional operational emissions would still exceed the SCAQMD daily emission threshold for regional CO, NOx, PM_{10}, $PM_{2.5}$, and VOC after implementation of all feasible mitigation measures. Therefore, operation of the Project would have a significant and unavoidable impact on regional air quality.

No significant impacts related to local CO concentrations would occur for the proposed Project. Project development would be consistent with the air quality polices set forth in the SCAQMD's AQMP, resulting in an impact that is less than significant.

With respect to potential impacts to on-site residential uses from off-site sources of TACs, the recommended air handling systems would substantially reduce carcinogenic exposure. Pollutant concentrations within residential buildings are best reduced by installing an air cleaning system to reduce the concentration of particulates associated with the infiltration of outside air. Air filters are commonly described and rated by the ASHRAE based upon their collection efficiency, pressure drop (or airflow resistance), and particulate-holding capacity. An air filtration system with a 12 MERV would reduce particles in the range of 1 to 3 microns by a minimum of 80 percent. This mitigation measure would reduce the carcinogenic risk to residential uses substantially, but impacts would remain significant and unavoidable.

Via compliance with industry standard odor control practices, SCAQMD Rule 402 (Nuisance), and SCAQMD Best Available Control Technology Guidelines, potential impacts that could result from any potential odor source would be less than significant.

7.0 CONCLUSIONS

Air emissions associated with the proposed Project have been evaluated to determine the level of impact from construction activities and future operations.

7.1 CONSTRUCTION

Construction of the proposed Project has the potential to create air quality impacts through the use of heavy-duty construction equipment and through vehicle trips generated from construction workers traveling to and from the Project site. In addition, fugitive dust emissions would result from site grading and preparation, and construction activities. As shown in Table 6 on page 32, construction-related daily emissions would exceed the SCAQMD's regional significance thresholds for CO, NOx, PM_{10}, $PM_{2.5}$, and VOC even with incorporation of recommended mitigation measures. As such, the development of proposed project would result in significant air quality impacts during construction.

Project development would cause an exceedance of temporary short-term SCAQMD localized significance thresholds for PM_{10} and $PM_{2.5}$ at residential uses near the Project site even with incorporation of mitigation measures. However, localized CO and NOx impacts would be less than significant. As such, development of the project would result in a significant and unavoidable localized air quality impact during the construction period.

No notable impacts related to TAC emissions during construction are anticipated to occur for the proposed Project. As such, potential impacts would be less than significant.

The proposed Project is not anticipated to generate a substantial amount of objectionable odor emissions during construction. Via mandatory compliance with SCAQMD Rules, no construction activities or materials are proposed that would create objectionable odors. As such, potential impacts would be less than significant.

7.2 OPERATION

Air pollutant emissions associated with proposed Project operations would be generated by the consumption of electricity and natural gas and by the operation of on-road vehicles. As shown in Table 7 on page 35, regional emissions associated with the proposed Project would exceed the SCAQMD daily significance thresholds for CO, NOx, PM_{10}, $PM_{2.5}$, and VOC even

with incorporation of mitigation measures. Project operations would not have a significant impact upon 1-hour or 8-hour local CO concentrations due to mobile source emissions. As significant impacts would not occur at the intersections with the highest traffic volumes that are located adjacent to sensitive receptors, no significant impacts are anticipated to occur at any other locations in the study area as the conditions yielding CO hotspots would not be worse than those occurring at the analyzed intersections. Consequently, on- and off-site sensitive receptors would not be significantly affected by CO emissions generated by the net increase in traffic which would occur under the proposed project.

As the project exceeds the SCAQMD daily emission thresholds during construction and operation of the proposed project, the project would also contribute to a significant cumulative air quality impact.

Cancer risk for on-site residential uses would be a maximum of 224 in one million and would exceed the 10 in one million threshold. The cancer risk is predominately related to diesel exhaust from existing conditions, such as the I-15 and Sunwest Materials. The cancer risk can be reduced by approximately 80 percent with incorporation of mitigation measures, but would still exceed the SCAQMD significance threshold. In addition, a distribution center may also be located within 1,000 feet of proposed sensitive land uses, which would likely expose sensitive land uses to a cancer risk of more than 10 in a million. As discussed previously, the existing conditions for the vast majority of the San Bernardino County is in an area between 250 and 750 cancers per million, which is less than the average cancer risk in the South Coast Air Basin (1,400 per million).[27] The health risk assessment performed for the project site demonstrates that the project site is less than this range, but still exceeds the SCAQMD thresholds. Therefore, there is an inherent health risk associated with living in urbanized areas of San Bernardino County, based upon existing conditions and land uses not caused by this project. Nevertheless, the project would result in locating sensitive receptors within an area of localized cancer risk in excess of the SCAQMD significance threshold of 10 in one million and, therefore, the project would result in a significant impact even with incorporation of mitigation measures.

[27] *http://www.arb.ca.gov/toxics/cti/hlthrisk/cncrinhl/riskmapviewfull.htm.*

Appendix A–1

- Construction Emissions Inventory
  - Regional Construction Emissions
    - URBEMIS2007 Output Files
    - Overlapping Construction Emissions Schedule
  - Local Construction Emissions
    - Contour Plots (Industrial Source Complex)
  - Construction Health Risk Assessment
    - Health Risk Assessment Calculations - Construction

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3/31/2008 06:12:20 PM

Urbemis 2007 Version 9.2.4

Detail Report for Summer Construction Mitigated Emissions (Pounds/Day)

File Name: V:\AQNOISE DIVISION\Active Projects\Rialto Specific Plan\Construction\URBEMIS\Phase I.urb924

Project Name: Lytle Creek Rialto Construction - Phase I

Project Location: San Bernadino County

On-Road Vehicle Emissions Based on: Version : Emfac2007 V2.3 Nov 1 2006

Off-Road Vehicle Emissions Based on: OFFROAD2007

CONSTRUCTION EMISSION ESTIMATES (Summer Pounds Per Day, Mitigated)

	ROG	NOx	CO	SO2	PM10 Dust	PM10 Exhaust	PM10 Total	PM2.5 Dust	PM2.5 Exhaust	PM2.5 Total	CO2
Time Slice 1/1/2009-5/29/2009 Active	32.50	288.92	143.45	0.01	859.53	12.96	872.49	179.51	11.92	191.43	25,911.05
Mass Grading 01/01/2009-	32.50	288.92	143.45	0.01	859.53	12.96	872.49	179.51	11.92	191.43	25,911.05
Mass Grading Dust	0.00	0.00	0.00	0.00	859.50	0.00	859.50	179.50	0.00	179.50	0.00
Mass Grading Off Road Diesel	32.28	288.50	136.57	0.00	0.00	12.94	12.94	0.00	11.90	11.90	25,197.84
Mass Grading On Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Mass Grading Worker Trips	0.22	0.41	6.88	0.01	0.03	0.02	0.06	0.01	0.02	0.03	713.21
Time Slice 6/1/2009-6/30/2009 Active	45.29	361.45	342.43	0.22	860.48	16.80	877.28	179.85	15.41	195.26	50,668.21
Building 06/01/2009-08/31/2015	12.79	72.53	198.98	0.22	0.94	3.84	4.78	0.34	3.49	3.83	24,757.15
Building Off Road Diesel	5.47	37.09	18.48	0.00	0.00	2.27	2.27	0.00	2.09	2.09	3,719.82
Building Vendor Trips	2.12	25.78	19.74	0.04	0.15	1.06	1.21	0.05	0.97	1.02	4,382.61
Building Worker Trips	5.21	9.66	160.76	0.17	0.79	0.52	1.31	0.28	0.44	0.72	16,654.72
Mass Grading 01/01/2009-	32.50	288.92	143.45	0.01	859.53	12.96	872.49	179.51	11.92	191.43	25,911.05
Mass Grading Dust	0.00	0.00	0.00	0.00	859.50	0.00	859.50	179.50	0.00	179.50	0.00
Mass Grading Off Road Diesel	32.28	288.50	136.57	0.00	0.00	12.94	12.94	0.00	11.90	11.90	25,197.84
Mass Grading On Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Mass Grading Worker Trips	0.22	0.41	6.88	0.01	0.03	0.02	0.06	0.01	0.02	0.03	713.21
Time Slice 7/1/2009-9/30/2009 Active	53.15	361.47	342.86	0.22	860.48	16.80	877.28	179.85	15.41	195.26	50,711.85
Building 06/01/2009-08/31/2015	12.79	72.53	198.98	0.22	0.94	3.84	4.78	0.34	3.49	3.83	24,757.15
Building Off Road Diesel	5.47	37.09	18.48	0.00	0.00	2.27	2.27	0.00	2.09	2.09	3,719.82
Building Vendor Trips	2.12	25.78	19.74	0.04	0.15	1.06	1.21	0.05	0.97	1.02	4,382.61
Building Worker Trips	5.21	9.66	160.76	0.17	0.79	0.52	1.31	0.28	0.44	0.72	16,654.72
Coating 07/01/2009-08/31/2015	7.86	0.03	0.42	0.00	0.00	0.00	0.00	0.00	0.00	0.00	43.64
Architectural Coating	7.85	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Coating Worker Trips	0.01	0.03	0.42	0.00	0.00	0.00	0.00	0.00	0.00	0.00	43.64

	ROG	NOx	CO	SO2	PM10 Dust	PM10 Exhaust	PM10 Total	PM2.5 Dust	PM2.5 Exhaust	PM2.5 Total	CO2
Mass Grading 01/01/2009-	32.50	288.92	143.45	0.01	859.53	12.96	872.49	179.51	11.92	191.43	25,911.05
Mass Grading Dust	0.00	0.00	0.00	0.00	859.50	0.00	859.50	179.50	0.00	179.50	0.00
Mass Grading Off Road Diesel	32.28	288.50	136.57	0.00	0.00	12.94	12.94	0.00	11.90	11.90	25,197.84
Mass Grading On Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Mass Grading Worker Trips	0.22	0.41	6.88	0.01	0.03	0.02	0.06	0.01	0.02	0.03	713.21
Time Slice 10/1/2009-12/31/2009	**55.79**	**376.63**	**351.93**	**0.23**	860.49	**18.08**	878.56	179.85	**16.58**	196.44	**51,945.55**
Asphalt 10/01/2009-08/31/2015	2.64	15.15	9.07	0.00	0.01	1.27	1.28	0.00	1.17	1.17	1,233.71
Paving Off-Gas	0.13	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Paving Off Road Diesel	2.43	14.47	7.65	0.00	0.00	1.24	1.24	0.00	1.14	1.14	1,033.53
Paving On Road Diesel	0.04	0.61	0.22	0.00	0.00	0.02	0.03	0.00	0.02	0.02	76.14
Paving Worker Trips	0.04	0.07	1.20	0.00	0.01	0.00	0.01	0.00	0.00	0.01	124.04
Building 06/01/2009-08/31/2015	12.79	72.53	198.98	0.22	0.94	3.84	4.78	0.34	3.49	3.83	24,757.15
Building Off Road Diesel	5.47	37.09	18.48	0.00	0.00	2.27	2.27	0.00	2.09	2.09	3,719.82
Building Vendor Trips	2.12	25.78	19.74	0.04	0.15	1.06	1.21	0.05	0.97	1.02	4,382.61
Building Worker Trips	5.21	9.66	160.76	0.17	0.79	0.52	1.31	0.28	0.44	0.72	16,654.72
Coating 07/01/2009-08/31/2015	7.86	0.03	0.42	0.00	0.00	0.00	0.00	0.00	0.00	0.00	43.64
Architectural Coating	7.85	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Coating Worker Trips	0.01	0.03	0.42	0.00	0.00	0.00	0.00	0.00	0.00	0.00	43.64
Mass Grading 01/01/2009-	32.50	288.92	143.45	0.01	859.53	12.96	872.49	179.51	11.92	191.43	25,911.05
Mass Grading Dust	0.00	0.00	0.00	0.00	859.50	0.00	859.50	179.50	0.00	179.50	0.00
Mass Grading Off Road Diesel	32.28	288.50	136.57	0.00	0.00	12.94	12.94	0.00	11.90	11.90	25,197.84
Mass Grading On Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Mass Grading Worker Trips	0.22	0.41	6.88	0.01	0.03	0.02	0.06	0.01	0.02	0.03	713.21
Time Slice 1/1/2010-7/30/2010 Active	53.15	355.10	327.69	**0.23**	860.49	17.03	877.51	179.85	15.62	195.47	51,928.94
Asphalt 10/01/2009-08/31/2015	2.50	14.39	8.87	0.00	0.01	1.24	1.24	0.00	1.14	1.14	1,233.59
Paving Off-Gas	0.13	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Paving Off Road Diesel	2.29	13.77	7.57	0.00	0.00	1.21	1.21	0.00	1.11	1.11	1,033.53
Paving On Road Diesel	0.04	0.55	0.20	0.00	0.00	0.02	0.02	0.00	0.02	0.02	76.14
Paving Worker Trips	0.04	0.07	1.10	0.00	0.01	0.00	0.01	0.00	0.00	0.01	123.92
Building 06/01/2009-08/31/2015	11.81	67.16	184.28	0.22	0.94	3.56	4.50	0.34	3.23	3.56	24,741.39
Building Off Road Diesel	5.14	34.93	17.86	0.00	0.00	2.09	2.09	0.00	1.92	1.92	3,719.82
Building Vendor Trips	1.97	23.48	18.35	0.04	0.15	0.95	1.10	0.05	0.87	0.92	4,382.83
Building Worker Trips	4.71	8.75	148.07	0.17	0.79	0.52	1.31	0.28	0.44	0.72	16,638.74
Coating 07/01/2009-08/31/2015	7.86	0.02	0.39	0.00	0.00	0.00	0.00	0.00	0.00	0.00	43.60
Architectural Coating	7.85	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Coating Worker Trips	0.01	0.02	0.39	0.00	0.00	0.00	0.00	0.00	0.00	0.00	43.60
Mass Grading 01/01/2009-	30.98	273.53	134.15	0.01	859.53	12.23	871.77	179.51	11.25	190.76	25,910.37
Mass Grading Dust	0.00	0.00	0.00	0.00	859.50	0.00	859.50	179.50	0.00	179.50	0.00

	ROG	NOx	CO	SO2	PM10 Dust	PM10 Exhaust	PM10 Total	PM2.5 Dust	PM2.5 Exhaust	PM2.5 Total	CO2
Mass Grading Off Road Diesel	30.78	273.16	127.81	0.00	0.00	12.21	12.21	0.00	11.23	11.23	25,197.84
Mass Grading On Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Mass Grading Worker Trips	0.20	0.37	6.34	0.01	0.03	0.02	0.06	0.01	0.02	0.03	712.53
Time Slice 8/2/2010-12/31/2010 Active	22.17	81.57	193.54	0.22	0.95	4.79	5.75	0.34	4.37	4.71	26,018.57
Asphalt 10/01/2009-08/31/2015	2.50	14.39	8.87	0.00	0.01	1.24	1.24	0.00	1.14	1.14	1,233.59
Paving Off-Gas	0.13	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Paving Off Road Diesel	2.29	13.77	7.57	0.00	0.00	1.21	1.21	0.00	1.11	1.11	1,033.53
Paving On Road Diesel	0.04	0.55	0.20	0.00	0.00	0.02	0.02	0.00	0.02	0.02	76.14
Paving Worker Trips	0.04	0.07	1.10	0.00	0.01	0.00	0.01	0.00	0.00	0.01	123.92
Building 06/01/2009-08/31/2015	11.81	67.16	184.28	0.22	0.94	3.56	4.50	0.34	3.23	3.56	24,741.39
Building Off Road Diesel	5.14	34.93	17.86	0.00	0.00	2.09	2.09	0.00	1.92	1.92	3,719.82
Building Vendor Trips	1.97	23.48	18.35	0.04	0.15	0.95	1.10	0.05	0.87	0.92	4,382.83
Building Worker Trips	4.71	8.75	148.07	0.17	0.79	0.52	1.31	0.28	0.44	0.72	16,638.74
Coating 07/01/2009-08/31/2015	7.86	0.02	0.39	0.00	0.00	0.00	0.00	0.00	0.00	0.00	43.60
Architectural Coating	7.85	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Coating Worker Trips	0.01	0.02	0.39	0.00	0.00	0.00	0.00	0.00	0.00	0.00	43.60
Time Slice 1/3/2011-12/30/2011 Active	21.05	75.27	180.08	0.22	0.95	4.50	5.46	0.34	4.10	4.44	26,005.77
Asphalt 10/01/2009-08/31/2015	2.36	13.66	8.67	0.00	0.01	1.19	1.19	0.00	1.09	1.09	1,233.49
Paving Off-Gas	0.13	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Paving Off Road Diesel	2.16	13.10	7.47	0.00	0.00	1.16	1.16	0.00	1.07	1.07	1,033.53
Paving On Road Diesel	0.04	0.50	0.18	0.00	0.00	0.02	0.02	0.00	0.02	0.02	76.14
Paving Worker Trips	0.03	0.06	1.02	0.00	0.01	0.00	0.01	0.00	0.00	0.01	123.82
Building 06/01/2009-08/31/2015	10.83	61.59	171.05	0.22	0.94	3.32	4.26	0.34	3.01	3.34	24,728.71
Building Off Road Diesel	4.73	32.50	17.29	0.00	0.00	1.95	1.95	0.00	1.79	1.79	3,719.82
Building Vendor Trips	1.81	21.14	16.96	0.04	0.15	0.85	1.00	0.05	0.78	0.83	4,383.13
Building Worker Trips	4.28	7.95	136.81	0.17	0.79	0.52	1.31	0.28	0.44	0.72	16,625.76
Coating 07/01/2009-08/31/2015	7.86	0.02	0.36	0.00	0.00	0.00	0.00	0.00	0.00	0.00	43.56
Architectural Coating	7.85	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Coating Worker Trips	0.01	0.02	0.36	0.00	0.00	0.00	0.00	0.00	0.00	0.00	43.56
Time Slice 1/2/2012-3/30/2012 Active	20.03	69.26	167.57	0.22	0.95	4.19	5.14	0.34	3.81	4.15	25,987.84
Asphalt 10/01/2009-08/31/2015	2.24	12.94	8.50	0.00	0.01	1.12	1.13	0.00	1.03	1.03	1,233.36
Paving Off-Gas	0.13	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Paving Off Road Diesel	2.04	12.44	7.40	0.00	0.00	1.10	1.10	0.00	1.01	1.01	1,033.53
Paving On Road Diesel	0.03	0.44	0.16	0.00	0.00	0.02	0.02	0.00	0.02	0.02	76.14
Paving Worker Trips	0.03	0.05	0.94	0.00	0.01	0.00	0.01	0.00	0.00	0.01	123.69
Building 06/01/2009-08/31/2015	9.94	56.30	158.74	0.22	0.94	3.07	4.01	0.34	2.78	3.12	24,710.97
Building Off Road Diesel	4.40	30.22	16.79	0.00	0.00	1.80	1.80	0.00	1.66	1.66	3,719.82
Building Vendor Trips	1.66	18.85	15.60	0.04	0.15	0.75	0.90	0.05	0.69	0.74	4,383.47
Building Worker Trips	3.87	7.24	126.34	0.17	0.79	0.52	1.31	0.28	0.44	0.72	16,607.68

	ROG	NOx	CO	SO2	PM10 Dust	PM10 Exhaust	PM10 Total	PM2.5 Dust	PM2.5 Exhaust	PM2.5 Total	CO2
Coating 07/01/2009-08/31/2015	7.86	0.02	0.33	0.00	0.00	0.00	0.00	0.00	0.00	0.00	43.52
Architectural Coating	7.85	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Coating Worker Trips	0.01	0.02	0.33	0.00	0.00	0.00	0.00	0.00	0.00	0.00	43.52
Time Slice 4/2/2012-10/31/2012 Active	47.74	310.15	286.40	**0.23**	280.20	14.52	294.73	58.66	13.32	71.98	51,896.88
Asphalt 10/01/2009-08/31/2015	2.24	12.94	8.50	0.00	0.01	1.12	1.13	0.00	1.03	1.03	1,233.36
Paving Off-Gas	0.13	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Paving Off Road Diesel	2.04	12.44	7.40	0.00	0.00	1.10	1.10	0.00	1.01	1.01	1,033.53
Paving On Road Diesel	0.03	0.44	0.16	0.00	0.00	0.02	0.02	0.00	0.02	0.02	76.14
Paving Worker Trips	0.03	0.05	0.94	0.00	0.01	0.00	0.01	0.00	0.00	0.01	123.69
Building 06/01/2009-08/31/2015	9.94	56.30	158.74	0.22	0.94	3.07	4.01	0.34	2.78	3.12	24,710.97
Building Off Road Diesel	4.40	30.22	16.79	0.00	0.00	1.80	1.80	0.00	1.66	1.66	3,719.82
Building Vendor Trips	1.66	18.85	15.60	0.04	0.15	0.75	0.90	0.05	0.69	0.74	4,383.47
Building Worker Trips	3.87	7.24	126.34	0.17	0.79	0.52	1.31	0.28	0.44	0.72	16,607.68
Coating 07/01/2009-08/31/2015	7.86	0.02	0.33	0.00	0.00	0.00	0.00	0.00	0.00	0.00	43.52
Architectural Coating	7.85	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Coating Worker Trips	0.01	0.02	0.33	0.00	0.00	0.00	0.00	0.00	0.00	0.00	43.52
Mass Grading 04/01/2012-	27.71	240.89	118.83	0.01	279.25	10.34	289.59	58.32	9.51	67.83	25,909.04
Mass Grading Dust	0.00	0.00	0.00	0.00	279.22	0.00	279.22	58.31	0.00	58.31	0.00
Mass Grading Off Road Diesel	27.54	240.58	113.42	0.00	0.00	10.31	10.31	0.00	9.49	9.49	25,197.84
Mass Grading On Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Mass Grading Worker Trips	0.17	0.31	5.41	0.01	0.03	0.02	0.06	0.01	0.02	0.03	711.20
Time Slice 11/1/2012-12/31/2012	20.03	69.26	167.57	0.22	0.95	4.19	5.14	0.34	3.81	4.15	25,987.84
Asphalt 10/01/2009-08/31/2015	2.24	12.94	8.50	0.00	0.01	1.12	1.13	0.00	1.03	1.03	1,233.36
Paving Off-Gas	0.13	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Paving Off Road Diesel	2.04	12.44	7.40	0.00	0.00	1.10	1.10	0.00	1.01	1.01	1,033.53
Paving On Road Diesel	0.03	0.44	0.16	0.00	0.00	0.02	0.02	0.00	0.02	0.02	76.14
Paving Worker Trips	0.03	0.05	0.94	0.00	0.01	0.00	0.01	0.00	0.00	0.01	123.69
Building 06/01/2009-08/31/2015	9.94	56.30	158.74	0.22	0.94	3.07	4.01	0.34	2.78	3.12	24,710.97
Building Off Road Diesel	4.40	30.22	16.79	0.00	0.00	1.80	1.80	0.00	1.66	1.66	3,719.82
Building Vendor Trips	1.66	18.85	15.60	0.04	0.15	0.75	0.90	0.05	0.69	0.74	4,383.47
Building Worker Trips	3.87	7.24	126.34	0.17	0.79	0.52	1.31	0.28	0.44	0.72	16,607.68
Coating 07/01/2009-08/31/2015	7.86	0.02	0.33	0.00	0.00	0.00	0.00	0.00	0.00	0.00	43.52
Architectural Coating	7.85	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Coating Worker Trips	0.01	0.02	0.33	0.00	0.00	0.00	0.00	0.00	0.00	0.00	43.52
Time Slice 1/1/2013-12/31/2013 Active	19.03	63.55	155.84	0.22	0.95	3.85	4.80	0.34	3.49	3.83	25,972.19
Asphalt 10/01/2009-08/31/2015	2.10	12.24	8.35	0.00	0.01	1.05	1.06	0.00	0.96	0.97	1,233.24
Paving Off-Gas	0.13	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Paving Off Road Diesel	1.91	11.80	7.33	0.00	0.00	1.03	1.03	0.00	0.95	0.95	1,033.53
Paving On Road Diesel	0.03	0.39	0.14	0.00	0.00	0.01	0.02	0.00	0.01	0.01	76.14

	ROG	NOx	CO	SO2	PM10 Dust	PM10 Exhaust	PM10 Total	PM2.5 Dust	PM2.5 Exhaust	PM2.5 Total	CO2
Paving Worker Trips	0.03	0.05	0.87	0.00	0.01	0.00	0.01	0.00	0.00	0.01	123.57
Building 06/01/2009-08/31/2015	9.08	51.29	147.19	0.22	0.94	2.80	3.74	0.34	2.53	2.86	24,695.48
Building Off Road Diesel	4.07	28.05	16.40	0.00	0.00	1.60	1.60	0.00	1.47	1.47	3,719.82
Building Vendor Trips	1.51	16.65	14.30	0.04	0.15	0.66	0.81	0.05	0.60	0.66	4,383.84
Building Worker Trips	3.49	6.60	116.48	0.17	0.79	0.54	1.33	0.28	0.45	0.74	16,591.82
Coating 07/01/2009-08/31/2015	7.86	0.02	0.31	0.00	0.00	0.00	0.00	0.00	0.00	0.00	43.47
Architectural Coating	7.85	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Coating Worker Trips	0.01	0.02	0.31	0.00	0.00	0.00	0.00	0.00	0.00	0.00	43.47
Time Slice 1/1/2014-12/31/2014 Active	18.14	57.88	145.08	0.22	0.95	3.50	4.45	0.34	3.17	3.51	25,958.42
Asphalt 10/01/2009-08/31/2015	1.99	11.57	8.21	0.00	0.01	0.98	0.99	0.00	0.90	0.90	1,233.14
Paving Off-Gas	0.13	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Paving Off Road Diesel	1.81	11.19	7.28	0.00	0.00	0.96	0.96	0.00	0.89	0.89	1,033.53
Paving On Road Diesel	0.03	0.34	0.13	0.00	0.00	0.01	0.02	0.00	0.01	0.01	76.14
Paving Worker Trips	0.02	0.04	0.80	0.00	0.01	0.00	0.01	0.00	0.00	0.01	123.47
Building 06/01/2009-08/31/2015	8.29	46.29	136.59	0.22	0.94	2.52	3.46	0.34	2.27	2.60	24,681.85
Building Off Road Diesel	3.76	25.68	16.00	0.00	0.00	1.40	1.40	0.00	1.29	1.29	3,719.82
Building Vendor Trips	1.37	14.59	13.12	0.04	0.15	0.58	0.73	0.05	0.53	0.58	4,384.10
Building Worker Trips	3.16	6.01	107.47	0.17	0.79	0.54	1.33	0.28	0.45	0.74	16,577.93
Coating 07/01/2009-08/31/2015	7.86	0.02	0.28	0.00	0.00	0.00	0.00	0.00	0.00	0.00	43.44
Architectural Coating	7.85	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Coating Worker Trips	0.01	0.02	0.28	0.00	0.00	0.00	0.00	0.00	0.00	0.00	43.44
Time Slice 1/1/2015-8/31/2015 Active	17.29	52.36	135.15	0.22	0.95	3.22	4.18	0.34	2.92	3.26	25,937.26
Asphalt 10/01/2009-08/31/2015	1.87	10.83	8.06	0.00	0.01	0.91	0.92	0.00	0.84	0.84	1,232.98
Paving Off-Gas	0.13	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Paving Off Road Diesel	1.70	10.49	7.21	0.00	0.00	0.90	0.90	0.00	0.82	0.82	1,033.53
Paving On Road Diesel	0.03	0.30	0.11	0.00	0.00	0.01	0.01	0.00	0.01	0.01	76.14
Paving Worker Trips	0.02	0.04	0.74	0.00	0.01	0.00	0.01	0.00	0.00	0.01	123.31
Building 06/01/2009-08/31/2015	7.56	41.52	126.83	0.22	0.94	2.31	3.25	0.34	2.08	2.42	24,660.90
Building Off Road Diesel	3.47	23.31	15.68	0.00	0.00	1.27	1.27	0.00	1.17	1.17	3,719.82
Building Vendor Trips	1.24	12.75	12.04	0.04	0.15	0.50	0.66	0.05	0.46	0.51	4,384.37
Building Worker Trips	2.85	5.47	99.10	0.17	0.79	0.54	1.33	0.28	0.45	0.74	16,556.71
Coating 07/01/2009-08/31/2015	7.85	0.01	0.26	0.00	0.00	0.00	0.00	0.00	0.00	0.00	43.38
Architectural Coating	7.85	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Coating Worker Trips	0.01	0.01	0.26	0.00	0.00	0.00	0.00	0.00	0.00	0.00	43.38

Construction Related Mitigation Measures

The following mitigation measures apply to Phase: Mass Grading 1/1/2009 - 7/31/2010 - Site Grading Phase 1A

For Soil Stablizing Measures, the Water exposed surfaces 2x daily watering mitigation reduces emissions by:

PM10: 55% PM25: 55%

	ROG	NOx	CO	SO2	PM10 Dust	PM10 Exhaust	PM10 Total	PM2.5 Dust	PM2.5 Exhaust	PM2.5 Total	CO2

For Unpaved Roads Measures, the Manage haul road dust 2x daily watering mitigation reduces emissions by:
PM10: 55% PM25: 55%
The following mitigation measures apply to Phase: Mass Grading 4/1/2012 - 10/31/2012 - Site Grading Phase 1B
For Soil Stablizing Measures, the Water exposed surfaces 2x daily watering mitigation reduces emissions by:
PM10: 55% PM25: 55%
For Unpaved Roads Measures, the Manage haul road dust 2x daily watering mitigation reduces emissions by:
PM10: 55% PM25: 55%

Phase Assumptions

Phase: Mass Grading 1/1/2009 - 7/31/2010 - Site Grading Phase 1A
Total Acres Disturbed: 271
Maximum Daily Acreage Disturbed: 50
Fugitive Dust Level of Detail: Default
38.2 lbs per acre-day
On Road Truck Travel (VMT): 0
Off-Road Equipment:
4 Graders (174 hp) operating at a 0.61 load factor for 8 hours per day
3 Rubber Tired Dozers (357 hp) operating at a 0.59 load factor for 8 hours per day
10 Scrapers (313 hp) operating at a 0.72 load factor for 8 hours per day
3 Tractors/Loaders/Backhoes (108 hp) operating at a 0.55 load factor for 8 hours per day
3 Water Trucks (189 hp) operating at a 0.5 load factor for 8 hours per day

Phase: Mass Grading 4/1/2012 - 10/31/2012 - Site Grading Phase 1B
Total Acres Disturbed: 100
Maximum Daily Acreage Disturbed: 50
Fugitive Dust Level of Detail: Low
Onsite Cut/Fill: 1021 cubic yards/day; Offsite Cut/Fill: 0 cubic yards/day
On Road Truck Travel (VMT): 0
Off-Road Equipment:
4 Graders (174 hp) operating at a 0.61 load factor for 8 hours per day
3 Rubber Tired Dozers (357 hp) operating at a 0.59 load factor for 8 hours per day
10 Scrapers (313 hp) operating at a 0.72 load factor for 8 hours per day
3 Tractors/Loaders/Backhoes (108 hp) operating at a 0.55 load factor for 8 hours per day
3 Water Trucks (189 hp) operating at a 0.5 load factor for 8 hours per day

Phase: Paving 10/1/2009 - 8/31/2015 - Asphalt Paving

	ROG	NOx	CO	SO2	PM10 Dust	PM10 Exhaust	PM10 Total	PM2.5 Dust	PM2.5 Exhaust	PM2.5 Total	CO2

Acres to be Paved: 77.22

Off-Road Equipment:

2 Paving Equipment (104 hp) operating at a 0.53 load factor for 8 hours per day

2 Rollers (95 hp) operating at a 0.56 load factor for 6 hours per day

Phase: Building Construction 6/1/2009 - 8/31/2015 - Building Construction

Off-Road Equipment:

1 Aerial Lifts (60 hp) operating at a 0.46 load factor for 8 hours per day

1 Cranes (399 hp) operating at a 0.43 load factor for 7 hours per day

2 Forklifts (145 hp) operating at a 0.3 load factor for 8 hours per day

1 Generator Sets (49 hp) operating at a 0.74 load factor for 8 hours per day

2 Other Equipment (190 hp) operating at a 0.62 load factor for 8 hours per day

3 Tractors/Loaders/Backhoes (108 hp) operating at a 0.55 load factor for 7 hours per day

1 Welders (45 hp) operating at a 0.45 load factor for 8 hours per day

Phase: Architectural Coating 7/1/2009 - 8/31/2015 - Arch Coatings

Rule: Residential Interior Coatings begins 1/1/2005 ends 6/30/2008 specifies a VOC of 100

Rule: Residential Interior Coatings begins 7/1/2008 ends 12/31/2040 specifies a VOC of 50

Rule: Residential Exterior Coatings begins 1/1/2005 ends 6/30/2008 specifies a VOC of 250

Rule: Residential Exterior Coatings begins 7/1/2008 ends 12/31/2040 specifies a VOC of 100

Rule: Nonresidential Interior Coatings begins 1/1/2005 ends 12/31/2040 specifies a VOC of 250

Rule: Nonresidential Exterior Coatings begins 1/1/2005 ends 12/31/2040 specifies a VOC of 250

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Urbemis 2007 Version 9.2.4

Detail Report for Summer Construction Mitigated Emissions (Pounds/Day)

File Name: V:\AQNOISE DIVISION\Active Projects\Rialto Specific Plan\Construction\URBEMIS\Phase II.urb924

Project Name: Lytle Creek Phase 2

Project Location: South Coast AQMD

On-Road Vehicle Emissions Based on: Version : Emfac2007 V2.3 Nov 1 2006

Off-Road Vehicle Emissions Based on: OFFROAD2007

CONSTRUCTION EMISSION ESTIMATES (Summer Pounds Per Day, Mitigated)

	ROG	NOx	CO	SO2	PM10 Dust	PM10 Exhaust	PM10 Total	PM2.5 Dust	PM2.5 Exhaust	PM2.5 Total	CO2
Time Slice 5/1/2009-5/29/2009 Active	4.52	41.97	21.14	0.02	10.98	2.11	13.08	2.29	1.94	4.23	4,287.52
Demolition 05/01/2009-05/31/2009	4.52	41.97	21.14	0.02	10.98	2.11	13.08	2.29	1.94	4.23	4,287.52
Fugitive Dust	0.00	0.00	0.00	0.00	10.92	0.00	10.92	2.27	0.00	2.27	0.00
Demo Off Road Diesel	3.56	29.56	15.27	0.00	0.00	1.59	1.59	0.00	1.46	1.46	2,632.55
Demo On Road Diesel	0.93	12.35	4.74	0.01	0.05	0.52	0.57	0.02	0.47	0.49	1,530.53
Demo Worker Trips	0.04	0.07	1.13	0.00	0.01	0.00	0.01	0.00	0.00	0.00	124.43
Time Slice 6/1/2009-12/31/2009 Active	45.86	403.89	202.22	0.01	859.55	18.36	877.92	179.52	16.89	196.41	36,173.57
Fine Grading 06/01/2009-	45.86	403.89	202.22	0.01	859.55	18.36	877.92	179.52	16.89	196.41	36,173.57
Fine Grading Dust	0.00	0.00	0.00	0.00	859.50	0.00	859.50	179.50	0.00	179.50	0.00
Fine Grading Off Road Diesel	45.54	403.30	192.36	0.00	0.00	18.33	18.33	0.00	16.87	16.87	35,084.80
Fine Grading On Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fine Grading Worker Trips	0.32	0.59	9.86	0.01	0.05	0.03	0.08	0.02	0.02	0.04	1,088.77
Time Slice 1/1/2010-3/31/2010 Active	43.70	382.28	190.11	0.01	859.55	17.33	876.89	179.52	15.95	195.46	36,173.25
Fine Grading 06/01/2009-	43.70	382.28	190.11	0.01	859.55	17.33	876.89	179.52	15.95	195.46	36,173.25
Fine Grading Dust	0.00	0.00	0.00	0.00	859.50	0.00	859.50	179.50	0.00	179.50	0.00
Fine Grading Off Road Diesel	43.41	381.74	180.94	0.00	0.00	17.30	17.30	0.00	15.92	15.92	35,084.80
Fine Grading On Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fine Grading Worker Trips	0.29	0.54	9.17	0.01	0.05	0.03	0.08	0.02	0.02	0.04	1,088.45
Time Slice 4/1/2010-4/30/2010 Active	83.22	542.50	1,022.56	1.05	864.15	26.62	890.78	181.17	24.30	205.47	141,641.03
Building 04/01/2010-05/31/2018	39.52	160.22	832.44	1.04	4.60	9.29	13.89	1.65	8.35	10.01	105,467.78
Building Off Road Diesel	10.56	53.72	35.18	0.00	0.00	4.27	4.27	0.00	3.93	3.93	5,057.89
Building Vendor Trips	5.40	62.31	48.11	0.11	0.40	2.60	3.00	0.14	2.38	2.52	11,505.87
Building Worker Trips	23.56	44.19	749.15	0.93	4.20	2.42	6.62	1.51	2.04	3.56	88,904.01
Fine Grading 06/01/2009-	43.70	382.28	190.11	0.01	859.55	17.33	876.89	179.52	15.95	195.46	36,173.25
Fine Grading Dust	0.00	0.00	0.00	0.00	859.50	0.00	859.50	179.50	0.00	179.50	0.00

	ROG	NOx	CO	SO2	PM10 Dust	PM10 Exhaust	PM10 Total	PM2.5 Dust	PM2.5 Exhaust	PM2.5 Total	CO2
Fine Grading Off Road Diesel	43.41	381.74	180.94	0.00	0.00	17.30	17.30	0.00	15.92	15.92	35,084.80
Fine Grading On Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fine Grading Worker Trips	0.29	0.54	9.17	0.01	0.05	0.03	0.08	0.02	0.02	0.04	1,088.45
Time Slice 5/3/2010-12/31/2010 Active	**102.55**	**563.15**	**1,036.11**	**1.06**	864.17	**28.37**	892.54	181.18	**25.90**	207.08	**143,546.85**
Asphalt 05/01/2010-05/31/2018	3.67	20.61	12.82	0.00	0.02	1.74	1.76	0.01	1.60	1.61	1,818.21
Paving Off-Gas	0.31	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Paving Off Road Diesel	3.20	19.17	10.47	0.00	0.00	1.68	1.68	0.00	1.55	1.55	1,418.81
Paving On Road Diesel	0.10	1.34	0.51	0.00	0.01	0.05	0.06	0.00	0.05	0.05	181.71
Paving Worker Trips	0.06	0.11	1.83	0.00	0.01	0.01	0.02	0.00	0.00	0.01	217.69
Building 04/01/2010-05/31/2018	39.52	160.22	832.44	1.04	4.60	9.29	13.89	1.65	8.35	10.01	105,467.78
Building Off Road Diesel	10.56	53.72	35.18	0.00	0.00	4.27	4.27	0.00	3.93	3.93	5,057.89
Building Vendor Trips	5.40	62.31	48.11	0.11	0.40	2.60	3.00	0.14	2.38	2.52	11,505.87
Building Worker Trips	23.56	44.19	749.15	0.93	4.20	2.42	6.62	1.51	2.04	3.56	88,904.01
Coating 05/01/2010-05/31/2018	15.65	0.04	0.74	0.00	0.00	0.00	0.01	0.00	0.00	0.00	87.61
Architectural Coating	15.63	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Coating Worker Trips	0.02	0.04	0.74	0.00	0.00	0.00	0.01	0.00	0.00	0.00	87.61
Fine Grading 06/01/2009-	43.70	382.28	190.11	0.01	859.55	17.33	876.89	179.52	15.95	195.46	36,173.25
Fine Grading Dust	0.00	0.00	0.00	0.00	859.50	0.00	859.50	179.50	0.00	179.50	0.00
Fine Grading Off Road Diesel	43.41	381.74	180.94	0.00	0.00	17.30	17.30	0.00	15.92	15.92	35,084.80
Fine Grading On Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fine Grading Worker Trips	0.29	0.54	9.17	0.01	0.05	0.03	0.08	0.02	0.02	0.04	1,088.45
Time Slice 1/3/2011-12/30/2011 Active	96.44	526.22	969.09	**1.06**	864.17	26.32	890.49	181.18	24.02	205.19	143,527.42
Asphalt 05/01/2010-05/31/2018	3.48	19.55	12.51	0.00	0.02	1.68	1.69	0.01	1.54	1.55	1,818.16
Paving Off-Gas	0.31	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Paving Off Road Diesel	3.02	18.25	10.34	0.00	0.00	1.62	1.62	0.00	1.49	1.49	1,418.81
Paving On Road Diesel	0.09	1.20	0.46	0.00	0.01	0.05	0.05	0.00	0.04	0.05	181.71
Paving Worker Trips	0.05	0.10	1.71	0.00	0.01	0.01	0.02	0.00	0.00	0.01	217.64
Building 04/01/2010-05/31/2018	36.28	147.38	776.33	1.04	4.60	8.77	13.37	1.65	7.88	9.53	105,448.65
Building Off Road Diesel	9.82	50.82	34.48	0.00	0.00	4.03	4.03	0.00	3.71	3.71	5,057.89
Building Vendor Trips	4.97	56.15	44.59	0.11	0.40	2.32	2.72	0.14	2.13	2.26	11,506.05
Building Worker Trips	21.49	40.41	697.26	0.93	4.20	2.42	6.62	1.51	2.04	3.56	88,884.70
Coating 05/01/2010-05/31/2018	15.65	0.04	0.69	0.00	0.00	0.00	0.01	0.00	0.00	0.00	87.59
Architectural Coating	15.63	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Coating Worker Trips	0.02	0.04	0.69	0.00	0.00	0.00	0.01	0.00	0.00	0.00	87.59
Fine Grading 06/01/2009-	41.02	359.25	179.56	0.01	859.55	15.87	875.42	179.52	14.60	194.11	36,173.01
Fine Grading Dust	0.00	0.00	0.00	0.00	859.50	0.00	859.50	179.50	0.00	179.50	0.00
Fine Grading Off Road Diesel	40.76	358.76	171.02	0.00	0.00	15.84	15.84	0.00	14.57	14.57	35,084.80
Fine Grading On Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fine Grading Worker Trips	0.26	0.49	8.54	0.01	0.05	0.03	0.08	0.02	0.02	0.04	1,088.22
Time Slice 1/2/2012-12/31/2012 Active	91.27	490.30	906.49	**1.06**	864.17	24.49	888.67	181.18	22.33	203.50	143,511.96

	ROG	NOx	CO	SO2	PM10 Dust	PM10 Exhaust	PM10 Total	PM2.5 Dust	PM2.5 Exhaust	PM2.5 Total	CO2
Asphalt 05/01/2010-05/31/2018	3.31	18.50	12.24	0.00	0.02	1.58	1.60	0.01	1.45	1.46	1,818.13
Paving Off-Gas	0.31	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Paving Off Road Diesel	2.86	17.34	10.24	0.00	0.00	1.53	1.53	0.00	1.41	1.41	1,418.81
Paving On Road Diesel	0.09	1.07	0.41	0.00	0.01	0.04	0.05	0.00	0.04	0.04	181.71
Paving Worker Trips	0.05	0.09	1.59	0.00	0.01	0.01	0.02	0.00	0.00	0.01	217.61
Building 04/01/2010-05/31/2018	33.21	135.06	723.70	1.04	4.60	8.18	12.78	1.65	7.33	8.98	105,433.43
Building Off Road Diesel	9.08	47.91	33.83	0.00	0.00	3.70	3.70	0.00	3.40	3.40	5,057.89
Building Vendor Trips	4.56	50.11	41.23	0.11	0.40	2.05	2.46	0.14	1.88	2.02	11,506.25
Building Worker Trips	19.57	37.04	648.64	0.93	4.20	2.43	6.63	1.51	2.04	3.56	88,869.29
Coating 05/01/2010-05/31/2018	15.65	0.04	0.64	0.00	0.00	0.00	0.01	0.00	0.00	0.00	87.58
Architectural Coating	15.63	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Coating Worker Trips	0.02	0.04	0.64	0.00	0.00	0.00	0.01	0.00	0.00	0.00	87.58
Fine Grading 06/01/2009-	39.11	336.71	169.91	0.01	859.55	14.73	874.28	179.52	13.55	193.06	36,172.82
Fine Grading Dust	0.00	0.00	0.00	0.00	859.50	0.00	859.50	179.50	0.00	179.50	0.00
Fine Grading Off Road Diesel	38.87	336.25	161.97	0.00	0.00	14.70	14.70	0.00	13.52	13.52	35,084.80
Fine Grading On Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fine Grading Worker Trips	0.24	0.45	7.94	0.01	0.05	0.03	0.08	0.02	0.02	0.04	1,088.03
Time Slice 1/1/2013-12/31/2013 Active	86.73	456.37	847.50	**1.06**	864.17	22.71	886.88	181.18	20.67	201.85	143,501.63
Asphalt 05/01/2010-05/31/2018	3.12	17.49	11.99	0.00	0.02	1.48	1.49	0.01	1.36	1.36	1,818.10
Paving Off-Gas	0.31	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Paving Off Road Diesel	2.69	16.46	10.15	0.00	0.00	1.43	1.43	0.00	1.32	1.32	1,418.81
Paving On Road Diesel	0.08	0.94	0.37	0.00	0.01	0.04	0.04	0.00	0.03	0.04	181.71
Paving Worker Trips	0.04	0.08	1.48	0.00	0.01	0.01	0.02	0.00	0.00	0.01	217.58
Building 04/01/2010-05/31/2018	30.30	123.06	673.99	1.04	4.60	7.58	12.18	1.65	6.76	8.41	105,423.26
Building Off Road Diesel	8.33	44.95	33.22	0.00	0.00	3.34	3.34	0.00	3.07	3.07	5,057.89
Building Vendor Trips	4.14	44.30	37.94	0.11	0.40	1.80	2.20	0.14	1.65	1.78	11,506.67
Building Worker Trips	17.83	33.80	602.84	0.93	4.20	2.44	6.64	1.51	2.04	3.56	88,858.71
Coating 05/01/2010-05/31/2018	15.65	0.03	0.59	0.00	0.00	0.00	0.01	0.00	0.00	0.00	87.57
Architectural Coating	15.63	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Coating Worker Trips	0.02	0.03	0.59	0.00	0.00	0.00	0.01	0.00	0.00	0.00	87.57
Fine Grading 06/01/2009-	37.66	315.79	160.92	0.01	859.55	13.65	873.20	179.52	12.56	192.07	36,172.69
Fine Grading Dust	0.00	0.00	0.00	0.00	859.50	0.00	859.50	179.50	0.00	179.50	0.00
Fine Grading Off Road Diesel	37.44	315.38	153.54	0.00	0.00	13.62	13.62	0.00	12.53	12.53	35,084.80
Fine Grading On Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fine Grading Worker Trips	0.22	0.41	7.38	0.01	0.05	0.03	0.08	0.02	0.02	0.04	1,087.90
Time Slice 1/1/2014-12/31/2014 Active	81.99	421.58	795.19	**1.06**	864.17	21.09	885.27	181.18	19.19	200.36	143,493.01
Asphalt 05/01/2010-05/31/2018	2.97	16.51	11.76	0.00	0.02	1.38	1.40	0.01	1.27	1.28	1,818.08
Paving Off-Gas	0.31	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Paving Off Road Diesel	2.54	15.61	10.07	0.00	0.00	1.34	1.34	0.00	1.24	1.24	1,418.81
Paving On Road Diesel	0.07	0.83	0.32	0.00	0.01	0.03	0.04	0.00	0.03	0.03	181.71

	ROG	NOx	CO	SO2	PM10 Dust	PM10 Exhaust	PM10 Total	PM2.5 Dust	PM2.5 Exhaust	PM2.5 Total	CO2
Paving Worker Trips	0.04	0.08	1.38	0.00	0.01	0.01	0.02	0.00	0.01	0.01	217.56
Building 04/01/2010-05/31/2018	27.64	112.11	629.10	1.04	4.60	7.20	11.80	1.65	6.41	8.06	105,414.79
Building Off Road Diesel	7.62	42.12	32.62	0.00	0.00	2.98	2.98	0.00	2.74	2.74	5,057.89
Building Vendor Trips	3.75	38.90	34.92	0.11	0.40	1.57	1.98	0.14	1.44	1.57	11,506.98
Building Worker Trips	16.26	31.09	561.57	0.93	4.20	2.64	6.84	1.51	2.23	3.74	88,849.92
Coating 05/01/2010-05/31/2018	15.65	0.03	0.55	0.00	0.00	0.00	0.01	0.00	0.00	0.00	87.56
Architectural Coating	15.63	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Coating Worker Trips	0.02	0.03	0.55	0.00	0.00	0.00	0.01	0.00	0.00	0.00	87.56
Fine Grading 06/01/2009-	35.75	292.92	153.77	0.01	859.55	12.51	872.06	179.52	11.51	191.02	36,172.59
Fine Grading Dust	0.00	0.00	0.00	0.00	859.50	0.00	859.50	179.50	0.00	179.50	0.00
Fine Grading Off Road Diesel	35.55	292.54	146.89	0.00	0.00	12.48	12.48	0.00	11.48	11.48	35,084.80
Fine Grading On Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fine Grading Worker Trips	0.20	0.38	6.88	0.01	0.05	0.03	0.08	0.02	0.03	0.05	1,087.79
Time Slice 1/1/2015-8/31/2015 Active	77.33	386.52	745.93	**1.06**	864.17	19.54	883.71	181.18	17.76	198.93	143,485.76
Asphalt 05/01/2010-05/31/2018	2.80	15.44	11.54	0.00	0.02	1.28	1.29	0.01	1.18	1.18	1,818.06
Paving Off-Gas	0.31	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Paving Off Road Diesel	2.38	14.65	9.98	0.00	0.00	1.25	1.25	0.00	1.15	1.15	1,418.81
Paving On Road Diesel	0.06	0.72	0.28	0.00	0.01	0.03	0.03	0.00	0.02	0.03	181.71
Paving Worker Trips	0.04	0.07	1.28	0.00	0.01	0.01	0.02	0.00	0.01	0.01	217.54
Building 04/01/2010-05/31/2018	25.21	101.60	587.08	1.04	4.60	6.73	11.34	1.65	5.98	7.63	105,407.66
Building Off Road Diesel	6.98	39.07	32.08	0.00	0.00	2.72	2.72	0.00	2.50	2.50	5,057.89
Building Vendor Trips	3.39	34.04	32.13	0.11	0.40	1.37	1.77	0.14	1.25	1.39	11,507.42
Building Worker Trips	14.84	28.50	522.87	0.93	4.20	2.64	6.84	1.51	2.23	3.74	88,842.34
Coating 05/01/2010-05/31/2018	15.65	0.03	0.52	0.00	0.00	0.00	0.01	0.00	0.00	0.00	87.55
Architectural Coating	15.63	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Coating Worker Trips	0.01	0.03	0.52	0.00	0.00	0.00	0.01	0.00	0.00	0.00	87.55
Fine Grading 06/01/2009-	33.68	269.44	146.80	0.01	859.55	11.52	871.07	179.52	10.60	190.11	36,172.49
Fine Grading Dust	0.00	0.00	0.00	0.00	859.50	0.00	859.50	179.50	0.00	179.50	0.00
Fine Grading Off Road Diesel	33.50	269.10	140.39	0.00	0.00	11.49	11.49	0.00	10.57	10.57	35,084.80
Fine Grading On Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fine Grading Worker Trips	0.18	0.35	6.40	0.01	0.05	0.03	0.08	0.02	0.03	0.05	1,087.70
Time Slice 9/1/2015-12/31/2015 Active	43.65	117.08	599.13	1.05	4.62	8.01	12.64	1.66	7.16	8.82	107,313.27
Asphalt 05/01/2010-05/31/2018	2.80	15.44	11.54	0.00	0.02	1.28	1.29	0.01	1.18	1.18	1,818.06
Paving Off-Gas	0.31	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Paving Off Road Diesel	2.38	14.65	9.98	0.00	0.00	1.25	1.25	0.00	1.15	1.15	1,418.81
Paving On Road Diesel	0.06	0.72	0.28	0.00	0.01	0.03	0.03	0.00	0.02	0.03	181.71
Paving Worker Trips	0.04	0.07	1.28	0.00	0.01	0.01	0.02	0.00	0.01	0.01	217.54
Building 04/01/2010-05/31/2018	25.21	101.60	587.08	1.04	4.60	6.73	11.34	1.65	5.98	7.63	105,407.66
Building Off Road Diesel	6.98	39.07	32.08	0.00	0.00	2.72	2.72	0.00	2.50	2.50	5,057.89
Building Vendor Trips	3.39	34.04	32.13	0.11	0.40	1.37	1.77	0.14	1.25	1.39	11,507.42

	ROG	NOx	CO	SO2	PM10 Dust	PM10 Exhaust	PM10 Total	PM2.5 Dust	PM2.5 Exhaust	PM2.5 Total	CO2
Building Worker Trips	14.84	28.50	522.87	0.93	4.20	2.64	6.84	1.51	2.23	3.74	88,842.34
Coating 05/01/2010-05/31/2018	15.65	0.03	0.52	0.00	0.00	0.00	0.01	0.00	0.00	0.00	87.55
Architectural Coating	15.63	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Coating Worker Trips	0.01	0.03	0.52	0.00	0.00	0.00	0.01	0.00	0.00	0.00	87.55
Time Slice 1/1/2016-12/30/2016 Active	41.36	107.11	561.70	1.05	4.62	7.42	12.04	1.66	6.61	8.27	107,302.95
Asphalt 05/01/2010-05/31/2018	2.62	14.42	11.36	0.00	0.02	1.17	1.19	0.01	1.08	1.08	1,818.04
Paving Off-Gas	0.31	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Paving Off Road Diesel	2.22	13.72	9.91	0.00	0.00	1.14	1.14	0.00	1.05	1.05	1,418.81
Paving On Road Diesel	0.06	0.63	0.25	0.00	0.01	0.02	0.03	0.00	0.02	0.02	181.71
Paving Worker Trips	0.03	0.06	1.20	0.00	0.01	0.01	0.02	0.00	0.01	0.01	217.51
Building 04/01/2010-05/31/2018	23.09	92.66	549.86	1.04	4.60	6.25	10.85	1.65	5.53	7.19	105,397.37
Building Off Road Diesel	6.39	36.26	31.63	0.00	0.00	2.39	2.39	0.00	2.20	2.20	5,057.89
Building Vendor Trips	3.09	30.06	29.79	0.11	0.40	1.21	1.62	0.14	1.11	1.24	11,507.68
Building Worker Trips	13.61	26.34	488.44	0.93	4.20	2.64	6.84	1.51	2.23	3.74	88,831.81
Coating 05/01/2010-05/31/2018	15.64	0.03	0.48	0.00	0.00	0.00	0.01	0.00	0.00	0.00	87.54
Architectural Coating	15.63	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Coating Worker Trips	0.01	0.03	0.48	0.00	0.00	0.00	0.01	0.00	0.00	0.00	87.54
Time Slice 1/2/2017-12/29/2017 Active	39.25	98.27	525.95	1.05	4.62	6.91	11.54	1.66	6.15	7.80	107,295.97
Asphalt 05/01/2010-05/31/2018	2.48	13.48	11.17	0.00	0.02	1.08	1.10	0.01	0.99	1.00	1,818.02
Paving Off-Gas	0.31	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Paving Off Road Diesel	2.09	12.86	9.83	0.00	0.00	1.05	1.05	0.00	0.97	0.97	1,418.81
Paving On Road Diesel	0.05	0.56	0.22	0.00	0.01	0.02	0.03	0.00	0.02	0.02	181.71
Paving Worker Trips	0.03	0.06	1.12	0.00	0.01	0.01	0.02	0.00	0.01	0.01	217.50
Building 04/01/2010-05/31/2018	21.13	84.76	514.33	1.04	4.60	5.83	10.43	1.65	5.15	6.80	105,390.41
Building Off Road Diesel	5.78	33.70	31.21	0.00	0.00	2.11	2.11	0.00	1.94	1.94	5,057.89
Building Vendor Trips	2.83	26.75	27.72	0.11	0.40	1.08	1.48	0.14	0.98	1.12	11,508.04
Building Worker Trips	12.52	24.31	455.39	0.93	4.20	2.64	6.84	1.51	2.23	3.74	88,824.48
Coating 05/01/2010-05/31/2018	15.64	0.02	0.45	0.00	0.00	0.00	0.01	0.00	0.00	0.00	87.53
Architectural Coating	15.63	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Coating Worker Trips	0.01	0.02	0.45	0.00	0.00	0.00	0.01	0.00	0.00	0.00	87.53
Time Slice 1/1/2018-5/31/2018 Active	37.30	90.24	492.72	1.05	4.62	6.47	11.09	1.66	5.73	7.39	107,291.16
Asphalt 05/01/2010-05/31/2018	2.36	12.58	11.03	0.00	0.02	0.99	1.00	0.01	0.91	0.91	1,818.00
Paving Off-Gas	0.31	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Paving Off Road Diesel	1.97	12.02	9.79	0.00	0.00	0.96	0.96	0.00	0.89	0.89	1,418.81
Paving On Road Diesel	0.05	0.50	0.20	0.00	0.01	0.02	0.02	0.00	0.02	0.02	181.71
Paving Worker Trips	0.03	0.05	1.04	0.00	0.01	0.01	0.02	0.00	0.01	0.01	217.48
Building 04/01/2010-05/31/2018	19.30	77.63	481.28	1.04	4.60	5.48	10.08	1.65	4.82	6.47	105,385.63
Building Off Road Diesel	5.22	31.25	30.82	0.00	0.00	1.86	1.86	0.00	1.71	1.71	5,057.89
Building Vendor Trips	2.60	23.98	25.89	0.11	0.40	0.97	1.37	0.14	0.88	1.02	11,508.46
Building Worker Trips	11.47	22.41	424.57	0.93	4.20	2.65	6.85	1.51	2.23	3.74	88,819.27

	ROG	NOx	CO	SO2	PM10 Dust	PM10 Exhaust	PM10 Total	PM2.5 Dust	PM2.5 Exhaust	PM2.5 Total	CO2
Coating 05/01/2010-05/31/2018	15.64	0.02	0.42	0.00	0.00	0.00	0.01	0.00	0.00	0.00	87.53
Architectural Coating	15.63	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Coating Worker Trips	0.01	0.02	0.42	0.00	0.00	0.00	0.01	0.00	0.00	0.00	87.53

Construction Related Mitigation Measures

The following mitigation measures apply to Phase: Fine Grading 6/1/2009 - 8/31/2015 - Default Fine Site Grading/Excavation Description

For Soil Stablizing Measures, the Water exposed surfaces 2x daily watering mitigation reduces emissions by:

PM10: 55% PM25: 55%

For Unpaved Roads Measures, the Manage haul road dust 2x daily watering mitigation reduces emissions by:

PM10: 55% PM25: 55%

Phase Assumptions

Phase: Demolition 5/1/2009 - 5/31/2009 - Type Your Description Here

Building Volume Total (cubic feet): 320000

Building Volume Daily (cubic feet): 26000

On Road Truck Travel (VMT): 361.11

Off-Road Equipment:

1 Other Equipment (190 hp) operating at a 0.62 load factor for 8 hours per day

1 Rubber Tired Dozers (357 hp) operating at a 0.59 load factor for 8 hours per day

2 Tractors/Loaders/Backhoes (108 hp) operating at a 0.55 load factor for 8 hours per day

Phase: Fine Grading 6/1/2009 - 8/31/2015 - Default Fine Site Grading/Excavation Description

Total Acres Disturbed: 761

Maximum Daily Acreage Disturbed: 50

Fugitive Dust Level of Detail: Default

38.2 lbs per acre-day

On Road Truck Travel (VMT): 0

Off-Road Equipment:

6 Graders (174 hp) operating at a 0.61 load factor for 8 hours per day

5 Rubber Tired Dozers (357 hp) operating at a 0.59 load factor for 8 hours per day

3 Rubber Tired Loaders (164 hp) operating at a 0.54 load factor for 8 hours per day

12 Scrapers (313 hp) operating at a 0.72 load factor for 8 hours per day

4 Tractors/Loaders/Backhoes (108 hp) operating at a 0.55 load factor for 8 hours per day

5 Water Trucks (189 hp) operating at a 0.5 load factor for 8 hours per day

Phase: Paving 5/1/2010 - 5/31/2018 - Default Paving Description

	ROG	NOx	CO	SO2	PM10 Dust	PM10 Exhaust	PM10 Total	PM2.5 Dust	PM2.5 Exhaust	PM2.5 Total	CO2

Acres to be Paved: 252
Off-Road Equipment:
2 Cement and Mortar Mixers (10 hp) operating at a 0.56 load factor for 0 hours per day
1 Pavers (100 hp) operating at a 0.62 load factor for 8 hours per day
2 Paving Equipment (104 hp) operating at a 0.53 load factor for 8 hours per day
2 Rollers (95 hp) operating at a 0.56 load factor for 6 hours per day

Phase: Building Construction 4/1/2010 - 5/31/2018 - Default Building Construction Description
Off-Road Equipment:
2 Aerial Lifts (60 hp) operating at a 0.46 load factor for 8 hours per day
3 Air Compressors (106 hp) operating at a 0.48 load factor for 8 hours per day
3 Cement and Mortar Mixers (10 hp) operating at a 0.56 load factor for 8 hours per day
3 Concrete/Industrial Saws (10 hp) operating at a 0.73 load factor for 8 hours per day
1 Cranes (399 hp) operating at a 0.43 load factor for 7 hours per day
5 Forklifts (145 hp) operating at a 0.3 load factor for 8 hours per day
3 Generator Sets (49 hp) operating at a 0.74 load factor for 8 hours per day
5 Tractors/Loaders/Backhoes (108 hp) operating at a 0.55 load factor for 7 hours per day
3 Welders (45 hp) operating at a 0.45 load factor for 8 hours per day

Phase: Architectural Coating 5/1/2010 - 5/31/2018 - Default Architectural Coating Description
Rule: Residential Interior Coatings begins 1/1/2005 ends 6/30/2008 specifies a VOC of 100
Rule: Residential Interior Coatings begins 7/1/2008 ends 12/31/2040 specifies a VOC of 50
Rule: Residential Exterior Coatings begins 1/1/2005 ends 6/30/2008 specifies a VOC of 250
Rule: Residential Exterior Coatings begins 7/1/2008 ends 12/31/2040 specifies a VOC of 100
Rule: Nonresidential Interior Coatings begins 1/1/2005 ends 12/31/2040 specifies a VOC of 250
Rule: Nonresidential Exterior Coatings begins 1/1/2005 ends 12/31/2040 specifies a VOC of 250

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Urbemis 2007 Version 9.2.4

Detail Report for Summer Construction Mitigated Emissions (Pounds/Day)

File Name: V:\AQNOISE DIVISION\Active Projects\Rialto Specific Plan\Construction\URBEMIS\Phase IIIa.urb924

Project Name: Lytle Creek Rialto - Construction - Phase IIIa

Project Location: San Bernadino County

On-Road Vehicle Emissions Based on: Version : Emfac2007 V2.3 Nov 1 2006

Off-Road Vehicle Emissions Based on: OFFROAD2007

CONSTRUCTION EMISSION ESTIMATES (Summer Pounds Per Day, Mitigated)

	ROG	NOx	CO	SO2	PM10 Dust	PM10 Exhaust	PM10 Total	PM2.5 Dust	PM2.5 Exhaust	PM2.5 Total	CO2
Time Slice 6/1/2011-12/30/2011 Active	35.79	308.21	159.43	0.01	859.55	14.36	873.91	179.52	13.21	192.73	31,854.28
Mass Grading 06/01/2011-	35.79	308.21	159.43	0.01	859.55	14.36	873.91	179.52	13.21	192.73	31,854.28
Mass Grading Dust	0.00	0.00	0.00	0.00	859.50	0.00	859.50	179.50	0.00	179.50	0.00
Mass Grading Off Road Diesel	35.51	307.69	150.51	0.00	0.00	14.33	14.33	0.00	13.18	13.18	30,770.84
Mass Grading On Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Mass Grading Worker Trips	0.28	0.52	8.92	0.01	0.05	0.03	0.09	0.02	0.03	0.05	1,083.44
Time Slice 1/2/2012-2/29/2012 Active	34.13	288.57	152.48	0.01	859.55	13.29	872.85	179.52	12.23	191.74	31,853.10
Mass Grading 06/01/2011-	34.13	288.57	152.48	0.01	859.55	13.29	872.85	179.52	12.23	191.74	31,853.10
Mass Grading Dust	0.00	0.00	0.00	0.00	859.50	0.00	859.50	179.50	0.00	179.50	0.00
Mass Grading Off Road Diesel	33.87	288.10	144.25	0.00	0.00	13.26	13.26	0.00	12.20	12.20	30,770.84
Mass Grading On Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Mass Grading Worker Trips	0.25	0.47	8.23	0.01	0.05	0.03	0.09	0.02	0.03	0.05	1,082.26
Time Slice 3/1/2012-3/30/2012 Active	56.08	392.50	598.86	0.66	862.38	19.11	881.49	180.53	17.44	197.97	97,636.03
Building 03/01/2012-02/28/2020	21.96	103.93	446.38	0.65	2.83	5.81	8.64	1.01	5.22	6.23	65,782.93
Building Off Road Diesel	5.36	25.96	19.91	0.00	0.00	2.02	2.02	0.00	1.86	1.86	2,771.15
Building Vendor Trips	4.97	56.23	46.99	0.13	0.46	2.24	2.70	0.16	2.05	2.21	13,130.56
Building Worker Trips	11.63	21.74	379.48	0.53	2.37	1.56	3.93	0.85	1.31	2.16	49,881.22
Mass Grading 06/01/2011-	34.13	288.57	152.48	0.01	859.55	13.29	872.85	179.52	12.23	191.74	31,853.10
Mass Grading Dust	0.00	0.00	0.00	0.00	859.50	0.00	859.50	179.50	0.00	179.50	0.00
Mass Grading Off Road Diesel	33.87	288.10	144.25	0.00	0.00	13.26	13.26	0.00	12.20	12.20	30,770.84
Mass Grading On Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Mass Grading Worker Trips	0.25	0.47	8.23	0.01	0.05	0.03	0.09	0.02	0.03	0.05	1,082.26
Time Slice 4/2/2012-12/31/2012 Active	**83.36**	**405.93**	**608.30**	**0.67**	862.40	**20.25**	882.64	180.53	**18.49**	199.02	**99,048.56**
Asphalt 04/01/2012-02/28/2020	2.41	13.39	8.67	0.00	0.01	1.13	1.15	0.00	1.04	1.05	1,311.78
Paving Off-Gas	0.27	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

	ROG	NOx	CO	SO2	PM10 Dust	PM10 Exhaust	PM10 Total	PM2.5 Dust	PM2.5 Exhaust	PM2.5 Total	CO2
Paving Off Road Diesel	2.04	12.44	7.40	0.00	0.00	1.10	1.10	0.00	1.01	1.01	1,033.53
Paving On Road Diesel	0.07	0.90	0.33	0.00	0.01	0.03	0.04	0.00	0.03	0.03	154.56
Paving Worker Trips	0.03	0.05	0.94	0.00	0.01	0.00	0.01	0.00	0.00	0.01	123.69
Building 03/01/2012-02/28/2020	21.96	103.93	446.38	0.65	2.83	5.81	8.64	1.01	5.22	6.23	65,782.93
Building Off Road Diesel	5.36	25.96	19.91	0.00	0.00	2.02	2.02	0.00	1.86	1.86	2,771.15
Building Vendor Trips	4.97	56.23	46.99	0.13	0.46	2.24	2.70	0.16	2.05	2.21	13,130.56
Building Worker Trips	11.63	21.74	379.48	0.53	2.37	1.56	3.93	0.85	1.31	2.16	49,881.22
Coating 04/01/2012-02/28/2020	24.87	0.04	0.77	0.00	0.00	0.00	0.01	0.00	0.00	0.00	100.76
Architectural Coating	24.84	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Coating Worker Trips	0.02	0.04	0.77	0.00	0.00	0.00	0.01	0.00	0.00	0.00	100.76
Mass Grading 06/01/2011-	34.13	288.57	152.48	0.01	859.55	13.29	872.85	179.52	12.23	191.74	31,853.10
Mass Grading Dust	0.00	0.00	0.00	0.00	859.50	0.00	859.50	179.50	0.00	179.50	0.00
Mass Grading Off Road Diesel	33.87	288.10	144.25	0.00	0.00	13.26	13.26	0.00	12.20	12.20	30,770.84
Mass Grading On Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Mass Grading Worker Trips	0.25	0.47	8.23	0.01	0.05	0.03	0.09	0.02	0.03	0.05	1,082.26
Time Slice 1/1/2013-12/31/2013 Active	79.62	376.83	567.87	**0.67**	862.40	18.80	881.20	180.53	17.15	197.69	99,000.80
Asphalt 04/01/2012-02/28/2020	2.27	12.64	8.49	0.00	0.01	1.06	1.07	0.00	0.98	0.98	1,311.66
Paving Off-Gas	0.27	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Paving Off Road Diesel	1.91	11.80	7.33	0.00	0.00	1.03	1.03	0.00	0.95	0.95	1,033.53
Paving On Road Diesel	0.06	0.79	0.29	0.00	0.01	0.03	0.03	0.00	0.03	0.03	154.56
Paving Worker Trips	0.03	0.05	0.87	0.00	0.01	0.00	0.01	0.00	0.00	0.01	123.57
Building 03/01/2012-02/28/2020	19.87	93.85	412.43	0.65	2.83	5.39	8.22	1.01	4.82	5.83	65,736.42
Building Off Road Diesel	4.86	24.36	19.49	0.00	0.00	1.80	1.80	0.00	1.66	1.66	2,771.15
Building Vendor Trips	4.52	49.67	43.08	0.13	0.46	1.97	2.43	0.16	1.80	1.96	13,131.68
Building Worker Trips	10.49	19.83	349.85	0.53	2.37	1.62	3.99	0.85	1.36	2.22	49,833.59
Coating 04/01/2012-02/28/2020	24.86	0.04	0.71	0.00	0.00	0.00	0.01	0.00	0.00	0.00	100.66
Architectural Coating	24.84	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Coating Worker Trips	0.02	0.04	0.71	0.00	0.00	0.00	0.01	0.00	0.00	0.00	100.66
Mass Grading 06/01/2011-	32.62	270.29	146.25	0.01	859.55	12.34	871.89	179.52	11.35	190.87	31,852.07
Mass Grading Dust	0.00	0.00	0.00	0.00	859.50	0.00	859.50	179.50	0.00	179.50	0.00
Mass Grading Off Road Diesel	32.39	269.86	138.66	0.00	0.00	12.31	12.31	0.00	11.32	11.32	30,770.84
Mass Grading On Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Mass Grading Worker Trips	0.23	0.43	7.59	0.01	0.05	0.04	0.09	0.02	0.03	0.05	1,081.23
Time Slice 1/1/2014-12/31/2014 Active	75.97	347.16	531.44	**0.67**	862.40	17.14	879.54	180.53	15.63	196.16	98,958.80
Asphalt 04/01/2012-02/28/2020	2.16	11.92	8.34	0.00	0.01	0.99	1.00	0.00	0.91	0.92	1,311.55
Paving Off-Gas	0.27	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Paving Off Road Diesel	1.81	11.19	7.28	0.00	0.00	0.96	0.96	0.00	0.89	0.89	1,033.53
Paving On Road Diesel	0.06	0.69	0.26	0.00	0.01	0.03	0.03	0.00	0.02	0.03	154.56
Paving Worker Trips	0.02	0.04	0.80	0.00	0.01	0.00	0.01	0.00	0.00	0.01	123.47
Building 03/01/2012-02/28/2020	17.99	84.43	381.42	0.65	2.83	4.94	7.77	1.01	4.40	5.41	65,695.51

	ROG	NOx	CO	SO2	PM10 Dust	PM10 Exhaust	PM10 Total	PM2.5 Dust	PM2.5 Exhaust	PM2.5 Total	CO2
Building Off Road Diesel	4.40	22.83	19.09	0.00	0.00	1.59	1.59	0.00	1.46	1.46	2,771.15
Building Vendor Trips	4.09	43.54	39.54	0.13	0.46	1.73	2.19	0.16	1.58	1.74	13,132.48
Building Worker Trips	9.50	18.06	322.79	0.53	2.37	1.62	3.99	0.85	1.36	2.22	49,791.87
Coating 04/01/2012-02/28/2020	24.86	0.04	0.65	0.00	0.00	0.00	0.01	0.00	0.00	0.00	100.58
Architectural Coating	24.84	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Coating Worker Trips	0.02	0.04	0.65	0.00	0.00	0.00	0.01	0.00	0.00	0.00	100.58
Mass Grading 06/01/2011-	30.96	250.78	141.03	0.01	859.55	11.21	870.76	179.52	10.31	189.83	31,851.16
Mass Grading Dust	0.00	0.00	0.00	0.00	859.50	0.00	859.50	179.50	0.00	179.50	0.00
Mass Grading Off Road Diesel	30.75	250.38	134.03	0.00	0.00	11.18	11.18	0.00	10.28	10.28	30,770.84
Mass Grading On Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Mass Grading Worker Trips	0.21	0.39	7.00	0.01	0.05	0.04	0.09	0.02	0.03	0.05	1,080.32
Time Slice 1/1/2015-12/31/2015 Active	72.18	316.43	497.66	**0.67**	862.40	15.84	878.23	180.53	14.43	194.96	98,894.23
Asphalt 04/01/2012-02/28/2020	2.03	11.13	8.18	0.00	0.01	0.92	0.93	0.00	0.85	0.85	1,311.40
Paving Off-Gas	0.27	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Paving Off Road Diesel	1.70	10.49	7.21	0.00	0.00	0.90	0.90	0.00	0.82	0.82	1,033.53
Paving On Road Diesel	0.05	0.60	0.23	0.00	0.01	0.02	0.03	0.00	0.02	0.02	154.56
Paving Worker Trips	0.02	0.04	0.74	0.00	0.01	0.00	0.01	0.00	0.00	0.01	123.31
Building 03/01/2012-02/28/2020	16.23	75.64	352.65	0.65	2.83	4.58	7.41	1.01	4.07	5.09	65,632.61
Building Off Road Diesel	3.98	21.19	18.71	0.00	0.00	1.45	1.45	0.00	1.34	1.34	2,771.15
Building Vendor Trips	3.69	38.04	36.28	0.13	0.46	1.51	1.97	0.16	1.38	1.53	13,133.31
Building Worker Trips	8.55	16.41	297.66	0.53	2.37	1.62	3.99	0.85	1.36	2.22	49,728.15
Coating 04/01/2012-02/28/2020	24.86	0.03	0.60	0.00	0.00	0.00	0.01	0.00	0.00	0.00	100.45
Architectural Coating	24.84	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Coating Worker Trips	0.02	0.03	0.60	0.00	0.00	0.00	0.01	0.00	0.00	0.00	100.45
Mass Grading 06/01/2011-	29.06	229.62	136.23	0.01	859.55	10.33	869.89	179.52	9.51	189.02	31,849.78
Mass Grading Dust	0.00	0.00	0.00	0.00	859.50	0.00	859.50	179.50	0.00	179.50	0.00
Mass Grading Off Road Diesel	28.87	229.27	129.77	0.00	0.00	10.30	10.30	0.00	9.48	9.48	30,770.84
Mass Grading On Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Mass Grading Worker Trips	0.19	0.36	6.46	0.01	0.05	0.04	0.09	0.02	0.03	0.05	1,078.94
Time Slice 1/1/2016-12/30/2016 Active	68.98	288.73	467.73	**0.67**	862.40	14.49	876.88	180.53	13.19	193.72	98,835.88
Asphalt 04/01/2012-02/28/2020	1.91	10.37	8.05	0.00	0.01	0.84	0.85	0.00	0.77	0.77	1,311.25
Paving Off-Gas	0.27	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Paving Off Road Diesel	1.58	9.81	7.17	0.00	0.00	0.81	0.81	0.00	0.75	0.75	1,033.53
Paving On Road Diesel	0.05	0.53	0.20	0.00	0.01	0.02	0.02	0.00	0.02	0.02	154.56
Paving Worker Trips	0.02	0.04	0.68	0.00	0.01	0.00	0.01	0.00	0.00	0.01	123.16
Building 03/01/2012-02/28/2020	14.78	68.18	326.92	0.65	2.83	4.22	7.05	1.01	3.75	4.76	65,575.77
Building Off Road Diesel	3.60	19.67	18.42	0.00	0.00	1.27	1.27	0.00	1.17	1.17	2,771.15
Building Vendor Trips	3.36	33.55	33.53	0.13	0.46	1.34	1.80	0.16	1.22	1.37	13,133.93
Building Worker Trips	7.81	14.96	274.98	0.53	2.37	1.62	3.99	0.85	1.36	2.22	49,670.69
Coating 04/01/2012-02/28/2020	24.86	0.03	0.56	0.00	0.00	0.00	0.01	0.00	0.00	0.00	100.33

	ROG	NOx	CO	SO2	PM10 Dust	PM10 Exhaust	PM10 Total	PM2.5 Dust	PM2.5 Exhaust	PM2.5 Total	CO2
Architectural Coating	24.84	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Coating Worker Trips	0.02	0.03	0.56	0.00	0.00	0.00	0.01	0.00	0.00	0.00	100.33
Mass Grading 06/01/2011-	27.43	210.14	132.21	0.01	859.55	9.43	868.98	179.52	8.67	188.19	31,848.53
Mass Grading Dust	0.00	0.00	0.00	0.00	859.50	0.00	859.50	179.50	0.00	179.50	0.00
Mass Grading Off Road Diesel	27.26	209.82	126.24	0.00	0.00	9.39	9.39	0.00	8.64	8.64	30,770.84
Mass Grading On Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Mass Grading Worker Trips	0.17	0.32	5.97	0.01	0.05	0.04	0.09	0.02	0.03	0.05	1,077.69
Time Slice 1/2/2017-5/31/2017 Active	65.95	263.19	439.82	**0.67**	862.40	13.19	875.58	180.53	11.99	192.53	98,783.07
Asphalt 04/01/2012-02/28/2020	1.80	9.68	7.92	0.00	0.01	0.77	0.78	0.00	0.71	0.71	1,311.12
Paving Off-Gas	0.27	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Paving Off Road Diesel	1.48	9.17	7.11	0.00	0.00	0.75	0.75	0.00	0.69	0.69	1,033.53
Paving On Road Diesel	0.04	0.47	0.18	0.00	0.01	0.02	0.02	0.00	0.02	0.02	154.56
Paving Worker Trips	0.02	0.03	0.63	0.00	0.01	0.00	0.01	0.00	0.00	0.01	123.04
Building 03/01/2012-02/28/2020	13.37	61.83	303.23	0.65	2.83	3.91	6.74	1.01	3.46	4.47	65,524.32
Building Off Road Diesel	3.23	18.32	18.15	0.00	0.00	1.10	1.10	0.00	1.01	1.01	2,771.15
Building Vendor Trips	3.08	29.77	31.09	0.13	0.46	1.19	1.65	0.16	1.09	1.24	13,134.55
Building Worker Trips	7.06	13.74	253.99	0.53	2.37	1.62	3.99	0.85	1.36	2.22	49,618.62
Coating 04/01/2012-02/28/2020	24.86	0.03	0.51	0.00	0.00	0.00	0.01	0.00	0.00	0.00	100.23
Architectural Coating	24.84	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Coating Worker Trips	0.01	0.03	0.51	0.00	0.00	0.00	0.01	0.00	0.00	0.00	100.23
Mass Grading 06/01/2011-	25.92	191.65	128.16	0.01	859.55	8.51	868.06	179.52	7.82	187.34	31,847.40
Mass Grading Dust	0.00	0.00	0.00	0.00	859.50	0.00	859.50	179.50	0.00	179.50	0.00
Mass Grading Off Road Diesel	25.77	191.35	122.65	0.00	0.00	8.47	8.47	0.00	7.79	7.79	30,770.84
Mass Grading On Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Mass Grading Worker Trips	0.15	0.30	5.51	0.01	0.05	0.04	0.09	0.02	0.03	0.05	1,076.56
Time Slice 6/1/2017-12/29/2017 Active	40.03	71.54	311.66	0.66	2.85	4.68	7.53	1.02	4.17	5.19	66,935.67
Asphalt 04/01/2012-02/28/2020	1.80	9.68	7.92	0.00	0.01	0.77	0.78	0.00	0.71	0.71	1,311.12
Paving Off-Gas	0.27	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Paving Off Road Diesel	1.48	9.17	7.11	0.00	0.00	0.75	0.75	0.00	0.69	0.69	1,033.53
Paving On Road Diesel	0.04	0.47	0.18	0.00	0.01	0.02	0.02	0.00	0.02	0.02	154.56
Paving Worker Trips	0.02	0.03	0.63	0.00	0.01	0.00	0.01	0.00	0.00	0.01	123.04
Building 03/01/2012-02/28/2020	13.37	61.83	303.23	0.65	2.83	3.91	6.74	1.01	3.46	4.47	65,524.32
Building Off Road Diesel	3.23	18.32	18.15	0.00	0.00	1.10	1.10	0.00	1.01	1.01	2,771.15
Building Vendor Trips	3.08	29.77	31.09	0.13	0.46	1.19	1.65	0.16	1.09	1.24	13,134.55
Building Worker Trips	7.06	13.74	253.99	0.53	2.37	1.62	3.99	0.85	1.36	2.22	49,618.62
Coating 04/01/2012-02/28/2020	24.86	0.03	0.51	0.00	0.00	0.00	0.01	0.00	0.00	0.00	100.23
Architectural Coating	24.84	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Coating Worker Trips	0.01	0.03	0.51	0.00	0.00	0.00	0.01	0.00	0.00	0.00	100.23
Time Slice 1/1/2018-12/31/2018 Active	38.70	65.21	290.01	0.66	2.85	4.35	7.19	1.02	3.86	4.88	66,862.56
Asphalt 04/01/2012-02/28/2020	1.72	9.02	7.83	0.00	0.01	0.70	0.71	0.00	0.64	0.65	1,310.94

	ROG	NOx	CO	SO2	PM10 Dust	PM10 Exhaust	PM10 Total	PM2.5 Dust	PM2.5 Exhaust	PM2.5 Total	CO2
Paving Off-Gas	0.27	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Paving Off Road Diesel	1.39	8.57	7.08	0.00	0.00	0.68	0.68	0.00	0.63	0.63	1,033.53
Paving On Road Diesel	0.04	0.42	0.16	0.00	0.01	0.01	0.02	0.00	0.01	0.01	154.56
Paving Worker Trips	0.02	0.03	0.58	0.00	0.01	0.00	0.01	0.00	0.00	0.01	122.85
Building 03/01/2012-02/28/2020	12.13	56.16	281.71	0.65	2.83	3.64	6.47	1.01	3.22	4.23	65,451.54
Building Off Road Diesel	2.89	17.02	17.90	0.00	0.00	0.96	0.96	0.00	0.88	0.88	2,771.15
Building Vendor Trips	2.84	26.59	28.94	0.13	0.46	1.07	1.53	0.16	0.97	1.13	13,135.11
Building Worker Trips	6.39	12.54	234.87	0.53	2.37	1.62	3.99	0.85	1.36	2.22	49,545.28
Coating 04/01/2012-02/28/2020	24.86	0.03	0.47	0.00	0.00	0.00	0.01	0.00	0.00	0.00	100.08
Architectural Coating	24.84	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Coating Worker Trips	0.01	0.03	0.47	0.00	0.00	0.00	0.01	0.00	0.00	0.00	100.08
Time Slice 1/1/2019-12/31/2019 Active	37.53	59.72	270.40	0.66	2.85	4.03	6.87	1.02	3.57	4.58	66,797.81
Asphalt 04/01/2012-02/28/2020	1.61	8.43	7.70	0.00	0.01	0.63	0.64	0.00	0.58	0.58	1,310.78
Paving Off-Gas	0.27	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Paving Off Road Diesel	1.29	8.02	7.01	0.00	0.00	0.61	0.61	0.00	0.56	0.56	1,033.53
Paving On Road Diesel	0.04	0.38	0.15	0.00	0.01	0.01	0.02	0.00	0.01	0.01	154.56
Paving Worker Trips	0.01	0.03	0.54	0.00	0.01	0.00	0.01	0.00	0.00	0.01	122.69
Building 03/01/2012-02/28/2020	11.06	51.27	262.26	0.65	2.83	3.40	6.22	1.01	2.99	4.00	65,387.09
Building Off Road Diesel	2.62	15.83	17.69	0.00	0.00	0.81	0.81	0.00	0.74	0.74	2,771.15
Building Vendor Trips	2.62	23.91	27.03	0.13	0.46	0.97	1.43	0.16	0.88	1.04	13,135.62
Building Worker Trips	5.82	11.53	217.54	0.53	2.37	1.62	3.99	0.85	1.36	2.22	49,480.32
Coating 04/01/2012-02/28/2020	24.86	0.02	0.44	0.00	0.00	0.00	0.01	0.00	0.00	0.00	99.95
Architectural Coating	24.84	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Coating Worker Trips	0.01	0.02	0.44	0.00	0.00	0.00	0.01	0.00	0.00	0.00	99.95
Time Slice 1/1/2020-2/28/2020 Active	36.42	54.90	252.00	0.66	2.85	3.81	6.65	1.02	3.37	4.38	66,739.47
Asphalt 04/01/2012-02/28/2020	1.51	7.85	7.61	0.00	0.01	0.60	0.61	0.00	0.55	0.55	1,310.64
Paving Off-Gas	0.27	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Paving Off Road Diesel	1.19	7.49	6.98	0.00	0.00	0.58	0.58	0.00	0.53	0.53	1,033.53
Paving On Road Diesel	0.03	0.34	0.14	0.00	0.01	0.01	0.02	0.00	0.01	0.01	154.56
Paving Worker Trips	0.01	0.03	0.50	0.00	0.01	0.00	0.01	0.00	0.00	0.01	122.55
Building 03/01/2012-02/28/2020	10.06	47.03	243.98	0.65	2.83	3.21	6.04	1.01	2.82	3.83	65,329.01
Building Off Road Diesel	2.36	14.83	17.54	0.00	0.00	0.71	0.71	0.00	0.65	0.65	2,771.15
Building Vendor Trips	2.44	21.66	25.32	0.13	0.46	0.88	1.34	0.16	0.80	0.96	13,136.09
Building Worker Trips	5.27	10.54	201.12	0.53	2.37	1.62	3.99	0.85	1.36	2.22	49,421.76
Coating 04/01/2012-02/28/2020	24.85	0.02	0.41	0.00	0.00	0.00	0.01	0.00	0.00	0.00	99.83
Architectural Coating	24.84	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Coating Worker Trips	0.01	0.02	0.41	0.00	0.00	0.00	0.01	0.00	0.00	0.00	99.83

Construction Related Mitigation Measures

	ROG	NOx	CO	SO2	PM10 Dust	PM10 Exhaust	PM10 Total	PM2.5 Dust	PM2.5 Exhaust	PM2.5 Total	CO2

The following mitigation measures apply to Phase: Mass Grading 6/1/2011 - 5/31/2017 - Default Mass Site Grading/Excavation Description

For Soil Stablizing Measures, the Water exposed surfaces 2x daily watering mitigation reduces emissions by:

PM10: 55% PM25: 55%

For Unpaved Roads Measures, the Manage haul road dust 2x daily watering mitigation reduces emissions by:

PM10: 55% PM25: 55%

Phase Assumptions

Phase: Mass Grading 6/1/2011 - 5/31/2017 - Default Mass Site Grading/Excavation Description

Total Acres Disturbed: 816

Maximum Daily Acreage Disturbed: 50

Fugitive Dust Level of Detail: Default

38.2 lbs per acre-day

On Road Truck Travel (VMT): 0

Off-Road Equipment:

12 Graders (174 hp) operating at a 0.61 load factor for 8 hours per day

3 Other Equipment (190 hp) operating at a 0.62 load factor for 8 hours per day

3 Rubber Tired Dozers (357 hp) operating at a 0.59 load factor for 8 hours per day

3 Rubber Tired Loaders (164 hp) operating at a 0.54 load factor for 8 hours per day

8 Scrapers (313 hp) operating at a 0.72 load factor for 8 hours per day

3 Tractors/Loaders/Backhoes (108 hp) operating at a 0.55 load factor for 8 hours per day

3 Water Trucks (189 hp) operating at a 0.5 load factor for 8 hours per day

Phase: Paving 4/1/2012 - 2/28/2020 - Default Paving Description

Acres to be Paved: 209.88

Off-Road Equipment:

2 Paving Equipment (104 hp) operating at a 0.53 load factor for 8 hours per day

2 Rollers (95 hp) operating at a 0.56 load factor for 6 hours per day

Phase: Building Construction 3/1/2012 - 2/28/2020 - Default Building Construction Description

Off-Road Equipment:

2 Aerial Lifts (60 hp) operating at a 0.46 load factor for 8 hours per day

1 Cranes (399 hp) operating at a 0.43 load factor for 3 hours per day

3 Forklifts (145 hp) operating at a 0.3 load factor for 8 hours per day

2 Generator Sets (49 hp) operating at a 0.74 load factor for 8 hours per day

2 Skid Steer Loaders (44 hp) operating at a 0.55 load factor for 8 hours per day

3 Tractors/Loaders/Backhoes (108 hp) operating at a 0.55 load factor for 7 hours per day

	ROG	NOx	CO	SO2	PM10 Dust	PM10 Exhaust	PM10 Total	PM2.5 Dust	PM2.5 Exhaust	PM2.5 Total	CO2
2 Welders (45 hp) operating at a 0.45 load factor for 8 hours per day											

Phase: Architectural Coating 4/1/2012 - 2/28/2020 - Default Architectural Coating Description

Rule: Residential Interior Coatings begins 1/1/2005 ends 6/30/2008 specifies a VOC of 100

Rule: Residential Interior Coatings begins 7/1/2008 ends 12/31/2040 specifies a VOC of 50

Rule: Residential Exterior Coatings begins 1/1/2005 ends 6/30/2008 specifies a VOC of 250

Rule: Residential Exterior Coatings begins 7/1/2008 ends 12/31/2040 specifies a VOC of 100

Rule: Nonresidential Interior Coatings begins 1/1/2005 ends 12/31/2040 specifies a VOC of 250

Rule: Nonresidential Exterior Coatings begins 1/1/2005 ends 12/31/2040 specifies a VOC of 250

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Urbemis 2007 Version 9.2.4

Detail Report for Summer Construction Mitigated Emissions (Pounds/Day)

File Name: V:\AQNOISE DIVISION\Active Projects\Rialto Specific Plan\Construction\URBEMIS\Phase IIIb.urb9

Project Name: Lytle Creek Rialto Construction - Phase IIIb

Project Location: San Bernadino County

On-Road Vehicle Emissions Based on: Version : Emfac2007 V2.3 Nov 1 2006

Off-Road Vehicle Emissions Based on: OFFROAD2007

CONSTRUCTION EMISSION ESTIMATES (Summer Pounds Per Day, Mitigated)

	ROG	NOx	CO	SO2	PM10 Dust	PM10 Exhaust	PM10 Total	PM2.5 Dust	PM2.5 Exhaust	PM2.5 Total	CO2
Time Slice 4/1/2024-8/30/2024 Active	20.65	138.37	114.34	0.01	859.55	5.78	865.33	179.51	5.32	184.83	29,550.75
Mass Grading 04/01/2024-	20.65	138.37	114.34	0.01	859.55	5.78	865.33	179.51	5.32	184.83	29,550.75
Mass Grading Dust	0.00	0.00	0.00	0.00	859.50	0.00	859.50	179.50	0.00	179.50	0.00
Mass Grading Off Road Diesel	20.58	138.23	111.53	0.00	0.00	5.75	5.75	0.00	5.29	5.29	28,574.71
Mass Grading On Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Mass Grading Worker Trips	0.07	0.14	2.81	0.01	0.05	0.03	0.08	0.02	0.03	0.04	976.03
Time Slice 9/2/2024-9/30/2024 Active	23.67	156.35	149.97	0.08	859.85	6.88	866.73	179.62	6.31	185.93	39,111.85
Building 09/01/2024-08/31/2025	3.02	17.98	35.63	0.07	0.30	1.09	1.40	0.11	0.99	1.10	9,561.10
Building Off Road Diesel	2.48	15.66	18.43	0.00	0.00	0.85	0.85	0.00	0.79	0.79	2,901.48
Building Vendor Trips	0.19	1.57	2.07	0.01	0.05	0.07	0.12	0.02	0.06	0.08	1,406.62
Building Worker Trips	0.35	0.76	15.13	0.06	0.25	0.17	0.43	0.09	0.15	0.24	5,253.01
Mass Grading 04/01/2024-	20.65	138.37	114.34	0.01	859.55	5.78	865.33	179.51	5.32	184.83	29,550.75
Mass Grading Dust	0.00	0.00	0.00	0.00	859.50	0.00	859.50	179.50	0.00	179.50	0.00
Mass Grading Off Road Diesel	20.58	138.23	111.53	0.00	0.00	5.75	5.75	0.00	5.29	5.29	28,574.71
Mass Grading On Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Mass Grading Worker Trips	0.07	0.14	2.81	0.01	0.05	0.03	0.08	0.02	0.03	0.04	976.03
Time Slice 10/1/2024-12/31/2024	**41.53**	**162.95**	**156.66**	**0.08**	859.86	**7.38**	867.24	179.63	**6.77**	186.40	**40,372.34**
Asphalt 10/01/2024-08/31/2025	1.31	6.59	6.42	0.00	0.01	0.50	0.51	0.00	0.46	0.46	1,167.76
Paving Off-Gas	0.27	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Paving Off Road Diesel	1.00	6.34	5.97	0.00	0.00	0.49	0.49	0.00	0.45	0.45	887.12
Paving On Road Diesel	0.03	0.23	0.10	0.00	0.01	0.01	0.01	0.00	0.01	0.01	158.64
Paving Worker Trips	0.01	0.02	0.35	0.00	0.01	0.00	0.01	0.00	0.00	0.01	122.00
Building 09/01/2024-08/31/2025	3.02	17.98	35.63	0.07	0.30	1.09	1.40	0.11	0.99	1.10	9,561.10
Building Off Road Diesel	2.48	15.66	18.43	0.00	0.00	0.85	0.85	0.00	0.79	0.79	2,901.48
Building Vendor Trips	0.19	1.57	2.07	0.01	0.05	0.07	0.12	0.02	0.06	0.08	1,406.62

	ROG	NOx	CO	SO2	PM10 Dust	PM10 Exhaust	PM10 Total	PM2.5 Dust	PM2.5 Exhaust	PM2.5 Total	CO2
Building Worker Trips	0.35	0.76	15.13	0.06	0.25	0.17	0.43	0.09	0.15	0.24	5,253.01
Coating 10/01/2024-08/31/2025	16.55	0.01	0.27	0.00	0.00	0.00	0.01	0.00	0.00	0.00	92.72
Architectural Coating	16.54	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Coating Worker Trips	0.01	0.01	0.27	0.00	0.00	0.00	0.01	0.00	0.00	0.00	92.72
Mass Grading 04/01/2024-	20.65	138.37	114.34	0.01	859.55	5.78	865.33	179.51	5.32	184.83	29,550.75
Mass Grading Dust	0.00	0.00	0.00	0.00	859.50	0.00	859.50	179.50	0.00	179.50	0.00
Mass Grading Off Road Diesel	20.58	138.23	111.53	0.00	0.00	5.75	5.75	0.00	5.29	5.29	28,574.71
Mass Grading On Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Mass Grading Worker Trips	0.07	0.14	2.81	0.01	0.05	0.03	0.08	0.02	0.03	0.04	976.03
Time Slice 1/1/2025-1/31/2025 Active	41.53	**162.95**	**156.66**	**0.08**	859.86	**7.38**	867.24	179.63	**6.77**	186.40	**40,372.34**
Asphalt 10/01/2024-08/31/2025	1.31	6.59	6.42	0.00	0.01	0.50	0.51	0.00	0.46	0.46	1,167.76
Paving Off-Gas	0.27	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Paving Off Road Diesel	1.00	6.34	5.97	0.00	0.00	0.49	0.49	0.00	0.45	0.45	887.12
Paving On Road Diesel	0.03	0.23	0.10	0.00	0.01	0.01	0.01	0.00	0.01	0.01	158.64
Paving Worker Trips	0.01	0.02	0.35	0.00	0.01	0.00	0.01	0.00	0.00	0.01	122.00
Building 09/01/2024-08/31/2025	3.02	17.98	35.63	0.07	0.30	1.09	1.40	0.11	0.99	1.10	9,561.10
Building Off Road Diesel	2.48	15.66	18.43	0.00	0.00	0.85	0.85	0.00	0.79	0.79	2,901.48
Building Vendor Trips	0.19	1.57	2.07	0.01	0.05	0.07	0.12	0.02	0.06	0.08	1,406.62
Building Worker Trips	0.35	0.76	15.13	0.06	0.25	0.17	0.43	0.09	0.15	0.24	5,253.01
Coating 10/01/2024-08/31/2025	16.55	0.01	0.27	0.00	0.00	0.00	0.01	0.00	0.00	0.00	92.72
Architectural Coating	16.54	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Coating Worker Trips	0.01	0.01	0.27	0.00	0.00	0.00	0.01	0.00	0.00	0.00	92.72
Mass Grading 04/01/2024-	20.65	138.37	114.34	0.01	859.55	5.78	865.33	179.51	5.32	184.83	29,550.75
Mass Grading Dust	0.00	0.00	0.00	0.00	859.50	0.00	859.50	179.50	0.00	179.50	0.00
Mass Grading Off Road Diesel	20.58	138.23	111.53	0.00	0.00	5.75	5.75	0.00	5.29	5.29	28,574.71
Mass Grading On Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Mass Grading Worker Trips	0.07	0.14	2.81	0.01	0.05	0.03	0.08	0.02	0.03	0.04	976.03
Time Slice 2/3/2025-8/29/2025 Active	20.89	24.58	42.32	0.07	0.32	1.60	1.91	0.11	1.45	1.57	10,821.59
Asphalt 10/01/2024-08/31/2025	1.31	6.59	6.42	0.00	0.01	0.50	0.51	0.00	0.46	0.46	1,167.76
Paving Off-Gas	0.27	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Paving Off Road Diesel	1.00	6.34	5.97	0.00	0.00	0.49	0.49	0.00	0.45	0.45	887.12
Paving On Road Diesel	0.03	0.23	0.10	0.00	0.01	0.01	0.01	0.00	0.01	0.01	158.64
Paving Worker Trips	0.01	0.02	0.35	0.00	0.01	0.00	0.01	0.00	0.00	0.01	122.00
Building 09/01/2024-08/31/2025	3.02	17.98	35.63	0.07	0.30	1.09	1.40	0.11	0.99	1.10	9,561.10
Building Off Road Diesel	2.48	15.66	18.43	0.00	0.00	0.85	0.85	0.00	0.79	0.79	2,901.48
Building Vendor Trips	0.19	1.57	2.07	0.01	0.05	0.07	0.12	0.02	0.06	0.08	1,406.62
Building Worker Trips	0.35	0.76	15.13	0.06	0.25	0.17	0.43	0.09	0.15	0.24	5,253.01
Coating 10/01/2024-08/31/2025	16.55	0.01	0.27	0.00	0.00	0.00	0.01	0.00	0.00	0.00	92.72
Architectural Coating	16.54	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Coating Worker Trips	0.01	0.01	0.27	0.00	0.00	0.00	0.01	0.00	0.00	0.00	92.72

	ROG	NOx	CO	SO2	PM10 Dust	PM10 Exhaust	PM10 Total	PM2.5 Dust	PM2.5 Exhaust	PM2.5 Total	CO2

Construction Related Mitigation Measures

The following mitigation measures apply to Phase: Mass Grading 4/1/2024 - 1/31/2025 - Default Mass Site Grading/Excavation Description

For Soil Stablizing Measures, the Water exposed surfaces 2x daily watering mitigation reduces emissions by:

PM10: 55% PM25: 55%

For Unpaved Roads Measures, the Manage haul road dust 2x daily watering mitigation reduces emissions by:

PM10: 55% PM25: 55%

Phase Assumptions

Phase: Mass Grading 4/1/2024 - 1/31/2025 - Default Mass Site Grading/Excavation Description

Total Acres Disturbed: 113

Maximum Daily Acreage Disturbed: 50

Fugitive Dust Level of Detail: Default

38.2 lbs per acre-day

On Road Truck Travel (VMT): 0

Off-Road Equipment:

12 Graders (174 hp) operating at a 0.61 load factor for 8 hours per day

3 Rubber Tired Dozers (357 hp) operating at a 0.59 load factor for 8 hours per day

3 Rubber Tired Loaders (164 hp) operating at a 0.54 load factor for 8 hours per day

8 Scrapers (313 hp) operating at a 0.72 load factor for 8 hours per day

3 Tractors/Loaders/Backhoes (108 hp) operating at a 0.55 load factor for 8 hours per day

3 Water Trucks (189 hp) operating at a 0.5 load factor for 8 hours per day

Phase: Paving 10/1/2024 - 8/31/2025 - Default Paving Description

Acres to be Paved: 24.92

Off-Road Equipment:

2 Paving Equipment (104 hp) operating at a 0.53 load factor for 6 hours per day

2 Rollers (95 hp) operating at a 0.56 load factor for 6 hours per day

Phase: Building Construction 9/1/2024 - 8/31/2025 - Default Building Construction Description

Off-Road Equipment:

2 Aerial Lifts (60 hp) operating at a 0.46 load factor for 8 hours per day

2 Air Compressors (106 hp) operating at a 0.48 load factor for 8 hours per day

1 Cranes (399 hp) operating at a 0.43 load factor for 2 hours per day

3 Forklifts (145 hp) operating at a 0.3 load factor for 8 hours per day

2 Generator Sets (49 hp) operating at a 0.74 load factor for 8 hours per day

	ROG	NOx	CO	SO2	PM10 Dust	PM10 Exhaust	PM10 Total	PM2.5 Dust	PM2.5 Exhaust	PM2.5 Total	CO2
3 Tractors/Loaders/Backhoes (108 hp) operating at a 0.55 load factor for 7 hours per day											
2 Welders (45 hp) operating at a 0.45 load factor for 8 hours per day											

Phase: Architectural Coating 10/1/2024 - 8/31/2025 - Default Architectural Coating Description
Rule: Residential Interior Coatings begins 1/1/2005 ends 6/30/2008 specifies a VOC of 100
Rule: Residential Interior Coatings begins 7/1/2008 ends 12/31/2040 specifies a VOC of 50
Rule: Residential Exterior Coatings begins 1/1/2005 ends 6/30/2008 specifies a VOC of 250
Rule: Residential Exterior Coatings begins 7/1/2008 ends 12/31/2040 specifies a VOC of 100
Rule: Nonresidential Interior Coatings begins 1/1/2005 ends 12/31/2040 specifies a VOC of 250
Rule: Nonresidential Exterior Coatings begins 1/1/2005 ends 12/31/2040 specifies a VOC of 250

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Urbemis 2007 Version 9.2.4

Detail Report for Summer Construction Mitigated Emissions (Pounds/Day)

File Name: V:\AQNOISE DIVISION\Active Projects\Rialto Specific Plan\Construction\URBEMIS\Phase IV.urb9

Project Name: Lytle Creek Phase 4

Project Location: South Coast AQMD

On-Road Vehicle Emissions Based on: Version : Emfac2007 V2.3 Nov 1 2006

Off-Road Vehicle Emissions Based on: OFFROAD2007

CONSTRUCTION EMISSION ESTIMATES (Summer Pounds Per Day, Mitigated)

	ROG	NOx	CO	SO2	PM10 Dust	PM10 Exhaust	PM10 Total	PM2.5 Dust	PM2.5 Exhaust	PM2.5 Total	CO2
Time Slice 7/3/2017-12/29/2017 Active	24.75	186.74	112.08	0.01	859.54	7.95	867.49	179.51	7.31	186.82	29,569.96
Fine Grading 07/01/2017-	24.75	186.74	112.08	0.01	859.54	7.95	867.49	179.51	7.31	186.82	29,569.96
Fine Grading Dust	0.00	0.00	0.00	0.00	859.50	0.00	859.50	179.50	0.00	179.50	0.00
Fine Grading Off Road Diesel	24.63	186.50	107.62	0.00	0.00	7.92	7.92	0.00	7.29	7.29	28,699.98
Fine Grading On Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fine Grading Worker Trips	0.12	0.24	4.46	0.01	0.04	0.03	0.07	0.01	0.02	0.04	869.98
Time Slice 1/1/2018-3/30/2018 Active	23.17	170.82	108.58	0.01	859.54	7.15	866.69	179.51	6.57	186.08	29,569.91
Fine Grading 07/01/2017-	23.17	170.82	108.58	0.01	859.54	7.15	866.69	179.51	6.57	186.08	29,569.91
Fine Grading Dust	0.00	0.00	0.00	0.00	859.50	0.00	859.50	179.50	0.00	179.50	0.00
Fine Grading Off Road Diesel	23.05	170.60	104.42	0.00	0.00	7.12	7.12	0.00	6.55	6.55	28,699.98
Fine Grading On Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fine Grading Worker Trips	0.11	0.22	4.16	0.01	0.04	0.03	0.07	0.01	0.02	0.04	869.93
Time Slice 4/2/2018-4/30/2018 Active	31.93	220.34	255.62	0.34	860.94	9.94	870.88	180.01	9.08	189.09	65,487.70
Building 04/01/2018-06/30/2021	8.76	49.52	147.04	0.33	1.40	2.79	4.19	0.50	2.51	3.01	35,917.79
Building Off Road Diesel	3.48	20.88	19.88	0.00	0.00	1.21	1.21	0.00	1.12	1.12	3,406.08
Building Vendor Trips	2.52	23.26	25.11	0.11	0.39	0.94	1.33	0.13	0.86	0.99	11,162.86
Building Worker Trips	2.76	5.39	102.05	0.22	1.01	0.64	1.65	0.36	0.54	0.90	21,348.85
Fine Grading 07/01/2017-	23.17	170.82	108.58	0.01	859.54	7.15	866.69	179.51	6.57	186.08	29,569.91
Fine Grading Dust	0.00	0.00	0.00	0.00	859.50	0.00	859.50	179.50	0.00	179.50	0.00
Fine Grading Off Road Diesel	23.05	170.60	104.42	0.00	0.00	7.12	7.12	0.00	6.55	6.55	28,699.98
Fine Grading On Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fine Grading Worker Trips	0.11	0.22	4.16	0.01	0.04	0.03	0.07	0.01	0.02	0.04	869.93
Time Slice 5/1/2018-12/31/2018 Active	**52.35**	**231.26**	**265.97**	**0.34**	860.96	**10.81**	871.77	180.02	**9.88**	189.90	**67,126.42**
Asphalt 05/01/2018-06/30/2021	1.87	10.90	9.86	0.00	0.01	0.87	0.88	0.00	0.80	0.80	1,535.88
Paving Off-Gas	0.08	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

	ROG	NOx	CO	SO2	PM10 Dust	PM10 Exhaust	PM10 Total	PM2.5 Dust	PM2.5 Exhaust	PM2.5 Total	CO2
Paving Off Road Diesel	1.75	10.72	8.76	0.00	0.00	0.86	0.86	0.00	0.79	0.79	1,272.41
Paving On Road Diesel	0.01	0.13	0.05	0.00	0.00	0.00	0.01	0.00	0.00	0.00	45.99
Paving Worker Trips	0.03	0.05	1.04	0.00	0.01	0.01	0.02	0.00	0.01	0.01	217.48
Building 04/01/2018-06/30/2021	8.76	49.52	147.04	0.33	1.40	2.79	4.19	0.50	2.51	3.01	35,917.79
Building Off Road Diesel	3.48	20.88	19.88	0.00	0.00	1.21	1.21	0.00	1.12	1.12	3,406.08
Building Vendor Trips	2.52	23.26	25.11	0.11	0.39	0.94	1.33	0.13	0.86	0.99	11,162.86
Building Worker Trips	2.76	5.39	102.05	0.22	1.01	0.64	1.65	0.36	0.54	0.90	21,348.85
Coating 05/01/2018-06/30/2021	18.55	0.03	0.49	0.00	0.00	0.00	0.01	0.00	0.00	0.00	102.84
Architectural Coating	18.53	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Coating Worker Trips	0.01	0.03	0.49	0.00	0.00	0.00	0.01	0.00	0.00	0.00	102.84
Fine Grading 07/01/2017-	23.17	170.82	108.58	0.01	859.54	7.15	866.69	179.51	6.57	186.08	29,569.91
Fine Grading Dust	0.00	0.00	0.00	0.00	859.50	0.00	859.50	179.50	0.00	179.50	0.00
Fine Grading Off Road Diesel	23.05	170.60	104.42	0.00	0.00	7.12	7.12	0.00	6.55	6.55	28,699.98
Fine Grading On Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fine Grading Worker Trips	0.11	0.22	4.16	0.01	0.04	0.03	0.07	0.01	0.02	0.04	869.93
Time Slice 1/1/2019-12/31/2019 Active	50.41	211.69	253.67	**0.34**	860.96	9.72	870.67	180.02	8.88	188.89	67,125.92
Asphalt 05/01/2018-06/30/2021	1.74	10.20	9.70	0.00	0.01	0.79	0.80	0.00	0.73	0.73	1,535.88
Paving Off-Gas	0.08	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Paving Off Road Diesel	1.63	10.04	8.69	0.00	0.00	0.78	0.78	0.00	0.72	0.72	1,272.41
Paving On Road Diesel	0.01	0.11	0.05	0.00	0.00	0.00	0.01	0.00	0.00	0.00	45.99
Paving Worker Trips	0.03	0.05	0.97	0.00	0.01	0.01	0.02	0.00	0.01	0.01	217.47
Building 04/01/2018-06/30/2021	8.06	45.29	138.33	0.33	1.40	2.53	3.93	0.50	2.27	2.76	35,917.34
Building Off Road Diesel	3.18	19.34	19.66	0.00	0.00	1.04	1.04	0.00	0.96	0.96	3,406.08
Building Vendor Trips	2.34	20.99	23.51	0.11	0.39	0.85	1.24	0.13	0.77	0.91	11,163.29
Building Worker Trips	2.54	4.96	95.15	0.22	1.01	0.64	1.65	0.36	0.54	0.90	21,347.97
Coating 05/01/2018-06/30/2021	18.55	0.02	0.46	0.00	0.00	0.00	0.01	0.00	0.00	0.00	102.83
Architectural Coating	18.53	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Coating Worker Trips	0.01	0.02	0.46	0.00	0.00	0.00	0.01	0.00	0.00	0.00	102.83
Fine Grading 07/01/2017-	22.06	156.18	105.19	0.01	859.54	6.39	865.93	179.51	5.88	185.39	29,569.88
Fine Grading Dust	0.00	0.00	0.00	0.00	859.50	0.00	859.50	179.50	0.00	179.50	0.00
Fine Grading Off Road Diesel	21.96	155.97	101.31	0.00	0.00	6.37	6.37	0.00	5.86	5.86	28,699.98
Fine Grading On Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fine Grading Worker Trips	0.10	0.20	3.88	0.01	0.04	0.03	0.07	0.01	0.02	0.04	869.90
Time Slice 1/1/2020-9/30/2020 Active	48.24	193.67	242.59	**0.34**	860.96	8.73	869.69	180.02	7.97	187.98	67,125.64
Asphalt 05/01/2018-06/30/2021	1.62	9.53	9.59	0.00	0.01	0.74	0.75	0.00	0.68	0.68	1,535.87
Paving Off-Gas	0.08	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Paving Off Road Diesel	1.51	9.38	8.65	0.00	0.00	0.73	0.73	0.00	0.67	0.67	1,272.41
Paving On Road Diesel	0.01	0.10	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	45.99
Paving Worker Trips	0.02	0.05	0.90	0.00	0.01	0.01	0.02	0.00	0.01	0.01	217.47
Building 04/01/2018-06/30/2021	7.36	41.70	130.18	0.33	1.40	2.33	3.73	0.50	2.08	2.58	35,917.09

	ROG	NOx	CO	SO2	PM10 Dust	PM10 Exhaust	PM10 Total	PM2.5 Dust	PM2.5 Exhaust	PM2.5 Total	CO2
Building Off Road Diesel	2.88	18.03	19.47	0.00	0.00	0.92	0.92	0.00	0.84	0.84	3,406.08
Building Vendor Trips	2.17	19.09	22.08	0.11	0.39	0.78	1.17	0.13	0.71	0.84	11,163.73
Building Worker Trips	2.31	4.58	88.62	0.22	1.01	0.64	1.65	0.36	0.54	0.90	21,347.29
Coating 05/01/2018-06/30/2021	18.54	0.02	0.43	0.00	0.00	0.00	0.01	0.00	0.00	0.00	102.83
Architectural Coating	18.53	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Coating Worker Trips	0.01	0.02	0.43	0.00	0.00	0.00	0.01	0.00	0.00	0.00	102.83
Fine Grading 07/01/2017-	20.71	142.42	102.39	0.01	859.54	5.66	865.20	179.51	5.20	184.72	29,569.85
Fine Grading Dust	0.00	0.00	0.00	0.00	859.50	0.00	859.50	179.50	0.00	179.50	0.00
Fine Grading Off Road Diesel	20.62	142.23	98.78	0.00	0.00	5.63	5.63	0.00	5.18	5.18	28,699.98
Fine Grading On Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fine Grading Worker Trips	0.09	0.19	3.61	0.01	0.04	0.03	0.07	0.01	0.02	0.04	869.87
Time Slice 10/1/2020-12/31/2020	27.53	51.25	140.19	0.33	1.42	3.07	4.49	0.50	2.76	3.27	37,555.79
Asphalt 05/01/2018-06/30/2021	1.62	9.53	9.59	0.00	0.01	0.74	0.75	0.00	0.68	0.68	1,535.87
Paving Off-Gas	0.08	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Paving Off Road Diesel	1.51	9.38	8.65	0.00	0.00	0.73	0.73	0.00	0.67	0.67	1,272.41
Paving On Road Diesel	0.01	0.10	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	45.99
Paving Worker Trips	0.02	0.05	0.90	0.00	0.01	0.01	0.02	0.00	0.01	0.01	217.47
Building 04/01/2018-06/30/2021	7.36	41.70	130.18	0.33	1.40	2.33	3.73	0.50	2.08	2.58	35,917.09
Building Off Road Diesel	2.88	18.03	19.47	0.00	0.00	0.92	0.92	0.00	0.84	0.84	3,406.08
Building Vendor Trips	2.17	19.09	22.08	0.11	0.39	0.78	1.17	0.13	0.71	0.84	11,163.73
Building Worker Trips	2.31	4.58	88.62	0.22	1.01	0.64	1.65	0.36	0.54	0.90	21,347.29
Coating 05/01/2018-06/30/2021	18.54	0.02	0.43	0.00	0.00	0.00	0.01	0.00	0.00	0.00	102.83
Architectural Coating	18.53	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Coating Worker Trips	0.01	0.02	0.43	0.00	0.00	0.00	0.01	0.00	0.00	0.00	102.83
Time Slice 1/1/2021-6/30/2021 Active	26.18	44.00	109.90	0.33	1.42	2.86	4.27	0.50	2.57	3.07	37,555.95
Asphalt 05/01/2018-06/30/2021	1.61	9.49	9.33	0.00	0.01	0.74	0.75	0.00	0.68	0.68	1,535.85
Paving Off-Gas	0.08	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Paving Off Road Diesel	1.51	9.38	8.65	0.00	0.00	0.73	0.73	0.00	0.67	0.67	1,272.41
Paving On Road Diesel	0.01	0.07	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	45.99
Paving Worker Trips	0.02	0.03	0.65	0.00	0.01	0.01	0.02	0.00	0.01	0.01	217.45
Building 04/01/2018-06/30/2021	6.03	34.49	100.27	0.33	1.40	2.12	3.52	0.50	1.89	2.39	35,917.28
Building Off Road Diesel	2.88	18.03	19.47	0.00	0.00	0.92	0.92	0.00	0.84	0.84	3,406.08
Building Vendor Trips	1.64	13.31	17.05	0.11	0.39	0.57	0.96	0.13	0.51	0.64	11,165.69
Building Worker Trips	1.52	3.16	63.74	0.22	1.01	0.64	1.65	0.36	0.54	0.90	21,345.52
Coating 05/01/2018-06/30/2021	18.54	0.02	0.31	0.00	0.00	0.00	0.01	0.00	0.00	0.00	102.82
Architectural Coating	18.53	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Coating Worker Trips	0.01	0.02	0.31	0.00	0.00	0.00	0.01	0.00	0.00	0.00	102.82

Construction Related Mitigation Measures

	ROG	NOx	CO	SO2	PM10 Dust	PM10 Exhaust	PM10 Total	PM2.5 Dust	PM2.5 Exhaust	PM2.5 Total	CO2

The following mitigation measures apply to Phase: Fine Grading 7/1/2017 - 9/30/2020 - Default Fine Site Grading/Excavation Description

For Soil Stablizing Measures, the Water exposed surfaces 2x daily watering mitigation reduces emissions by:

PM10: 55% PM25: 55%

For Unpaved Roads Measures, the Manage haul road dust 2x daily watering mitigation reduces emissions by:

PM10: 55% PM25: 55%

Phase Assumptions

Phase: Fine Grading 7/1/2017 - 9/30/2020 - Default Fine Site Grading/Excavation Description

Total Acres Disturbed: 252

Maximum Daily Acreage Disturbed: 50

Fugitive Dust Level of Detail: Default

38.2 lbs per acre-day

On Road Truck Travel (VMT): 0

Off-Road Equipment:

6 Graders (174 hp) operating at a 0.61 load factor for 8 hours per day

4 Rubber Tired Dozers (357 hp) operating at a 0.59 load factor for 8 hours per day

2 Rubber Tired Loaders (164 hp) operating at a 0.54 load factor for 8 hours per day

10 Scrapers (313 hp) operating at a 0.72 load factor for 8 hours per day

3 Tractors/Loaders/Backhoes (108 hp) operating at a 0.55 load factor for 8 hours per day

3 Water Trucks (189 hp) operating at a 0.5 load factor for 8 hours per day

Phase: Paving 5/1/2018 - 6/30/2021 - Default Paving Description

Acres to be Paved: 25

Off-Road Equipment:

2 Cement and Mortar Mixers (10 hp) operating at a 0.56 load factor for 0 hours per day

1 Pavers (100 hp) operating at a 0.62 load factor for 8 hours per day

2 Paving Equipment (104 hp) operating at a 0.53 load factor for 6 hours per day

2 Rollers (95 hp) operating at a 0.56 load factor for 6 hours per day

Phase: Building Construction 4/1/2018 - 6/30/2021 - Default Building Construction Description

Off-Road Equipment:

1 Aerial Lifts (60 hp) operating at a 0.46 load factor for 8 hours per day

2 Air Compressors (106 hp) operating at a 0.48 load factor for 8 hours per day

2 Cement and Mortar Mixers (10 hp) operating at a 0.56 load factor for 8 hours per day

2 Concrete/Industrial Saws (10 hp) operating at a 0.73 load factor for 8 hours per day

1 Cranes (399 hp) operating at a 0.43 load factor for 7 hours per day

	ROG	NOx	CO	SO2	PM10 Dust	PM10 Exhaust	PM10 Total	PM2.5 Dust	PM2.5 Exhaust	PM2.5 Total	CO2
3 Forklifts (145 hp) operating at a 0.3 load factor for 8 hours per day											
2 Generator Sets (49 hp) operating at a 0.74 load factor for 8 hours per day											
3 Tractors/Loaders/Backhoes (108 hp) operating at a 0.55 load factor for 7 hours per day											
2 Welders (45 hp) operating at a 0.45 load factor for 8 hours per day											

Phase: Architectural Coating 5/1/2018 - 6/30/2021 - Default Architectural Coating Description
Rule: Residential Interior Coatings begins 1/1/2005 ends 6/30/2008 specifies a VOC of 100
Rule: Residential Interior Coatings begins 7/1/2008 ends 12/31/2040 specifies a VOC of 50
Rule: Residential Exterior Coatings begins 1/1/2005 ends 6/30/2008 specifies a VOC of 250
Rule: Residential Exterior Coatings begins 7/1/2008 ends 12/31/2040 specifies a VOC of 100
Rule: Nonresidential Interior Coatings begins 1/1/2005 ends 12/31/2040 specifies a VOC of 250
Rule: Nonresidential Exterior Coatings begins 1/1/2005 ends 12/31/2040 specifies a VOC of 250

Lytle Creek Ranch
Construction Emissions Overlapping Scenario

		Year	2009											
Neighborhood	**Pollutant**	**Month**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
I	CO		143.5	143.5	143.5	143.5	143.5	342.4	342.9	342.9	342.9	351.9	351.9	351.9
	CO2		25911.1	25911.1	25911.1	25911.1	25911.1	50668.2	50711.8	50711.8	50711.8	51945.6	51945.6	51945.6
	NOx		288.9	288.9	288.9	288.9	288.9	361.4	361.5	361.5	361.5	376.6	376.6	376.6
	PM10 Dust		859.5	859.5	859.5	859.5	859.5	860.5	860.5	860.5	860.5	860.5	860.5	860.5
	PM10 Exhaust		13.0	13.0	13.0	13.0	13.0	16.8	16.8	16.8	16.8	18.1	18.1	18.1
	PM10 Total		872.5	872.5	872.5	872.5	872.5	877.3	877.3	877.3	877.3	878.6	878.6	878.6
	PM2.5 Dust		179.5	179.5	179.5	179.5	179.5	179.8	179.8	179.8	179.8	179.9	179.9	179.9
	PM2.5 Exhaust		11.9	11.9	11.9	11.9	11.9	15.4	15.4	15.4	15.4	16.6	16.6	16.6
	PM2.5 Total		191.4	191.4	191.4	191.4	191.4	195.3	195.3	195.3	195.3	196.4	196.4	196.4
	ROG		32.5	32.5	32.5	32.5	32.5	45.3	53.2	53.2	53.2	55.8	55.8	55.8
	SO2		0.0	0.0	0.0	0.0	0.0	0.2	0.2	0.2	0.2	0.2	0.2	0.2
II	CO						63.8	202.2	202.2	202.2	202.2	202.2	202.2	202.2
	CO2						18062.3	36173.6	36173.6	36173.6	36173.6	36173.6	36173.6	36173.6
	NOx						153.1	403.9	403.9	403.9	403.9	403.9	403.9	403.9
	PM10 Dust						109.7	859.6	859.6	859.6	859.6	859.6	859.6	859.6
	PM10 Exhaust						6.8	18.4	18.4	18.4	18.4	18.4	18.4	18.4
	PM10 Total						116.5	877.9	877.9	877.9	877.9	877.9	877.9	877.9
	PM2.5 Dust						22.9	179.5	179.5	179.5	179.5	179.5	179.5	179.5
	PM2.5 Exhaust						6.2	16.9	16.9	16.9	16.9	16.9	16.9	16.9
	PM2.5 Total						29.1	196.4	196.4	196.4	196.4	196.4	196.4	196.4
	ROG						12.9	45.9	45.9	45.9	45.9	45.9	45.9	45.9
	SO2						0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
IIIA	CO													
	CO2													
	NOx													
	PM10 Dust													
	PM10 Exhaust													
	PM10 Total													
	PM2.5 Dust													
	PM2.5 Exhaust													
	PM2.5 Total													
	ROG													
	SO2													

		Year	2009											
Neighborhood	**Pollutant**	**Month**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
IIIB	CO													
	CO2													
	NOx													
	PM10 Dust													
	PM10 Exhaust													
	PM10 Total													
	PM2.5 Dust													
	PM2.5 Exhaust													
	PM2.5 Total													
	ROG													
	SO2													
IV	CO													
	CO2													
	NOx													
	PM10 Dust													
	PM10 Exhaust													
	PM10 Total													
	PM2.5 Dust													
	PM2.5 Exhaust													
	PM2.5 Total													
	ROG													
	SO2													
Overlapping	CO Sum		143.5	143.5	143.5	143.5	164.6	544.7	545.1	545.1	545.1	554.1	554.1	554.1
	CO2 Sum		25911.1	25911.1	25911.1	25911.1	30198.6	86841.8	86885.4	86885.4	86885.4	88119.1	88119.1	88119.1
	NOx Sum		288.9	288.9	288.9	288.9	330.9	765.3	765.4	765.4	765.4	780.5	780.5	780.5
	PM10 Dust Sum		859.5	859.5	859.5	859.5	870.5	1720.0	1720.0	1720.0	1720.0	1720.0	1720.0	1720.0
	PM10 Exhaust Sum		13.0	13.0	13.0	13.0	15.1	35.2	35.2	35.2	35.2	36.4	36.4	36.4
	PM10 Total Sum		872.5	872.5	872.5	872.5	885.6	1755.2	1755.2	1755.2	1755.2	1756.5	1756.5	1756.5
	PM2.5 Dust Sum		179.5	179.5	179.5	179.5	181.8	359.4	359.4	359.4	359.4	359.4	359.4	359.4
	PM2.5 Exhaust Sum		11.9	11.9	11.9	11.9	13.9	32.3	32.3	32.3	32.3	33.5	33.5	33.5
	PM2.5 Total Sum		191.4	191.4	191.4	191.4	195.7	391.7	391.7	391.7	391.7	392.8	392.8	392.8
	ROG Sum		32.5	32.5	32.5	32.5	37.0	91.2	99.0	99.0	99.0	101.7	101.7	101.7
	SO2 Sum		0.0	0.0	0.0	0.0	0.0	0.2	0.2	0.2	0.2	0.2	0.2	0.2

		Year	2010											
Neighborhood	Pollutant	Month	1	2	3	4	5	6	7	8	9	10	11	12
I	CO		327.7	327.7	327.7	327.7	327.7	327.7	327.7	193.5	193.5	193.5	193.5	193.5
	CO2		51928.9	51928.9	51928.9	51928.9	51928.9	51928.9	51928.9	26018.6	26018.6	26018.6	26018.6	26018.6
	NOx		355.1	355.1	355.1	355.1	355.1	355.1	355.1	81.6	81.6	81.6	81.6	81.6
	PM10 Dust		860.5	860.5	860.5	860.5	860.5	860.5	860.5	1.0	1.0	1.0	1.0	1.0
	PM10 Exhaust		17.0	17.0	17.0	17.0	17.0	17.0	17.0	4.8	4.8	4.8	4.8	4.8
	PM10 Total		877.5	877.5	877.5	877.5	877.5	877.5	877.5	5.7	5.7	5.7	5.7	5.7
	PM2.5 Dust		179.9	179.9	179.9	179.9	179.9	179.9	179.9	0.3	0.3	0.3	0.3	0.3
	PM2.5 Exhaust		15.6	15.6	15.6	15.6	15.6	15.6	15.6	4.4	4.4	4.4	4.4	4.4
	PM2.5 Total		195.5	195.5	195.5	195.5	195.5	195.5	195.5	4.7	4.7	4.7	4.7	4.7
	ROG		53.2	53.2	53.2	53.2	53.2	53.2	53.2	22.2	22.2	22.2	22.2	22.2
	SO2		0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
II	CO		190.1	190.1	190.1	1022.6	1036.1	1036.1	1036.1	1036.1	1036.1	1036.1	1036.1	1036.1
	CO2		36173.2	36173.2	36173.2	141641.0	143546.9	143546.9	143546.9	143546.9	143546.9	143546.9	143546.9	143546.9
	NOx		382.3	382.3	382.3	542.5	563.2	563.2	563.2	563.2	563.2	563.2	563.2	563.2
	PM10 Dust		859.6	859.6	859.6	864.2	864.2	864.2	864.2	864.2	864.2	864.2	864.2	864.2
	PM10 Exhaust		17.3	17.3	17.3	26.6	28.4	28.4	28.4	28.4	28.4	28.4	28.4	28.4
	PM10 Total		876.9	876.9	876.9	890.8	892.5	892.5	892.5	892.5	892.5	892.5	892.5	892.5
	PM2.5 Dust		179.5	179.5	179.5	181.2	181.2	181.2	181.2	181.2	181.2	181.2	181.2	181.2
	PM2.5 Exhaust		15.9	15.9	15.9	24.3	25.9	25.9	25.9	25.9	25.9	25.9	25.9	25.9
	PM2.5 Total		195.5	195.5	195.5	205.5	207.1	207.1	207.1	207.1	207.1	207.1	207.1	207.1
	ROG		43.7	43.7	43.7	83.2	102.5	102.5	102.5	102.5	102.5	102.5	102.5	102.5
	SO2		0.0	0.0	0.0	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1
IIIA	CO													
	CO2													
	NOx													
	PM10 Dust													
	PM10 Exhaust													
	PM10 Total													
	PM2.5 Dust													
	PM2.5 Exhaust													
	PM2.5 Total													
	ROG													
	SO2													

		Year	2010											
Neighborhood	**Pollutant**	**Month**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
IIIB	CO													
	CO2													
	NOx													
	PM10 Dust													
	PM10 Exhaust													
	PM10 Total													
	PM2.5 Dust													
	PM2.5 Exhaust													
	PM2.5 Total													
	ROG													
	SO2													
IV	CO													
	CO2													
	NOx													
	PM10 Dust													
	PM10 Exhaust													
	PM10 Total													
	PM2.5 Dust													
	PM2.5 Exhaust													
	PM2.5 Total													
	ROG													
	SO2													
Overlapping	CO Sum		517.8	517.8	517.8	1350.2	1363.8	1363.8	1363.8	1229.7	1229.7	1229.7	1229.7	1229.7
	CO2 Sum		88102.2	88102.2	88102.2	193570.0	195475.8	195475.8	195475.8	169565.4	169565.4	169565.4	169565.4	169565.4
	NOx Sum		737.4	737.4	737.4	897.6	918.3	918.3	918.3	644.7	644.7	644.7	644.7	644.7
	PM10 Dust Sum		1720.0	1720.0	1720.0	1724.6	1724.7	1724.7	1724.7	865.1	865.1	865.1	865.1	865.1
	PM10 Exhaust Sum		34.4	34.4	34.4	43.7	45.4	45.4	45.4	33.2	33.2	33.2	33.2	33.2
	PM10 Total Sum		1754.4	1754.4	1754.4	1768.3	1770.1	1770.1	1770.1	898.3	898.3	898.3	898.3	898.3
	PM2.5 Dust Sum		359.4	359.4	359.4	361.0	361.0	361.0	361.0	181.5	181.5	181.5	181.5	181.5
	PM2.5 Exhaust Sum		31.6	31.6	31.6	39.9	41.5	41.5	41.5	30.3	30.3	30.3	30.3	30.3
	PM2.5 Total Sum		390.9	390.9	390.9	400.9	402.5	402.5	402.5	211.8	211.8	211.8	211.8	211.8
	ROG Sum		96.9	96.9	96.9	136.4	155.7	155.7	155.7	124.7	124.7	124.7	124.7	124.7
	SO2 Sum		0.2	0.2	0.2	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3

		Year	2011											
Neighborhood	Pollutant	Month	1	2	3	4	5	6	7	8	9	10	11	12
I	CO		180.1	180.1	180.1	180.1	180.1	180.1	180.1	180.1	180.1	180.1	180.1	180.1
	CO2		26005.8	26005.8	26005.8	26005.8	26005.8	26005.8	26005.8	26005.8	26005.8	26005.8	26005.8	26005.8
	NOx		75.3	75.3	75.3	75.3	75.3	75.3	75.3	75.3	75.3	75.3	75.3	75.3
	PM10 Dust		1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
	PM10 Exhaust		4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
	PM10 Total		5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5
	PM2.5 Dust		0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
	PM2.5 Exhaust		4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1
	PM2.5 Total		4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4
	ROG		21.0	21.0	21.0	21.0	21.0	21.0	21.0	21.0	21.0	21.0	21.0	21.0
	SO2		0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
II	CO		969.1	969.1	969.1	969.1	969.1	969.1	969.1	969.1	969.1	969.1	969.1	969.1
	CO2		143527.4	143527.4	143527.4	143527.4	143527.4	143527.4	143527.4	143527.4	143527.4	143527.4	143527.4	143527.4
	NOx		526.2	526.2	526.2	526.2	526.2	526.2	526.2	526.2	526.2	526.2	526.2	526.2
	PM10 Dust		864.2	864.2	864.2	864.2	864.2	864.2	864.2	864.2	864.2	864.2	864.2	864.2
	PM10 Exhaust		26.3	26.3	26.3	26.3	26.3	26.3	26.3	26.3	26.3	26.3	26.3	26.3
	PM10 Total		890.5	890.5	890.5	890.5	890.5	890.5	890.5	890.5	890.5	890.5	890.5	890.5
	PM2.5 Dust		181.2	181.2	181.2	181.2	181.2	181.2	181.2	181.2	181.2	181.2	181.2	181.2
	PM2.5 Exhaust		24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0
	PM2.5 Total		205.2	205.2	205.2	205.2	205.2	205.2	205.2	205.2	205.2	205.2	205.2	205.2
	ROG		96.4	96.4	96.4	96.4	96.4	96.4	96.4	96.4	96.4	96.4	96.4	96.4
	SO2		1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1
IIIA	CO							159.4	159.4	159.4	159.4	159.4	159.4	159.4
	CO2							31854.3	31854.3	31854.3	31854.3	31854.3	31854.3	31854.3
	NOx							308.2	308.2	308.2	308.2	308.2	308.2	308.2
	PM10 Dust							859.6	859.6	859.6	859.6	859.6	859.6	859.6
	PM10 Exhaust							14.4	14.4	14.4	14.4	14.4	14.4	14.4
	PM10 Total							873.9	873.9	873.9	873.9	873.9	873.9	873.9
	PM2.5 Dust							179.5	179.5	179.5	179.5	179.5	179.5	179.5
	PM2.5 Exhaust							13.2	13.2	13.2	13.2	13.2	13.2	13.2
	PM2.5 Total							192.7	192.7	192.7	192.7	192.7	192.7	192.7
	ROG							35.8	35.8	35.8	35.8	35.8	35.8	35.8
	SO2							0.0	0.0	0.0	0.0	0.0	0.0	0.0

		Year	2011											
Neighborhood	Pollutant	Month	1	2	3	4	5	6	7	8	9	10	11	12
IIIB	CO													
	CO2													
	NOx													
	PM10 Dust													
	PM10 Exhaust													
	PM10 Total													
	PM2.5 Dust													
	PM2.5 Exhaust													
	PM2.5 Total													
	ROG													
	SO2													
IV	CO													
	CO2													
	NOx													
	PM10 Dust													
	PM10 Exhaust													
	PM10 Total													
	PM2.5 Dust													
	PM2.5 Exhaust													
	PM2.5 Total													
	ROG													
	SO2													
Overlapping	CO Sum		1149.2	1149.2	1149.2	1149.2	1149.2	1308.6	1308.6	1308.6	1308.6	1308.6	1308.6	1308.6
	CO2 Sum		169533.2	169533.2	169533.2	169533.2	169533.2	201387.5	201387.5	201387.5	201387.5	201387.5	201387.5	201387.5
	NOx Sum		601.5	601.5	601.5	601.5	601.5	909.7	909.7	909.7	909.7	909.7	909.7	909.7
	PM10 Dust Sum		865.1	865.1	865.1	865.1	865.1	1724.7	1724.7	1724.7	1724.7	1724.7	1724.7	1724.7
	PM10 Exhaust Sum		30.8	30.8	30.8	30.8	30.8	45.2	45.2	45.2	45.2	45.2	45.2	45.2
	PM10 Total Sum		895.9	895.9	895.9	895.9	895.9	1769.9	1769.9	1769.9	1769.9	1769.9	1769.9	1769.9
	PM2.5 Dust Sum		181.5	181.5	181.5	181.5	181.5	361.0	361.0	361.0	361.0	361.0	361.0	361.0
	PM2.5 Exhaust Sum		28.1	28.1	28.1	28.1	28.1	41.3	41.3	41.3	41.3	41.3	41.3	41.3
	PM2.5 Total Sum		209.6	209.6	209.6	209.6	209.6	402.4	402.4	402.4	402.4	402.4	402.4	402.4
	ROG Sum		117.5	117.5	117.5	117.5	117.5	153.3	153.3	153.3	153.3	153.3	153.3	153.3
	SO2 Sum		1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3

		Year	2012											
Neighborhood	Pollutant	Month	1	2	3	4	5	6	7	8	9	10	11	12
I	CO		167.6	167.6	167.6	286.4	286.4	286.4	286.4	286.4	286.4	286.4	167.6	167.6
	CO2		25987.8	25987.8	25987.8	51896.9	51896.9	51896.9	51896.9	51896.9	51896.9	51896.9	25987.8	25987.8
	NOx		69.3	69.3	69.3	310.2	310.2	310.2	310.2	310.2	310.2	310.2	69.3	69.3
	PM10 Dust		1.0	1.0	1.0	280.2	280.2	280.2	280.2	280.2	280.2	280.2	1.0	1.0
	PM10 Exhaust		4.2	4.2	4.2	14.5	14.5	14.5	14.5	14.5	14.5	14.5	4.2	4.2
	PM10 Total		5.1	5.1	5.1	294.7	294.7	294.7	294.7	294.7	294.7	294.7	5.1	5.1
	PM2.5 Dust		0.3	0.3	0.3	58.7	58.7	58.7	58.7	58.7	58.7	58.7	0.3	0.3
	PM2.5 Exhaust		3.8	3.8	3.8	13.3	13.3	13.3	13.3	13.3	13.3	13.3	3.8	3.8
	PM2.5 Total		4.1	4.1	4.1	72.0	72.0	72.0	72.0	72.0	72.0	72.0	4.1	4.1
	ROG		20.0	20.0	20.0	47.7	47.7	47.7	47.7	47.7	47.7	47.7	20.0	20.0
	SO2		0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
II	CO		906.5	906.5	906.5	906.5	906.5	906.5	906.5	906.5	906.5	906.5	906.5	906.5
	CO2		143512.0	143512.0	143512.0	143512.0	143512.0	143512.0	143512.0	143512.0	143512.0	143512.0	143512.0	143512.0
	NOx		490.3	490.3	490.3	490.3	490.3	490.3	490.3	490.3	490.3	490.3	490.3	490.3
	PM10 Dust		864.2	864.2	864.2	864.2	864.2	864.2	864.2	864.2	864.2	864.2	864.2	864.2
	PM10 Exhaust		24.5	24.5	24.5	24.5	24.5	24.5	24.5	24.5	24.5	24.5	24.5	24.5
	PM10 Total		888.7	888.7	888.7	888.7	888.7	888.7	888.7	888.7	888.7	888.7	888.7	888.7
	PM2.5 Dust		181.2	181.2	181.2	181.2	181.2	181.2	181.2	181.2	181.2	181.2	181.2	181.2
	PM2.5 Exhaust		22.3	22.3	22.3	22.3	22.3	22.3	22.3	22.3	22.3	22.3	22.3	22.3
	PM2.5 Total		203.5	203.5	203.5	203.5	203.5	203.5	203.5	203.5	203.5	203.5	203.5	203.5
	ROG		91.3	91.3	91.3	91.3	91.3	91.3	91.3	91.3	91.3	91.3	91.3	91.3
	SO2		1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1
IIIA	CO		152.5	152.5	598.9	608.3	608.3	608.3	608.3	608.3	608.3	608.3	608.3	608.3
	CO2		31853.1	31853.1	97636.0	99048.6	99048.6	99048.6	99048.6	99048.6	99048.6	99048.6	99048.6	99048.6
	NOx		288.6	288.6	392.5	405.9	405.9	405.9	405.9	405.9	405.9	405.9	405.9	405.9
	PM10 Dust		859.6	859.6	862.4	862.4	862.4	862.4	862.4	862.4	862.4	862.4	862.4	862.4
	PM10 Exhaust		13.3	13.3	19.1	20.2	20.2	20.2	20.2	20.2	20.2	20.2	20.2	20.2
	PM10 Total		872.8	872.8	881.5	882.6	882.6	882.6	882.6	882.6	882.6	882.6	882.6	882.6
	PM2.5 Dust		179.5	179.5	180.5	180.5	180.5	180.5	180.5	180.5	180.5	180.5	180.5	180.5
	PM2.5 Exhaust		12.2	12.2	17.4	18.5	18.5	18.5	18.5	18.5	18.5	18.5	18.5	18.5
	PM2.5 Total		191.7	191.7	198.0	199.0	199.0	199.0	199.0	199.0	199.0	199.0	199.0	199.0
	ROG		34.1	34.1	56.1	83.4	83.4	83.4	83.4	83.4	83.4	83.4	83.4	83.4
	SO2		0.0	0.0	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7

		Year	2012											
Neighborhood	Pollutant	Month	1	2	3	4	5	6	7	8	9	10	11	12
IIIB	CO													
	CO2													
	NOx													
	PM10 Dust													
	PM10 Exhaust													
	PM10 Total													
	PM2.5 Dust													
	PM2.5 Exhaust													
	PM2.5 Total													
	ROG													
	SO2													
IV	CO													
	CO2													
	NOx													
	PM10 Dust													
	PM10 Exhaust													
	PM10 Total													
	PM2.5 Dust													
	PM2.5 Exhaust													
	PM2.5 Total													
	ROG													
	SO2													
Overlapping	CO Sum		1226.5	1226.5	1672.9	1801.2	1801.2	1801.2	1801.2	1801.2	1801.2	1801.2	1682.4	1682.4
	CO2 Sum		201352.9	201352.9	267135.8	294457.4	294457.4	294457.4	294457.4	294457.4	294457.4	294457.4	268548.4	268548.4
	NOx Sum		848.1	848.1	952.1	1206.4	1206.4	1206.4	1206.4	1206.4	1206.4	1206.4	965.5	965.5
	PM10 Dust Sum		1724.7	1724.7	1727.5	2006.8	2006.8	2006.8	2006.8	2006.8	2006.8	2006.8	1727.5	1727.5
	PM10 Exhaust Sum		42.0	42.0	47.8	59.3	59.3	59.3	59.3	59.3	59.3	59.3	48.9	48.9
	PM10 Total Sum		1766.7	1766.7	1775.3	2066.0	2066.0	2066.0	2066.0	2066.0	2066.0	2066.0	1776.4	1776.4
	PM2.5 Dust Sum		361.0	361.0	362.0	420.4	420.4	420.4	420.4	420.4	420.4	420.4	362.0	362.0
	PM2.5 Exhaust Sum		38.4	38.4	43.6	54.1	54.1	54.1	54.1	54.1	54.1	54.1	44.6	44.6
	PM2.5 Total Sum		399.4	399.4	405.6	474.5	474.5	474.5	474.5	474.5	474.5	474.5	406.7	406.7
	ROG Sum		145.4	145.4	167.4	222.4	222.4	222.4	222.4	222.4	222.4	222.4	194.7	194.7
	SO2 Sum		1.3	1.3	1.9	2.0	2.0	2.0	2.0	2.0	2.0	2.0	1.9	1.9

		Year	2013											
Neighborhood	Pollutant	Month	1	2	3	4	5	6	7	8	9	10	11	12
I	CO		155.8	155.8	155.8	155.8	155.8	155.8	155.8	155.8	155.8	155.8	155.8	155.8
	CO2		25972.2	25972.2	25972.2	25972.2	25972.2	25972.2	25972.2	25972.2	25972.2	25972.2	25972.2	25972.2
	NOx		63.6	63.6	63.6	63.6	63.6	63.6	63.6	63.6	63.6	63.6	63.6	63.6
	PM10 Dust		1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
	PM10 Exhaust		3.8	3.8	3.8	3.8	3.8	3.8	3.8	3.8	3.8	3.8	3.8	3.8
	PM10 Total		4.8	4.8	4.8	4.8	4.8	4.8	4.8	4.8	4.8	4.8	4.8	4.8
	PM2.5 Dust		0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
	PM2.5 Exhaust		3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
	PM2.5 Total		3.8	3.8	3.8	3.8	3.8	3.8	3.8	3.8	3.8	3.8	3.8	3.8
	ROG		19.0	19.0	19.0	19.0	19.0	19.0	19.0	19.0	19.0	19.0	19.0	19.0
	SO2		0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
II	CO		847.5	847.5	847.5	847.5	847.5	847.5	847.5	847.5	847.5	847.5	847.5	847.5
	CO2		143501.6	143501.6	143501.6	143501.6	143501.6	143501.6	143501.6	143501.6	143501.6	143501.6	143501.6	143501.6
	NOx		456.4	456.4	456.4	456.4	456.4	456.4	456.4	456.4	456.4	456.4	456.4	456.4
	PM10 Dust		864.2	864.2	864.2	864.2	864.2	864.2	864.2	864.2	864.2	864.2	864.2	864.2
	PM10 Exhaust		22.7	22.7	22.7	22.7	22.7	22.7	22.7	22.7	22.7	22.7	22.7	22.7
	PM10 Total		886.9	886.9	886.9	886.9	886.9	886.9	886.9	886.9	886.9	886.9	886.9	886.9
	PM2.5 Dust		181.2	181.2	181.2	181.2	181.2	181.2	181.2	181.2	181.2	181.2	181.2	181.2
	PM2.5 Exhaust		20.7	20.7	20.7	20.7	20.7	20.7	20.7	20.7	20.7	20.7	20.7	20.7
	PM2.5 Total		201.8	201.8	201.8	201.8	201.8	201.8	201.8	201.8	201.8	201.8	201.8	201.8
	ROG		86.7	86.7	86.7	86.7	86.7	86.7	86.7	86.7	86.7	86.7	86.7	86.7
	SO2		1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1
IIIA	CO		567.9	567.9	567.9	567.9	567.9	567.9	567.9	567.9	567.9	567.9	567.9	567.9
	CO2		99000.8	99000.8	99000.8	99000.8	99000.8	99000.8	99000.8	99000.8	99000.8	99000.8	99000.8	99000.8
	NOx		376.8	376.8	376.8	376.8	376.8	376.8	376.8	376.8	376.8	376.8	376.8	376.8
	PM10 Dust		862.4	862.4	862.4	862.4	862.4	862.4	862.4	862.4	862.4	862.4	862.4	862.4
	PM10 Exhaust		18.8	18.8	18.8	18.8	18.8	18.8	18.8	18.8	18.8	18.8	18.8	18.8
	PM10 Total		881.2	881.2	881.2	881.2	881.2	881.2	881.2	881.2	881.2	881.2	881.2	881.2
	PM2.5 Dust		180.5	180.5	180.5	180.5	180.5	180.5	180.5	180.5	180.5	180.5	180.5	180.5
	PM2.5 Exhaust		17.2	17.2	17.2	17.2	17.2	17.2	17.2	17.2	17.2	17.2	17.2	17.2
	PM2.5 Total		197.7	197.7	197.7	197.7	197.7	197.7	197.7	197.7	197.7	197.7	197.7	197.7
	ROG		79.6	79.6	79.6	79.6	79.6	79.6	79.6	79.6	79.6	79.6	79.6	79.6
	SO2		0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7

		Year	2013											
Neighborhood	**Pollutant**	**Month**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
IIIB	CO													
	CO2													
	NOx													
	PM10 Dust													
	PM10 Exhaust													
	PM10 Total													
	PM2.5 Dust													
	PM2.5 Exhaust													
	PM2.5 Total													
	ROG													
	SO2													
IV	CO													
	CO2													
	NOx													
	PM10 Dust													
	PM10 Exhaust													
	PM10 Total													
	PM2.5 Dust													
	PM2.5 Exhaust													
	PM2.5 Total													
	ROG													
	SO2													
Overlapping	CO Sum		1571.2	1571.2	1571.2	1571.2	1571.2	1571.2	1571.2	1571.2	1571.2	1571.2	1571.2	1571.2
	CO2 Sum		268474.6	268474.6	268474.6	268474.6	268474.6	268474.6	268474.6	268474.6	268474.6	268474.6	268474.6	268474.6
	NOx Sum		896.8	896.8	896.8	896.8	896.8	896.8	896.8	896.8	896.8	896.8	896.8	896.8
	PM10 Dust Sum		1727.5	1727.5	1727.5	1727.5	1727.5	1727.5	1727.5	1727.5	1727.5	1727.5	1727.5	1727.5
	PM10 Exhaust Sum		45.4	45.4	45.4	45.4	45.4	45.4	45.4	45.4	45.4	45.4	45.4	45.4
	PM10 Total Sum		1772.9	1772.9	1772.9	1772.9	1772.9	1772.9	1772.9	1772.9	1772.9	1772.9	1772.9	1772.9
	PM2.5 Dust Sum		362.0	362.0	362.0	362.0	362.0	362.0	362.0	362.0	362.0	362.0	362.0	362.0
	PM2.5 Exhaust Sum		41.3	41.3	41.3	41.3	41.3	41.3	41.3	41.3	41.3	41.3	41.3	41.3
	PM2.5 Total Sum		403.4	403.4	403.4	403.4	403.4	403.4	403.4	403.4	403.4	403.4	403.4	403.4
	ROG Sum		185.4	185.4	185.4	185.4	185.4	185.4	185.4	185.4	185.4	185.4	185.4	185.4
	SO2 Sum		1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9

		Year	2014											
Neighborhood	Pollutant	Month	1	2	3	4	5	6	7	8	9	10	11	12
I	CO		145.1	145.1	145.1	145.1	145.1	145.1	145.1	145.1	145.1	145.1	145.1	145.1
	CO2		25958.4	25958.4	25958.4	25958.4	25958.4	25958.4	25958.4	25958.4	25958.4	25958.4	25958.4	25958.4
	NOx		57.9	57.9	57.9	57.9	57.9	57.9	57.9	57.9	57.9	57.9	57.9	57.9
	PM10 Dust		1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
	PM10 Exhaust		3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
	PM10 Total		4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4
	PM2.5 Dust		0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
	PM2.5 Exhaust		3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2
	PM2.5 Total		3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
	ROG		18.1	18.1	18.1	18.1	18.1	18.1	18.1	18.1	18.1	18.1	18.1	18.1
	SO2		0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
II	CO		795.2	795.2	795.2	795.2	795.2	795.2	795.2	795.2	795.2	795.2	795.2	795.2
	CO2		143493.0	143493.0	143493.0	143493.0	143493.0	143493.0	143493.0	143493.0	143493.0	143493.0	143493.0	143493.0
	NOx		421.6	421.6	421.6	421.6	421.6	421.6	421.6	421.6	421.6	421.6	421.6	421.6
	PM10 Dust		864.2	864.2	864.2	864.2	864.2	864.2	864.2	864.2	864.2	864.2	864.2	864.2
	PM10 Exhaust		21.1	21.1	21.1	21.1	21.1	21.1	21.1	21.1	21.1	21.1	21.1	21.1
	PM10 Total		885.3	885.3	885.3	885.3	885.3	885.3	885.3	885.3	885.3	885.3	885.3	885.3
	PM2.5 Dust		181.2	181.2	181.2	181.2	181.2	181.2	181.2	181.2	181.2	181.2	181.2	181.2
	PM2.5 Exhaust		19.2	19.2	19.2	19.2	19.2	19.2	19.2	19.2	19.2	19.2	19.2	19.2
	PM2.5 Total		200.4	200.4	200.4	200.4	200.4	200.4	200.4	200.4	200.4	200.4	200.4	200.4
	ROG		82.0	82.0	82.0	82.0	82.0	82.0	82.0	82.0	82.0	82.0	82.0	82.0
	SO2		1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1
IIIA	CO		531.4	531.4	531.4	531.4	531.4	531.4	531.4	531.4	531.4	531.4	531.4	531.4
	CO2		98958.8	98958.8	98958.8	98958.8	98958.8	98958.8	98958.8	98958.8	98958.8	98958.8	98958.8	98958.8
	NOx		347.2	347.2	347.2	347.2	347.2	347.2	347.2	347.2	347.2	347.2	347.2	347.2
	PM10 Dust		862.4	862.4	862.4	862.4	862.4	862.4	862.4	862.4	862.4	862.4	862.4	862.4
	PM10 Exhaust		17.1	17.1	17.1	17.1	17.1	17.1	17.1	17.1	17.1	17.1	17.1	17.1
	PM10 Total		879.5	879.5	879.5	879.5	879.5	879.5	879.5	879.5	879.5	879.5	879.5	879.5
	PM2.5 Dust		180.5	180.5	180.5	180.5	180.5	180.5	180.5	180.5	180.5	180.5	180.5	180.5
	PM2.5 Exhaust		15.6	15.6	15.6	15.6	15.6	15.6	15.6	15.6	15.6	15.6	15.6	15.6
	PM2.5 Total		196.2	196.2	196.2	196.2	196.2	196.2	196.2	196.2	196.2	196.2	196.2	196.2
	ROG		76.0	76.0	76.0	76.0	76.0	76.0	76.0	76.0	76.0	76.0	76.0	76.0
	SO2		0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7

		Year	2014											
Neighborhood	**Pollutant**	**Month**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
IIIB	CO													
	CO2													
	NOx													
	PM10 Dust													
	PM10 Exhaust													
	PM10 Total													
	PM2.5 Dust													
	PM2.5 Exhaust													
	PM2.5 Total													
	ROG													
	SO2													
IV	CO													
	CO2													
	NOx													
	PM10 Dust													
	PM10 Exhaust													
	PM10 Total													
	PM2.5 Dust													
	PM2.5 Exhaust													
	PM2.5 Total													
	ROG													
	SO2													
Overlapping	CO Sum		1471.7	1471.7	1471.7	1471.7	1471.7	1471.7	1471.7	1471.7	1471.7	1471.7	1471.7	1471.7
	CO2 Sum		268410.2	268410.2	268410.2	268410.2	268410.2	268410.2	268410.2	268410.2	268410.2	268410.2	268410.2	268410.2
	NOx Sum		826.6	826.6	826.6	826.6	826.6	826.6	826.6	826.6	826.6	826.6	826.6	826.6
	PM10 Dust Sum		1727.5	1727.5	1727.5	1727.5	1727.5	1727.5	1727.5	1727.5	1727.5	1727.5	1727.5	1727.5
	PM10 Exhaust Sum		41.7	41.7	41.7	41.7	41.7	41.7	41.7	41.7	41.7	41.7	41.7	41.7
	PM10 Total Sum		1769.3	1769.3	1769.3	1769.3	1769.3	1769.3	1769.3	1769.3	1769.3	1769.3	1769.3	1769.3
	PM2.5 Dust Sum		362.0	362.0	362.0	362.0	362.0	362.0	362.0	362.0	362.0	362.0	362.0	362.0
	PM2.5 Exhaust Sum		38.0	38.0	38.0	38.0	38.0	38.0	38.0	38.0	38.0	38.0	38.0	38.0
	PM2.5 Total Sum		400.0	400.0	400.0	400.0	400.0	400.0	400.0	400.0	400.0	400.0	400.0	400.0
	ROG Sum		176.1	176.1	176.1	176.1	176.1	176.1	176.1	176.1	176.1	176.1	176.1	176.1
	SO2 Sum		1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9

		Year	2015											
Neighborhood	Pollutant	Month	1	2	3	4	5	6	7	8	9	10	11	12
I	CO		135.2	135.2	135.2	135.2	135.2	135.2	135.2	135.2				
	CO2		25937.3	25937.3	25937.3	25937.3	25937.3	25937.3	25937.3	25937.3				
	NOx		52.4	52.4	52.4	52.4	52.4	52.4	52.4	52.4				
	PM10 Dust		1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0				
	PM10 Exhaust		3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2				
	PM10 Total		4.2	4.2	4.2	4.2	4.2	4.2	4.2	4.2				
	PM2.5 Dust		0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3				
	PM2.5 Exhaust		2.9	2.9	2.9	2.9	2.9	2.9	2.9	2.9				
	PM2.5 Total		3.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3				
	ROG		17.3	17.3	17.3	17.3	17.3	17.3	17.3	17.3				
	SO2		0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2				
II	CO		745.9	745.9	745.9	745.9	745.9	745.9	745.9	745.9	599.1	599.1	599.1	599.1
	CO2		143485.8	143485.8	143485.8	143485.8	143485.8	143485.8	143485.8	143485.8	107313.3	107313.3	107313.3	107313.3
	NOx		386.5	386.5	386.5	386.5	386.5	386.5	386.5	386.5	117.1	117.1	117.1	117.1
	PM10 Dust		864.2	864.2	864.2	864.2	864.2	864.2	864.2	864.2	4.6	4.6	4.6	4.6
	PM10 Exhaust		19.5	19.5	19.5	19.5	19.5	19.5	19.5	19.5	8.0	8.0	8.0	8.0
	PM10 Total		883.7	883.7	883.7	883.7	883.7	883.7	883.7	883.7	12.6	12.6	12.6	12.6
	PM2.5 Dust		181.2	181.2	181.2	181.2	181.2	181.2	181.2	181.2	1.7	1.7	1.7	1.7
	PM2.5 Exhaust		17.8	17.8	17.8	17.8	17.8	17.8	17.8	17.8	7.2	7.2	7.2	7.2
	PM2.5 Total		198.9	198.9	198.9	198.9	198.9	198.9	198.9	198.9	8.8	8.8	8.8	8.8
	ROG		77.3	77.3	77.3	77.3	77.3	77.3	77.3	77.3	43.6	43.6	43.6	43.6
	SO2		1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.0	1.0	1.0	1.0
IIIA	CO		497.7	497.7	497.7	497.7	497.7	497.7	497.7	497.7	497.7	497.7	497.7	497.7
	CO2		98894.2	98894.2	98894.2	98894.2	98894.2	98894.2	98894.2	98894.2	98894.2	98894.2	98894.2	98894.2
	NOx		316.4	316.4	316.4	316.4	316.4	316.4	316.4	316.4	316.4	316.4	316.4	316.4
	PM10 Dust		862.4	862.4	862.4	862.4	862.4	862.4	862.4	862.4	862.4	862.4	862.4	862.4
	PM10 Exhaust		15.8	15.8	15.8	15.8	15.8	15.8	15.8	15.8	15.8	15.8	15.8	15.8
	PM10 Total		878.2	878.2	878.2	878.2	878.2	878.2	878.2	878.2	878.2	878.2	878.2	878.2
	PM2.5 Dust		180.5	180.5	180.5	180.5	180.5	180.5	180.5	180.5	180.5	180.5	180.5	180.5
	PM2.5 Exhaust		14.4	14.4	14.4	14.4	14.4	14.4	14.4	14.4	14.4	14.4	14.4	14.4
	PM2.5 Total		195.0	195.0	195.0	195.0	195.0	195.0	195.0	195.0	195.0	195.0	195.0	195.0
	ROG		72.2	72.2	72.2	72.2	72.2	72.2	72.2	72.2	72.2	72.2	72.2	72.2
	SO2		0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7

		Year	2015											
Neighborhood	Pollutant	Month	1	2	3	4	5	6	7	8	9	10	11	12
IIIB	CO													
	CO2													
	NOx													
	PM10 Dust													
	PM10 Exhaust													
	PM10 Total													
	PM2.5 Dust													
	PM2.5 Exhaust													
	PM2.5 Total													
	ROG													
	SO2													
IV	CO													
	CO2													
	NOx													
	PM10 Dust													
	PM10 Exhaust													
	PM10 Total													
	PM2.5 Dust													
	PM2.5 Exhaust													
	PM2.5 Total													
	ROG													
	SO2													
Overlapping	CO Sum		1378.7	1378.7	1378.7	1378.7	1378.7	1378.7	1378.7	1378.7	1096.8	2193.6	2193.6	2193.6
	CO2 Sum		268317.3	268317.3	268317.3	268317.3	268317.3	268317.3	268317.3	268317.3	206207.5	412415.0	412415.0	412415.0
	NOx Sum		755.3	755.3	755.3	755.3	755.3	755.3	755.3	755.3	433.5	867.0	867.0	867.0
	PM10 Dust Sum		1727.5	1727.5	1727.5	1727.5	1727.5	1727.5	1727.5	1727.5	867.0	1734.0	1734.0	1734.0
	PM10 Exhaust Sum		38.6	38.6	38.6	38.6	38.6	38.6	38.6	38.6	23.9	47.7	47.7	47.7
	PM10 Total Sum		1766.1	1766.1	1766.1	1766.1	1766.1	1766.1	1766.1	1766.1	890.9	1781.7	1781.7	1781.7
	PM2.5 Dust Sum		362.0	362.0	362.0	362.0	362.0	362.0	362.0	362.0	182.2	364.4	364.4	364.4
	PM2.5 Exhaust Sum		35.1	35.1	35.1	35.1	35.1	35.1	35.1	35.1	21.6	43.2	43.2	43.2
	PM2.5 Total Sum		397.2	397.2	397.2	397.2	397.2	397.2	397.2	397.2	203.8	407.6	407.6	407.6
	ROG Sum		166.8	166.8	166.8	166.8	166.8	166.8	166.8	166.8	115.8	231.7	231.7	231.7
	SO2 Sum		1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.7	3.4	3.4	3.4

		Year	2016											
Neighborhood	Pollutant	Month	1	2	3	4	5	6	7	8	9	10	11	12
I	CO													
	CO2													
	NOx													
	PM10 Dust													
	PM10 Exhaust													
	PM10 Total													
	PM2.5 Dust													
	PM2.5 Exhaust													
	PM2.5 Total													
	ROG													
	SO2													
II	CO		561.7	561.7	561.7	561.7	561.7	561.7	561.7	561.7	561.7	561.7	561.7	561.7
	CO2		107303.0	107303.0	107303.0	107303.0	107303.0	107303.0	107303.0	107303.0	107303.0	107303.0	107303.0	107303.0
	NOx		107.1	107.1	107.1	107.1	107.1	107.1	107.1	107.1	107.1	107.1	107.1	107.1
	PM10 Dust		4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6
	PM10 Exhaust		7.4	7.4	7.4	7.4	7.4	7.4	7.4	7.4	7.4	7.4	7.4	7.4
	PM10 Total		12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0
	PM2.5 Dust		1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7
	PM2.5 Exhaust		6.6	6.6	6.6	6.6	6.6	6.6	6.6	6.6	6.6	6.6	6.6	6.6
	PM2.5 Total		8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3
	ROG		41.4	41.4	41.4	41.4	41.4	41.4	41.4	41.4	41.4	41.4	41.4	41.4
	SO2		1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
IIIA	CO		467.7	467.7	467.7	467.7	467.7	467.7	467.7	467.7	467.7	467.7	467.7	467.7
	CO2		98835.9	98835.9	98835.9	98835.9	98835.9	98835.9	98835.9	98835.9	98835.9	98835.9	98835.9	98835.9
	NOx		288.7	288.7	288.7	288.7	288.7	288.7	288.7	288.7	288.7	288.7	288.7	288.7
	PM10 Dust		862.4	862.4	862.4	862.4	862.4	862.4	862.4	862.4	862.4	862.4	862.4	862.4
	PM10 Exhaust		14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5
	PM10 Total		876.9	876.9	876.9	876.9	876.9	876.9	876.9	876.9	876.9	876.9	876.9	876.9
	PM2.5 Dust		180.5	180.5	180.5	180.5	180.5	180.5	180.5	180.5	180.5	180.5	180.5	180.5
	PM2.5 Exhaust		13.2	13.2	13.2	13.2	13.2	13.2	13.2	13.2	13.2	13.2	13.2	13.2
	PM2.5 Total		193.7	193.7	193.7	193.7	193.7	193.7	193.7	193.7	193.7	193.7	193.7	193.7
	ROG		69.0	69.0	69.0	69.0	69.0	69.0	69.0	69.0	69.0	69.0	69.0	69.0
	SO2		0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7

		Year	2016											
Neighborhood	**Pollutant**	**Month**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
IIIB	CO													
	CO2													
	NOx													
	PM10 Dust													
	PM10 Exhaust													
	PM10 Total													
	PM2.5 Dust													
	PM2.5 Exhaust													
	PM2.5 Total													
	ROG													
	SO2													
IV	CO													
	CO2													
	NOx													
	PM10 Dust													
	PM10 Exhaust													
	PM10 Total													
	PM2.5 Dust													
	PM2.5 Exhaust													
	PM2.5 Total													
	ROG													
	SO2													
Overlapping	CO Sum		1029.4	1029.4	1029.4	1029.4	1029.4	1029.4	1029.4	1029.4	1029.4	1029.4	1029.4	1029.4
	CO2 Sum		206138.8	206138.8	206138.8	206138.8	206138.8	206138.8	206138.8	206138.8	206138.8	206138.8	206138.8	206138.8
	NOx Sum		395.8	395.8	395.8	395.8	395.8	395.8	395.8	395.8	395.8	395.8	395.8	395.8
	PM10 Dust Sum		867.0	867.0	867.0	867.0	867.0	867.0	867.0	867.0	867.0	867.0	867.0	867.0
	PM10 Exhaust Sum		21.9	21.9	21.9	21.9	21.9	21.9	21.9	21.9	21.9	21.9	21.9	21.9
	PM10 Total Sum		888.9	888.9	888.9	888.9	888.9	888.9	888.9	888.9	888.9	888.9	888.9	888.9
	PM2.5 Dust Sum		182.2	182.2	182.2	182.2	182.2	182.2	182.2	182.2	182.2	182.2	182.2	182.2
	PM2.5 Exhaust Sum		19.8	19.8	19.8	19.8	19.8	19.8	19.8	19.8	19.8	19.8	19.8	19.8
	PM2.5 Total Sum		202.0	202.0	202.0	202.0	202.0	202.0	202.0	202.0	202.0	202.0	202.0	202.0
	ROG Sum		110.3	110.3	110.3	110.3	110.3	110.3	110.3	110.3	110.3	110.3	110.3	110.3
	SO2 Sum		1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7

		Year	2017											
Neighborhood	Pollutant	Month	1	2	3	4	5	6	7	8	9	10	11	12
I	CO													
	CO2													
	NOx													
	PM10 Dust													
	PM10 Exhaust													
	PM10 Total													
	PM2.5 Dust													
	PM2.5 Exhaust													
	PM2.5 Total													
	ROG													
	SO2													
II	CO		525.9	525.9	525.9	525.9	525.9	525.9	525.9	525.9	525.9	525.9	525.9	525.9
	CO2		107296.0	107296.0	107296.0	107296.0	107296.0	107296.0	107296.0	107296.0	107296.0	107296.0	107296.0	107296.0
	NOx		98.3	98.3	98.3	98.3	98.3	98.3	98.3	98.3	98.3	98.3	98.3	98.3
	PM10 Dust		4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6
	PM10 Exhaust		6.9	6.9	6.9	6.9	6.9	6.9	6.9	6.9	6.9	6.9	6.9	6.9
	PM10 Total		11.5	11.5	11.5	11.5	11.5	11.5	11.5	11.5	11.5	11.5	11.5	11.5
	PM2.5 Dust		1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7
	PM2.5 Exhaust		6.1	6.1	6.1	6.1	6.1	6.1	6.1	6.1	6.1	6.1	6.1	6.1
	PM2.5 Total		7.8	7.8	7.8	7.8	7.8	7.8	7.8	7.8	7.8	7.8	7.8	7.8
	ROG		39.3	39.3	39.3	39.3	39.3	39.3	39.3	39.3	39.3	39.3	39.3	39.3
	SO2		1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
IIIA	CO		439.8	439.8	439.8	439.8	439.8	311.7	311.7	311.7	311.7	311.7	311.7	311.7
	CO2		98783.1	98783.1	98783.1	98783.1	98783.1	66935.7	66935.7	66935.7	66935.7	66935.7	66935.7	66935.7
	NOx		263.2	263.2	263.2	263.2	263.2	71.5	71.5	71.5	71.5	71.5	71.5	71.5
	PM10 Dust		862.4	862.4	862.4	862.4	862.4	2.8	2.8	2.8	2.8	2.8	2.8	2.8
	PM10 Exhaust		13.2	13.2	13.2	13.2	13.2	4.7	4.7	4.7	4.7	4.7	4.7	4.7
	PM10 Total		875.6	875.6	875.6	875.6	875.6	7.5	7.5	7.5	7.5	7.5	7.5	7.5
	PM2.5 Dust		180.5	180.5	180.5	180.5	180.5	1.0	1.0	1.0	1.0	1.0	1.0	1.0
	PM2.5 Exhaust		12.0	12.0	12.0	12.0	12.0	4.2	4.2	4.2	4.2	4.2	4.2	4.2
	PM2.5 Total		192.5	192.5	192.5	192.5	192.5	5.2	5.2	5.2	5.2	5.2	5.2	5.2
	ROG		66.0	66.0	66.0	66.0	66.0	40.0	40.0	40.0	40.0	40.0	40.0	40.0
	SO2		0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7

		Year	2017											
Neighborhood	**Pollutant**	**Month**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
IIIB	CO													
	CO2													
	NOx													
	PM10 Dust													
	PM10 Exhaust													
	PM10 Total													
	PM2.5 Dust													
	PM2.5 Exhaust													
	PM2.5 Total													
	ROG													
	SO2													
IV	CO								112.1	112.1	112.1	112.1	112.1	112.1
	CO2								29570.0	29570.0	29570.0	29570.0	29570.0	29570.0
	NOx								186.7	186.7	186.7	186.7	186.7	186.7
	PM10 Dust								859.5	859.5	859.5	859.5	859.5	859.5
	PM10 Exhaust								7.9	7.9	7.9	7.9	7.9	7.9
	PM10 Total								867.5	867.5	867.5	867.5	867.5	867.5
	PM2.5 Dust								179.5	179.5	179.5	179.5	179.5	179.5
	PM2.5 Exhaust								7.3	7.3	7.3	7.3	7.3	7.3
	PM2.5 Total								186.8	186.8	186.8	186.8	186.8	186.8
	ROG								24.7	24.7	24.7	24.7	24.7	24.7
	SO2								0.0	0.0	0.0	0.0	0.0	0.0
Overlapping	CO Sum		965.8	965.8	965.8	965.8	965.8	837.6	949.7	949.7	949.7	949.7	949.7	949.7
	CO2 Sum		206079.0	206079.0	206079.0	206079.0	206079.0	174231.6	203801.6	203801.6	203801.6	203801.6	203801.6	203801.6
	NOx Sum		361.5	361.5	361.5	361.5	361.5	169.8	356.5	356.5	356.5	356.5	356.5	356.5
	PM10 Dust Sum		867.0	867.0	867.0	867.0	867.0	7.5	867.0	867.0	867.0	867.0	867.0	867.0
	PM10 Exhaust Sum		20.1	20.1	20.1	20.1	20.1	11.6	19.5	19.5	19.5	19.5	19.5	19.5
	PM10 Total Sum		887.1	887.1	887.1	887.1	887.1	19.1	886.6	886.6	886.6	886.6	886.6	886.6
	PM2.5 Dust Sum		182.2	182.2	182.2	182.2	182.2	2.7	182.2	182.2	182.2	182.2	182.2	182.2
	PM2.5 Exhaust Sum		18.1	18.1	18.1	18.1	18.1	10.3	17.6	17.6	17.6	17.6	17.6	17.6
	PM2.5 Total Sum		200.3	200.3	200.3	200.3	200.3	13.0	199.8	199.8	199.8	199.8	199.8	199.8
	ROG Sum		105.2	105.2	105.2	105.2	105.2	79.3	104.0	104.0	104.0	104.0	104.0	104.0
	SO2 Sum		1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7

		Year	2018											
Neighborhood	Pollutant	Month	1	2	3	4	5	6	7	8	9	10	11	12
I	CO													
	CO2													
	NOx													
	PM10 Dust													
	PM10 Exhaust													
	PM10 Total													
	PM2.5 Dust													
	PM2.5 Exhaust													
	PM2.5 Total													
	ROG													
	SO2													
II	CO		492.7	492.7	492.7	492.7	492.7							
	CO2		107291.2	107291.2	107291.2	107291.2	107291.2							
	NOx		90.2	90.2	90.2	90.2	90.2							
	PM10 Dust		4.6	4.6	4.6	4.6	4.6							
	PM10 Exhaust		6.5	6.5	6.5	6.5	6.5							
	PM10 Total		11.1	11.1	11.1	11.1	11.1							
	PM2.5 Dust		1.7	1.7	1.7	1.7	1.7							
	PM2.5 Exhaust		5.7	5.7	5.7	5.7	5.7							
	PM2.5 Total		7.4	7.4	7.4	7.4	7.4							
	ROG		37.3	37.3	37.3	37.3	37.3							
	SO2		1.0	1.0	1.0	1.0	1.0							
IIIA	CO		290.0	290.0	290.0	290.0	290.0	290.0	290.0	290.0	290.0	290.0	290.0	290.0
	CO2		66862.6	66862.6	66862.6	66862.6	66862.6	66862.6	66862.6	66862.6	66862.6	66862.6	66862.6	66862.6
	NOx		65.2	65.2	65.2	65.2	65.2	65.2	65.2	65.2	65.2	65.2	65.2	65.2
	PM10 Dust		2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8
	PM10 Exhaust		4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3
	PM10 Total		7.2	7.2	7.2	7.2	7.2	7.2	7.2	7.2	7.2	7.2	7.2	7.2
	PM2.5 Dust		1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
	PM2.5 Exhaust		3.9	3.9	3.9	3.9	3.9	3.9	3.9	3.9	3.9	3.9	3.9	3.9
	PM2.5 Total		4.9	4.9	4.9	4.9	4.9	4.9	4.9	4.9	4.9	4.9	4.9	4.9
	ROG		38.7	38.7	38.7	38.7	38.7	38.7	38.7	38.7	38.7	38.7	38.7	38.7
	SO2		0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7

		Year	2018											
Neighborhood	**Pollutant**	**Month**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
IIIB	CO													
	CO2													
	NOx													
	PM10 Dust													
	PM10 Exhaust													
	PM10 Total													
	PM2.5 Dust													
	PM2.5 Exhaust													
	PM2.5 Total													
	ROG													
	SO2													
IV	CO		108.6	108.6	108.6	183.5	193.6	193.6	193.6	193.6	193.6	193.6	193.6	193.6
	CO2		29569.9	29569.9	29569.9	47045.8	48626.3	48626.3	48626.3	48626.3	48626.3	48626.3	48626.3	48626.3
	NOx		170.8	170.8	170.8	204.0	215.0	215.0	215.0	215.0	215.0	215.0	215.0	215.0
	PM10 Dust		859.5	859.5	859.5	860.1	860.2	860.2	860.2	860.2	860.2	860.2	860.2	860.2
	PM10 Exhaust		7.1	7.1	7.1	9.0	9.9	9.9	9.9	9.9	9.9	9.9	9.9	9.9
	PM10 Total		866.7	866.7	866.7	869.2	870.1	870.1	870.1	870.1	870.1	870.1	870.1	870.1
	PM2.5 Dust		179.5	179.5	179.5	179.7	179.7	179.7	179.7	179.7	179.7	179.7	179.7	179.7
	PM2.5 Exhaust		6.6	6.6	6.6	8.3	9.1	9.1	9.1	9.1	9.1	9.1	9.1	9.1
	PM2.5 Total		186.1	186.1	186.1	188.0	188.8	188.8	188.8	188.8	188.8	188.8	188.8	188.8
	ROG		23.2	23.2	23.2	28.9	39.1	39.1	39.1	39.1	39.1	39.1	39.1	39.1
	SO2		0.0	0.0	0.0	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
Overlapping	CO Sum		891.3	891.3	891.3	1038.4	1048.7	556.0	556.0	556.0	556.0	556.0	556.0	556.0
	CO2 Sum		203723.6	203723.6	203723.6	239641.4	241280.1	133989.0	133989.0	133989.0	133989.0	133989.0	133989.0	133989.0
	NOx Sum		326.3	326.3	326.3	375.8	386.7	296.5	296.5	296.5	296.5	296.5	296.5	296.5
	PM10 Dust Sum		867.0	867.0	867.0	868.4	868.4	863.8	863.8	863.8	863.8	863.8	863.8	863.8
	PM10 Exhaust Sum		18.0	18.0	18.0	20.8	21.6	15.2	15.2	15.2	15.2	15.2	15.2	15.2
	PM10 Total Sum		885.0	885.0	885.0	889.2	890.1	879.0	879.0	879.0	879.0	879.0	879.0	879.0
	PM2.5 Dust Sum		182.2	182.2	182.2	182.7	182.7	181.0	181.0	181.0	181.0	181.0	181.0	181.0
	PM2.5 Exhaust Sum		16.2	16.2	16.2	18.7	19.5	13.7	13.7	13.7	13.7	13.7	13.7	13.7
	PM2.5 Total Sum		198.4	198.4	198.4	201.4	202.2	194.8	194.8	194.8	194.8	194.8	194.8	194.8
	ROG Sum		99.2	99.2	99.2	107.9	128.4	91.0	91.0	91.0	91.0	91.0	91.0	91.0
	SO2 Sum		1.7	1.7	1.7	2.0	2.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0

		Year	2019											
Neighborhood	Pollutant	Month	1	2	3	4	5	6	7	8	9	10	11	12
I	CO													
	CO2													
	NOx													
	PM10 Dust													
	PM10 Exhaust													
	PM10 Total													
	PM2.5 Dust													
	PM2.5 Exhaust													
	PM2.5 Total													
	ROG													
	SO2													
II	CO													
	CO2													
	NOx													
	PM10 Dust													
	PM10 Exhaust													
	PM10 Total													
	PM2.5 Dust													
	PM2.5 Exhaust													
	PM2.5 Total													
	ROG													
	SO2													
IIIA	CO		270.4	270.4	270.4	270.4	270.4	270.4	270.4	270.4	270.4	270.4	270.4	270.4
	CO2		66797.8	66797.8	66797.8	66797.8	66797.8	66797.8	66797.8	66797.8	66797.8	66797.8	66797.8	66797.8
	NOx		59.7	59.7	59.7	59.7	59.7	59.7	59.7	59.7	59.7	59.7	59.7	59.7
	PM10 Dust		2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8
	PM10 Exhaust		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
	PM10 Total		6.9	6.9	6.9	6.9	6.9	6.9	6.9	6.9	6.9	6.9	6.9	6.9
	PM2.5 Dust		1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
	PM2.5 Exhaust		3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6
	PM2.5 Total		4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6
	ROG		37.5	37.5	37.5	37.5	37.5	37.5	37.5	37.5	37.5	37.5	37.5	37.5
	SO2		0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7

		Year	2019											
Neighborhood	**Pollutant**	**Month**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
IIIB	CO													
	CO2													
	NOx													
	PM10 Dust													
	PM10 Exhaust													
	PM10 Total													
	PM2.5 Dust													
	PM2.5 Exhaust													
	PM2.5 Total													
	ROG													
	SO2													
IV	CO		186.2	186.2	186.2	186.2	186.2	186.2	186.2	186.2	186.2	186.2	186.2	186.2
	CO2		48626.0	48626.0	48626.0	48626.0	48626.0	48626.0	48626.0	48626.0	48626.0	48626.0	48626.0	48626.0
	NOx		196.9	196.9	196.9	196.9	196.9	196.9	196.9	196.9	196.9	196.9	196.9	196.9
	PM10 Dust		860.2	860.2	860.2	860.2	860.2	860.2	860.2	860.2	860.2	860.2	860.2	860.2
	PM10 Exhaust		8.9	8.9	8.9	8.9	8.9	8.9	8.9	8.9	8.9	8.9	8.9	8.9
	PM10 Total		869.0	869.0	869.0	869.0	869.0	869.0	869.0	869.0	869.0	869.0	869.0	869.0
	PM2.5 Dust		179.7	179.7	179.7	179.7	179.7	179.7	179.7	179.7	179.7	179.7	179.7	179.7
	PM2.5 Exhaust		8.1	8.1	8.1	8.1	8.1	8.1	8.1	8.1	8.1	8.1	8.1	8.1
	PM2.5 Total		187.9	187.9	187.9	187.9	187.9	187.9	187.9	187.9	187.9	187.9	187.9	187.9
	ROG		37.4	37.4	37.4	37.4	37.4	37.4	37.4	37.4	37.4	37.4	37.4	37.4
	SO2		0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
Overlapping	CO Sum		524.1	524.1	524.1	524.1	524.1	524.1	524.1	524.1	524.1	524.1	524.1	524.1
	CO2 Sum		133923.7	133923.7	133923.7	133923.7	133923.7	133923.7	133923.7	133923.7	133923.7	133923.7	133923.7	133923.7
	NOx Sum		271.4	271.4	271.4	271.4	271.4	271.4	271.4	271.4	271.4	271.4	271.4	271.4
	PM10 Dust Sum		863.8	863.8	863.8	863.8	863.8	863.8	863.8	863.8	863.8	863.8	863.8	863.8
	PM10 Exhaust Sum		13.7	13.7	13.7	13.7	13.7	13.7	13.7	13.7	13.7	13.7	13.7	13.7
	PM10 Total Sum		877.5	877.5	877.5	877.5	877.5	877.5	877.5	877.5	877.5	877.5	877.5	877.5
	PM2.5 Dust Sum		181.0	181.0	181.0	181.0	181.0	181.0	181.0	181.0	181.0	181.0	181.0	181.0
	PM2.5 Exhaust Sum		12.4	12.4	12.4	12.4	12.4	12.4	12.4	12.4	12.4	12.4	12.4	12.4
	PM2.5 Total Sum		193.5	193.5	193.5	193.5	193.5	193.5	193.5	193.5	193.5	193.5	193.5	193.5
	ROG Sum		87.9	87.9	87.9	87.9	87.9	87.9	87.9	87.9	87.9	87.9	87.9	87.9
	SO2 Sum		1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0

		Year	2020											
Neighborhood	Pollutant	Month	1	2	3	4	5	6	7	8	9	10	11	12
I	CO													
	CO2													
	NOx													
	PM10 Dust													
	PM10 Exhaust													
	PM10 Total													
	PM2.5 Dust													
	PM2.5 Exhaust													
	PM2.5 Total													
	ROG													
	SO2													
II	CO													
	CO2													
	NOx													
	PM10 Dust													
	PM10 Exhaust													
	PM10 Total													
	PM2.5 Dust													
	PM2.5 Exhaust													
	PM2.5 Total													
	ROG													
	SO2													
IIIA	CO		252.0	252.0										
	CO2		66739.5	66739.5										
	NOx		54.9	54.9										
	PM10 Dust		2.8	2.8										
	PM10 Exhaust		3.8	3.8										
	PM10 Total		6.7	6.7										
	PM2.5 Dust		1.0	1.0										
	PM2.5 Exhaust		3.4	3.4										
	PM2.5 Total		4.4	4.4										
	ROG		36.4	36.4										
	SO2		0.7	0.7										

		Year	2020											
Neighborhood	**Pollutant**	**Month**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
IIIB	CO													
	CO2													
	NOx													
	PM10 Dust													
	PM10 Exhaust													
	PM10 Total													
	PM2.5 Dust													
	PM2.5 Exhaust													
	PM2.5 Total													
	ROG													
	SO2													
IV	CO		179.6	179.6	179.6	179.6	179.6	179.6	179.6	179.6	179.6	77.2	77.2	77.2
	CO2		48625.9	48625.9	48625.9	48625.9	48625.9	48625.9	48625.9	48625.9	48625.9	19056.0	19056.0	19056.0
	NOx		180.2	180.2	180.2	180.2	180.2	180.2	180.2	180.2	180.2	37.8	37.8	37.8
	PM10 Dust		860.2	860.2	860.2	860.2	860.2	860.2	860.2	860.2	860.2	0.6	0.6	0.6
	PM10 Exhaust		7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9	2.3	2.3	2.3
	PM10 Total		868.1	868.1	868.1	868.1	868.1	868.1	868.1	868.1	868.1	2.9	2.9	2.9
	PM2.5 Dust		179.7	179.7	179.7	179.7	179.7	179.7	179.7	179.7	179.7	0.2	0.2	0.2
	PM2.5 Exhaust		7.3	7.3	7.3	7.3	7.3	7.3	7.3	7.3	7.3	2.1	2.1	2.1
	PM2.5 Total		187.0	187.0	187.0	187.0	187.0	187.0	187.0	187.0	187.0	2.3	2.3	2.3
	ROG		35.5	35.5	35.5	35.5	35.5	35.5	35.5	35.5	35.5	14.8	14.8	14.8
	SO2		0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.1	0.1	0.1
Overlapping	CO Sum		494.6	494.6	242.6	242.6	242.6	242.6	242.6	242.6	242.6	140.2	140.2	140.2
	CO2 Sum		133865.1	133865.1	67125.6	67125.6	67125.6	67125.6	67125.6	67125.6	67125.6	37555.8	37555.8	37555.8
	NOx Sum		248.6	248.6	193.7	193.7	193.7	193.7	193.7	193.7	193.7	51.3	51.3	51.3
	PM10 Dust Sum		863.8	863.8	861.0	861.0	861.0	861.0	861.0	861.0	861.0	1.4	1.4	1.4
	PM10 Exhaust Sum		12.5	12.5	8.7	8.7	8.7	8.7	8.7	8.7	8.7	3.1	3.1	3.1
	PM10 Total Sum		876.3	876.3	869.7	869.7	869.7	869.7	869.7	869.7	869.7	4.5	4.5	4.5
	PM2.5 Dust Sum		181.0	181.0	180.0	180.0	180.0	180.0	180.0	180.0	180.0	0.5	0.5	0.5
	PM2.5 Exhaust Sum		11.3	11.3	8.0	8.0	8.0	8.0	8.0	8.0	8.0	2.8	2.8	2.8
	PM2.5 Total Sum		192.4	192.4	188.0	188.0	188.0	188.0	188.0	188.0	188.0	3.3	3.3	3.3
	ROG Sum		84.7	84.7	48.2	48.2	48.2	48.2	48.2	48.2	48.2	27.5	27.5	27.5
	SO2 Sum		1.0	1.0	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3

		Year	2021						2024									Max
Neighborhood	Pollutant	Month	1	2	3	4	5	6	4	5	6	7	8	9	10	11	12	(lbs/day)
I	CO																	351.9
	CO2																	51945.6
	NOx																	376.6
	PM10 Dust																	860.5
	PM10 Exhaust																	18.1
	PM10 Total																	878.6
	PM2.5 Dust																	179.9
	PM2.5 Exhaust																	16.6
	PM2.5 Total																	196.4
	ROG																	55.8
	SO2																	0.2
II	CO																	1036.1
	CO2																	143546.9
	NOx																	563.2
	PM10 Dust																	864.2
	PM10 Exhaust																	28.4
	PM10 Total																	892.5
	PM2.5 Dust																	181.2
	PM2.5 Exhaust																	25.9
	PM2.5 Total																	207.1
	ROG																	102.5
	SO2																	1.1
IIIA	CO																	608.3
	CO2																	99048.6
	NOx																	405.9
	PM10 Dust																	862.4
	PM10 Exhaust																	20.2
	PM10 Total																	882.6
	PM2.5 Dust																	180.5
	PM2.5 Exhaust																	18.5
	PM2.5 Total																	199.0
	ROG																	83.4
	SO2																	0.7

		Year	2021						2024									Max
Neighborhood	Pollutant	Month	1	2	3	4	5	6	4	5	6	7	8	9	10	11	12	(lbs/day)
IIIB	CO								114.3	114.3	114.3	114.3	114.3	150.0	156.7	156.7	156.7	156.7
	CO2								29550.7	29550.7	29550.7	29550.7	29550.7	39111.9	40372.3	40372.3	40372.3	40372.3
	NOx								138.4	138.4	138.4	138.4	138.4	156.3	162.9	162.9	162.9	162.9
	PM10 Dust								859.5	859.5	859.5	859.5	859.5	859.8	859.9	859.9	859.9	859.9
	PM10 Exhaust								5.8	5.8	5.8	5.8	5.8	6.9	7.4	7.4	7.4	7.4
	PM10 Total								865.3	865.3	865.3	865.3	865.3	866.7	867.2	867.2	867.2	867.2
	PM2.5 Dust								179.5	179.5	179.5	179.5	179.5	179.6	179.6	179.6	179.6	179.6
	PM2.5 Exhaust								5.3	5.3	5.3	5.3	5.3	6.3	6.8	6.8	6.8	6.8
	PM2.5 Total								184.8	184.8	184.8	184.8	184.8	185.9	186.4	186.4	186.4	186.4
	ROG								20.6	20.6	20.6	20.6	20.6	23.7	41.5	41.5	41.5	41.5
	SO2								0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1
IV	CO		63.9	63.9	63.9	63.9	63.9	63.9										193.6
	CO2		19056.1	19056.1	19056.1	19056.1	19056.1	19056.1										48626.3
	NOx		34.6	34.6	34.6	34.6	34.6	34.6										215.0
	PM10 Dust		0.6	0.6	0.6	0.6	0.6	0.6										860.2
	PM10 Exhaust		2.2	2.2	2.2	2.2	2.2	2.2										9.9
	PM10 Total		2.8	2.8	2.8	2.8	2.8	2.8										870.1
	PM2.5 Dust		0.2	0.2	0.2	0.2	0.2	0.2										179.7
	PM2.5 Exhaust		2.0	2.0	2.0	2.0	2.0	2.0										9.1
	PM2.5 Total		2.2	2.2	2.2	2.2	2.2	2.2										188.8
	ROG		14.2	14.2	14.2	14.2	14.2	14.2										39.1
	SO2		0.1	0.1	0.1	0.1	0.1	0.1										0.2
Overlapping	CO Sum		109.9	109.9	109.9	109.9	109.9	109.9	114.3	114.3	114.3	114.3	114.3	150.0	156.7	156.7	156.7	2193.6
	CO2 Sum		37556.0	37556.0	37556.0	37556.0	37556.0	37556.0	29550.7	29550.7	29550.7	29550.7	29550.7	39111.9	40372.3	40372.3	40372.3	412415.0
	NOx Sum		44.0	44.0	44.0	44.0	44.0	44.0	138.4	138.4	138.4	138.4	138.4	156.3	162.9	162.9	162.9	1206.4
	PM10 Dust Sum		1.4	1.4	1.4	1.4	1.4	1.4	859.5	859.5	859.5	859.5	859.5	859.8	859.9	859.9	859.9	2006.8
	PM10 Exhaust Sum		2.9	2.9	2.9	2.9	2.9	2.9	5.8	5.8	5.8	5.8	5.8	6.9	7.4	7.4	7.4	59.3
	PM10 Total Sum		4.3	4.3	4.3	4.3	4.3	4.3	865.3	865.3	865.3	865.3	865.3	866.7	867.2	867.2	867.2	2066.0
	PM2.5 Dust Sum		0.5	0.5	0.5	0.5	0.5	0.5	179.5	179.5	179.5	179.5	179.5	179.6	179.6	179.6	179.6	420.4
	PM2.5 Exhaust Sum		2.6	2.6	2.6	2.6	2.6	2.6	5.3	5.3	5.3	5.3	5.3	6.3	6.8	6.8	6.8	54.1
	PM2.5 Total Sum		3.1	3.1	3.1	3.1	3.1	3.1	184.8	184.8	184.8	184.8	184.8	185.9	186.4	186.4	186.4	474.5
	ROG Sum		26.2	26.2	26.2	26.2	26.2	26.2	20.6	20.6	20.6	20.6	20.6	23.7	41.5	41.5	41.5	231.7
	SO2 Sum		0.3	0.3	0.3	0.3	0.3	0.3	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	3.4

Lytle Creek Ranch
Construction Period Health Risk Assessment

Adult Risk

Source	Mass GLC		Weight Fraction	Contaminant	Carcinogenic Risk			
	(ug/m3)				URF (ug/m3)	CPF $(mg/kg/day)^{-1}$	Dose (mg/kg*day)	RISK
(a)	(b)		(d)	(e)	(f)	(g)		(h)
Construction Equipment	0.10906		1.00E+00	Diesel Particulate	3.0E-04	1.1E+00	3.83E-06	4.21E-06

Total **4.21E-06**

Note: Exposure factors used to calculate contaminant intake

exposure frequency (days/year)	250
exposure duration (years)	13
inhalation rate (L/kg*day)	271
average body weight (kg)	63
averaging $time_{(cancer)}$ (days)	25550
averaging $time_{(noncancer)}$ (days)	4836.25

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PROJECT TITLE:

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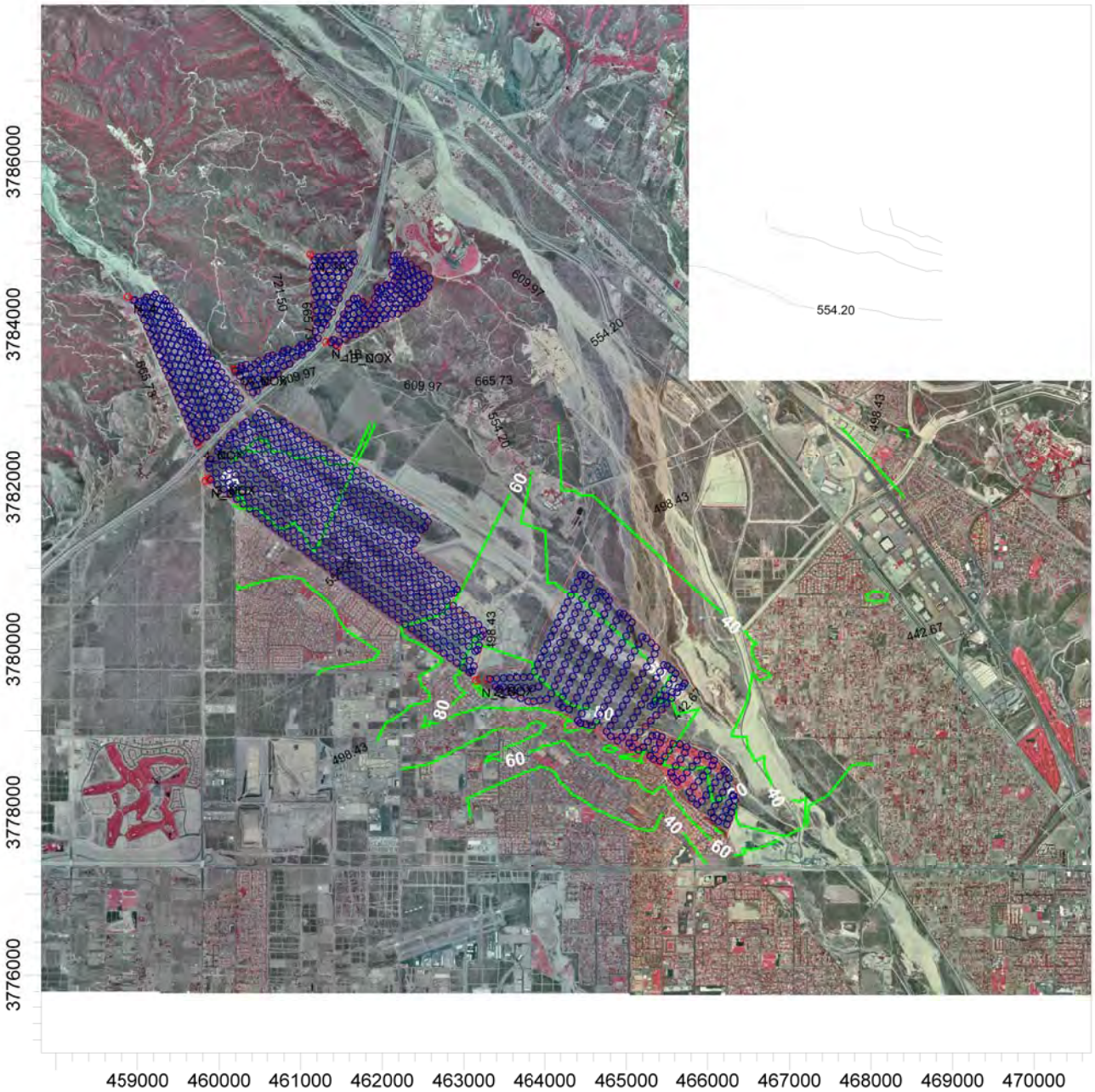

COMMENTS:	SOURCES:	COMPANY NAME:	
Lytle Creek Ranch Construction 1-hr CO (Unmitigated)	**15**		
	RECEPTORS:	MODELER:	
	1059		
	OUTPUT TYPE:	SCALE: 1:78,687	
	Concentration	0 ▬▬▬ 3 km	
	MAX:	DATE:	PROJECT NO.:
	104.38733 ug/m^3	**10/9/2007**	

PROJECT TITLE:

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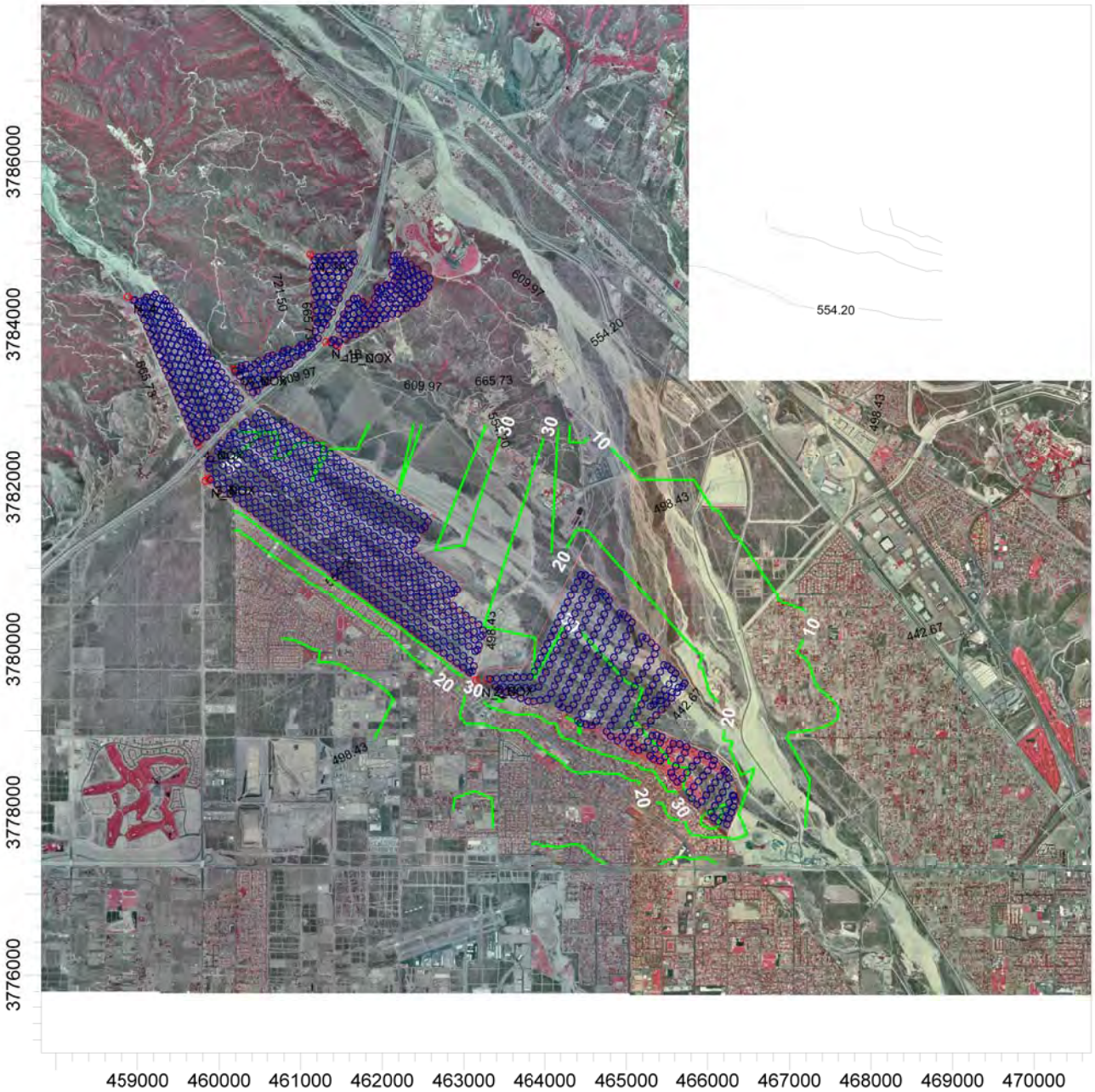

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	RECEPTORS:	MODELER:	
	1059		
	OUTPUT TYPE:	SCALE: 1:78,687	
	Concentration	0 ▬▬▬ 3 km	
	MAX:	DATE:	PROJECT NO.:
	41.16273 ug/m^3	**10/9/2007**	

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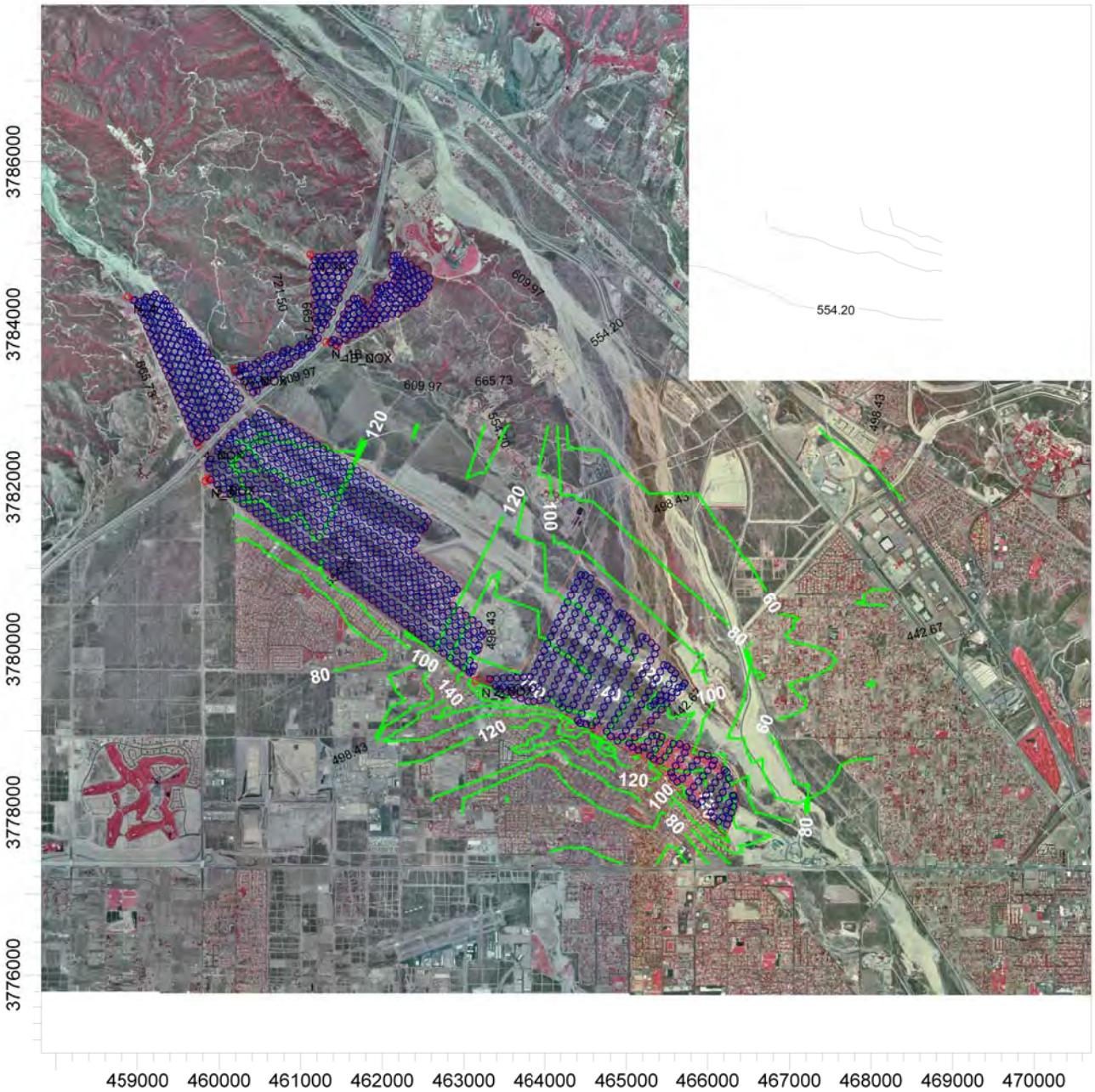

COMMENTS:	SOURCES:	COMPANY NAME:	
Lytle Creek Ranch Construction 1-hr NOx (Unmitigated)	**15**		
	RECEPTORS:	MODELER:	
	1059		
	OUTPUT TYPE:	SCALE: 1:78,687	
	Concentration	0 ▬▬▬ 3 km	
	MAX:	DATE:	PROJECT NO.:
	203.40826 ug/m^3	**10/9/2007**	

PROJECT TITLE:

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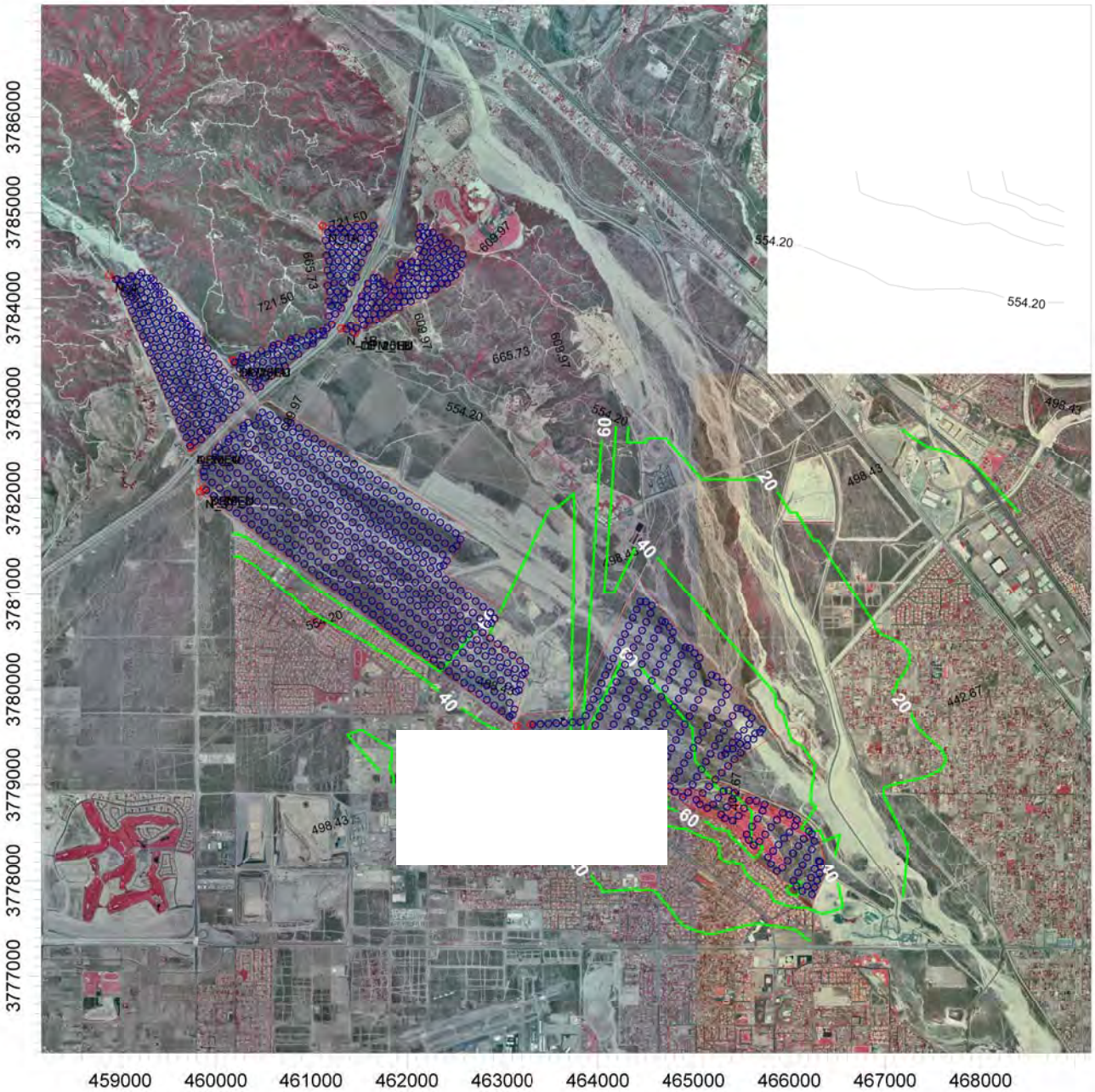
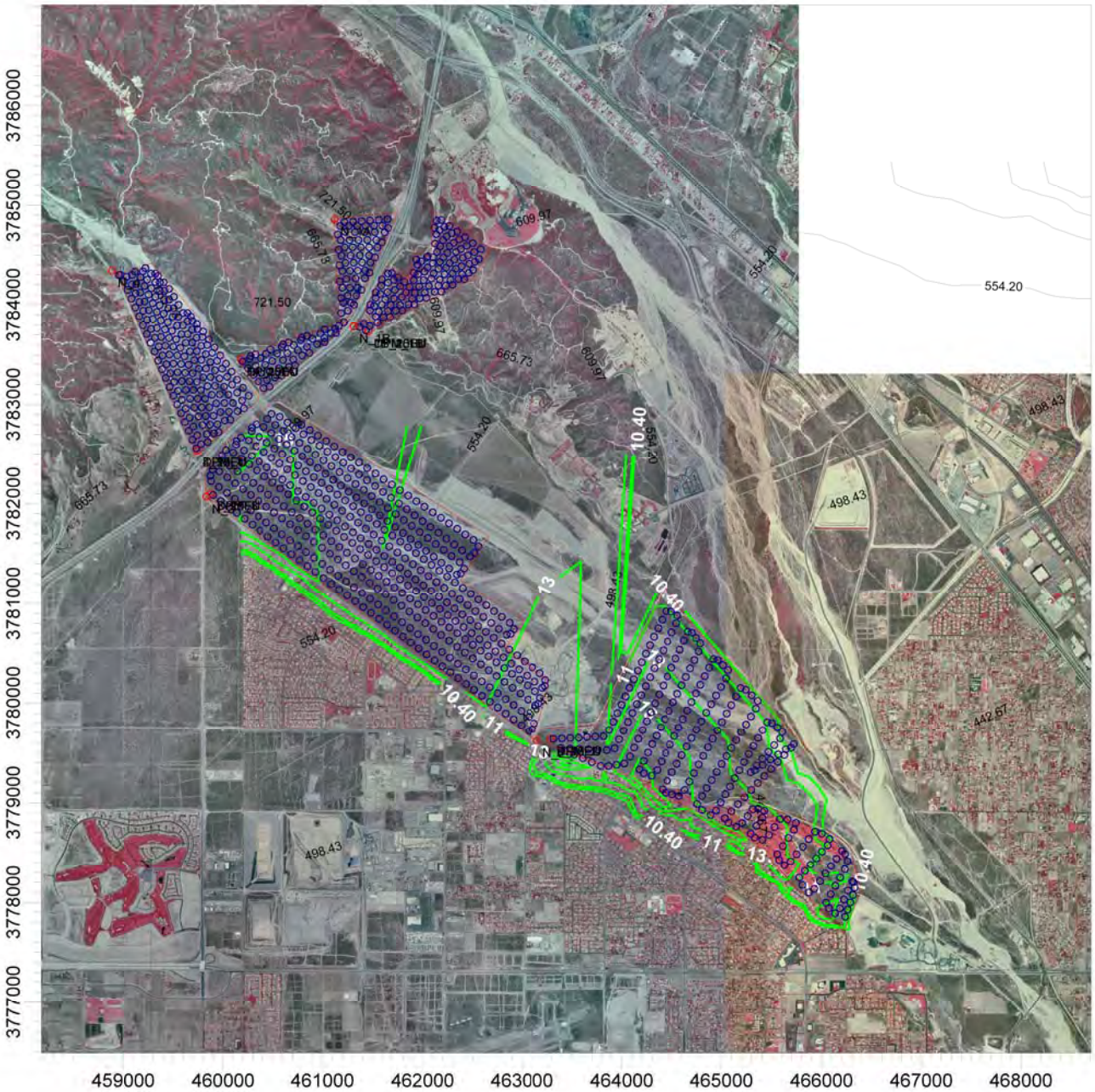


COMMENTS:	SOURCES:	COMPANY NAME:	
Lytle Creek Ranch Construction 24-hr PM10 (Unmitigated)	**30**		
	RECEPTORS: **1061**	MODELER:	
	OUTPUT TYPE: **Concentration**	SCALE: 1:67,055 0 2 km	
	MAX: **80.23141 ug/m^3**	DATE: **10/9/2007**	PROJECT NO.:

PROJECT TITLE:

C:\ISC Models\Lytle Creek Construction\PM.isc



COMMENTS:	SOURCES:	COMPANY NAME:	
Lytle Creek Ranch Construction 24-hr PM2.5 (Unmitigated)	**30**		
	RECEPTORS: **1061**	MODELER:	
	OUTPUT TYPE: **Concentration**	SCALE: 1:64,253 0 — 2 km	
	MAX: **17.88474 ug/m^3**	DATE: **10/9/2007**	PROJECT NO.:

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Appendix A-2

- SCAQMD Rule 403 (Fugitive Dust) Control Requirements

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(Adopted May 7, 1976) (Amended November 6, 1992)
(Amended July 9, 1993) (Amended February 14, 1997)
(Amended December 11, 1998)(Amended April 2, 2004)
(Amended June 3, 2005)

RULE 403. FUGITIVE DUST

(a) Purpose

The purpose of this Rule is to reduce the amount of particulate matter entrained in the ambient air as a result of anthropogenic (man-made) fugitive dust sources by requiring actions to prevent, reduce or mitigate fugitive dust emissions.

(b) Applicability

The provisions of this Rule shall apply to any activity or man-made condition capable of generating fugitive dust.

(c) Definitions

(1) ACTIVE OPERATIONS means any source capable of generating fugitive dust, including, but not limited to, earth-moving activities, construction/demolition activities, disturbed surface area, or heavy- and light-duty vehicular movement.

(2) AGGREGATE-RELATED PLANTS are defined as facilities that produce and / or mix sand and gravel and crushed stone.

(3) AGRICULTURAL HANDBOOK means the region-specific guidance document that has been approved by the Governing Board or hereafter approved by the Executive Officer and the U.S. EPA. For the South Coast Air Basin, the Board-approved region-specific guidance document is the Rule 403 Agricultural Handbook dated December 1998. For the Coachella Valley, the Board-approved region-specific guidance document is the Rule 403 Coachella Valley Agricultural Handbook dated April 2, 2004.

(4) ANEMOMETERS are devices used to measure wind speed and direction in accordance with the performance standards, and maintenance and calibration criteria as contained in the most recent Rule 403 Implementation Handbook.

(5) BEST AVAILABLE CONTROL MEASURES means fugitive dust control actions that are set forth in Table 1 of this Rule.

(6) BULK MATERIAL is sand, gravel, soil, aggregate material less than two inches in length or diameter, and other organic or inorganic particulate matter.

(7) CEMENT MANUFACTURING FACILITY is any facility that has a cement kiln at the facility.

(8) CHEMICAL STABILIZERS are any non-toxic chemical dust suppressant which must not be used if prohibited for use by the Regional Water Quality Control Boards, the California Air Resources Board, the U.S. Environmental Protection Agency (U.S. EPA), or any applicable law, rule or regulation. The chemical stabilizers shall meet any specifications, criteria, or tests required by any federal, state, or local water agency. Unless otherwise indicated, the use of a non-toxic chemical stabilizer shall be of sufficient concentration and application frequency to maintain a stabilized surface.

(9) COMMERCIAL POULTRY RANCH means any building, structure, enclosure, or premises where more than 100 fowl are kept or maintained for the primary purpose of producing eggs or meat for sale or other distribution.

(10) CONFINED ANIMAL FACILITY means a source or group of sources of air pollution at an agricultural source for the raising of 3,360 or more fowl or 50 or more animals, including but not limited to, any structure, building, installation, farm, corral, coop, feed storage area, milking parlor, or system for the collection, storage, or distribution of solid and liquid manure; if domesticated animals, including horses, sheep, goats, swine, beef cattle, rabbits, chickens, turkeys, or ducks are corralled, penned, or otherwise caused to remain in restricted areas for commercial agricultural purposes and feeding is by means other than grazing.

(11) CONSTRUCTION/DEMOLITION ACTIVITIES means any on-site mechanical activities conducted in preparation of, or related to, the building, alteration, rehabilitation, demolition or improvement of property, including, but not limited to the following activities: grading, excavation, loading, crushing, cutting, planing, shaping or ground breaking.

(12) CONTRACTOR means any person who has a contractual arrangement to conduct an active operation for another person.

(13) DAIRY FARM is an operation on a property, or set of properties that are contiguous or separated only by a public right-of-way, that raises cows or

produces milk from cows for the purpose of making a profit or for a livelihood. Heifer and calf farms are dairy farms.

(14) DISTURBED SURFACE AREA means a portion of the earth's surface which has been physically moved, uncovered, destabilized, or otherwise modified from its undisturbed natural soil condition, thereby increasing the potential for emission of fugitive dust. This definition excludes those areas which have:

(A) been restored to a natural state, such that the vegetative ground cover and soil characteristics are similar to adjacent or nearby natural conditions;

(B) been paved or otherwise covered by a permanent structure; or

(C) sustained a vegetative ground cover of at least 70 percent of the native cover for a particular area for at least 30 days.

(15) DUST SUPPRESSANTS are water, hygroscopic materials, or non-toxic chemical stabilizers used as a treatment material to reduce fugitive dust emissions.

(16) EARTH-MOVING ACTIVITIES means the use of any equipment for any activity where soil is being moved or uncovered, and shall include, but not be limited to the following: grading, earth cutting and filling operations, loading or unloading of dirt or bulk materials, adding to or removing from open storage piles of bulk materials, landfill operations, weed abatement through disking, and soil mulching.

(17) DUST CONTROL SUPERVISOR means a person with the authority to expeditiously employ sufficient dust mitigation measures to ensure compliance with all Rule 403 requirements at an active operation.

(18) FUGITIVE DUST means any solid particulate matter that becomes airborne, other than that emitted from an exhaust stack, directly or indirectly as a result of the activities of any person.

(19) HIGH WIND CONDITIONS means that instantaneous wind speeds exceed 25 miles per hour.

(20) INACTIVE DISTURBED SURFACE AREA means any disturbed surface area upon which active operations have not occurred or are not expected to occur for a period of 20 consecutive days.

(21) LARGE OPERATIONS means any active operations on property which contains 50 or more acres of disturbed surface area; or any earth-moving operation with a daily earth-moving or throughput volume of 3,850 cubic

meters (5,000 cubic yards) or more three times during the most recent 365-day period.

(22) OPEN STORAGE PILE is any accumulation of bulk material, which is not fully enclosed, covered or chemically stabilized, and which attains a height of three feet or more and a total surface area of 150 or more square feet.

(23) PARTICULATE MATTER means any material, except uncombined water, which exists in a finely divided form as a liquid or solid at standard conditions.

(24) PAVED ROAD means a public or private improved street, highway, alley, public way, or easement that is covered by typical roadway materials, but excluding access roadways that connect a facility with a public paved roadway and are not open to through traffic. Public paved roads are those open to public access and that are owned by any federal, state, county, municipal or any other governmental or quasi-governmental agencies. Private paved roads are any paved roads not defined as public.

(25) PM_{10} means particulate matter with an aerodynamic diameter smaller than or equal to 10 microns as measured by the applicable State and Federal reference test methods.

(26) PROPERTY LINE means the boundaries of an area in which either a person causing the emission or a person allowing the emission has the legal use or possession of the property. Where such property is divided into one or more sub-tenancies, the property line(s) shall refer to the boundaries dividing the areas of all sub-tenancies.

(27) RULE 403 IMPLEMENTATION HANDBOOK means a guidance document that has been approved by the Governing Board on April 2, 2004 or hereafter approved by the Executive Officer and the U.S. EPA.

(28) SERVICE ROADS are paved or unpaved roads that are used by one or more public agencies for inspection or maintenance of infrastructure and which are not typically used for construction-related activity.

(29) SIMULTANEOUS SAMPLING means the operation of two PM_{10} samplers in such a manner that one sampler is started within five minutes of the other, and each sampler is operated for a consecutive period which must be not less than 290 minutes and not more than 310 minutes.

(30) SOUTH COAST AIR BASIN means the non-desert portions of Los Angeles, Riverside, and San Bernardino counties and all of Orange

County as defined in California Code of Regulations, Title 17, Section 60104. The area is bounded on the west by the Pacific Ocean, on the north and east by the San Gabriel, San Bernardino, and San Jacinto Mountains, and on the south by the San Diego county line.

(31) STABILIZED SURFACE means any previously disturbed surface area or open storage pile which, through the application of dust suppressants, shows visual or other evidence of surface crusting and is resistant to wind-driven fugitive dust and is demonstrated to be stabilized. Stabilization can be demonstrated by one or more of the applicable test methods contained in the Rule 403 Implementation Handbook.

(32) TRACK-OUT means any bulk material that adheres to and agglomerates on the exterior surface of motor vehicles, haul trucks, and equipment (including tires) that have been released onto a paved road and can be removed by a vacuum sweeper or a broom sweeper under normal operating conditions.

(33) TYPICAL ROADWAY MATERIALS means concrete, asphaltic concrete, recycled asphalt, asphalt, or any other material of equivalent performance as determined by the Executive Officer, and the U.S. EPA.

(34) UNPAVED ROADS means any unsealed or unpaved roads, equipment paths, or travel ways that are not covered by typical roadway materials. Public unpaved roads are any unpaved roadway owned by federal, state, county, municipal or other governmental or quasi-governmental agencies. Private unpaved roads are all other unpaved roadways not defined as public.

(35) VISIBLE ROADWAY DUST means any sand, soil, dirt, or other solid particulate matter which is visible upon paved road surfaces and which can be removed by a vacuum sweeper or a broom sweeper under normal operating conditions.

(36) WIND-DRIVEN FUGITIVE DUST means visible emissions from any disturbed surface area which is generated by wind action alone.

(37) WIND GUST is the maximum instantaneous wind speed as measured by an anemometer.

(d) Requirements

(1) No person shall cause or allow the emissions of fugitive dust from any active operation, open storage pile, or disturbed surface area such that:

(A) the dust remains visible in the atmosphere beyond the property line of the emission source; or

(B) the dust emission exceeds 20 percent opacity (as determined by the appropriate test method included in the Rule 403 Implementation Handbook), if the dust emission is the result of movement of a motorized vehicle.

(2) No person shall conduct active operations without utilizing the applicable best available control measures included in Table 1 of this Rule to minimize fugitive dust emissions from each fugitive dust source type within the active operation.

(3) No person shall cause or allow PM_{10} levels to exceed 50 micrograms per cubic meter when determined, by simultaneous sampling, as the difference between upwind and downwind samples collected on high-volume particulate matter samplers or other U.S. EPA-approved equivalent method for PM_{10} monitoring. If sampling is conducted, samplers shall be:

(A) Operated, maintained, and calibrated in accordance with 40 Code of Federal Regulations (CFR), Part 50, Appendix J, or appropriate U.S. EPA-published documents for U.S. EPA-approved equivalent method(s) for PM_{10}.

(B) Reasonably placed upwind and downwind of key activity areas and as close to the property line as feasible, such that other sources of fugitive dust between the sampler and the property line are minimized.

(4) No person shall allow track-out to extend 25 feet or more in cumulative length from the point of origin from an active operation. Notwithstanding the preceding, all track-out from an active operation shall be removed at the conclusion of each workday or evening shift.

(5) No person shall conduct an active operation with a disturbed surface area of five or more acres, or with a daily import or export of 100 cubic yards or more of bulk material without utilizing at least one of the measures listed in subparagraphs (d)(5)(A) through (d)(5)(E) at each vehicle egress from the site to a paved public road.

(A) Install a pad consisting of washed gravel (minimum-size: one inch) maintained in a clean condition to a depth of at least six inches and extending at least 30 feet wide and at least 50 feet long.

(B) Pave the surface extending at least 100 feet and at least 20 feet wide.

(C) Utilize a wheel shaker/wheel spreading device consisting of raised dividers (rails, pipe, or grates) at least 24 feet long and 10 feet wide to remove bulk material from tires and vehicle undercarriages before vehicles exit the site.

(D) Install and utilize a wheel washing system to remove bulk material from tires and vehicle undercarriages before vehicles exit the site.

(E) Any other control measures approved by the Executive Officer and the U.S. EPA as equivalent to the actions specified in subparagraphs (d)(5)(A) through (d)(5)(D).

(6) Beginning January 1, 2006, any person who operates or authorizes the operation of a confined animal facility subject to this Rule shall implement the applicable conservation management practices specified in Table 4 of this Rule.

(e) Additional Requirements for Large Operations

(1) Any person who conducts or authorizes the conducting of a large operation subject to this Rule shall implement the applicable actions specified in Table 2 of this Rule at all times and shall implement the applicable actions specified in Table 3 of this Rule when the applicable performance standards can not be met through use of Table 2 actions; and shall:

(A) submit a fully executed Large Operation Notification (Form 403 N) to the Executive Officer within 7 days of qualifying as a large operation;

(B) include, as part of the notification, the name(s), address(es), and phone number(s) of the person(s) responsible for the submittal, and a description of the operation(s), including a map depicting the location of the site;

(C) maintain daily records to document the specific dust control actions taken, maintain such records for a period of not less than three years; and make such records available to the Executive Officer upon request;

(D) install and maintain project signage with project contact signage that meets the minimum standards of the Rule 403 Implementation Handbook, prior to initiating any earthmoving activities;

(E) identify a dust control supervisor that:

(i) is employed by or contracted with the property owner or developer;

(ii) is on the site or available on-site within 30 minutes during working hours;

(iii) has the authority to expeditiously employ sufficient dust mitigation measures to ensure compliance with all Rule requirements;

(iv) has completed the AQMD Fugitive Dust Control Class and has been issued a valid Certificate of Completion for the class; and

(F) notify the Executive Officer in writing within 30 days after the site no longer qualifies as a large operation as defined by paragraph (c)(18).

(2) Any Large Operation Notification submitted to the Executive Officer or AQMD-approved dust control plan shall be valid for a period of one year from the date of written acceptance by the Executive Officer. Any Large Operation Notification accepted pursuant to paragraph (e)(1), excluding those submitted by aggregate-related plants and cement manufacturing facilities must be resubmitted annually by the person who conducts or authorizes the conducting of a large operation, at least 30 days prior to the expiration date, or the submittal shall no longer be valid as of the expiration date. If all fugitive dust sources and corresponding control measures or special circumstances remain identical to those identified in the previously accepted submittal or in an AQMD-approved dust control plan, the resubmittal may be a simple statement of no-change (Form 403NC).

(f) Compliance Schedule

The newly amended provisions of this Rule shall become effective upon adoption. Pursuant to subdivision (e), any existing site that qualifies as a large operation will have 60 days from the date of Rule adoption to comply with the notification and recordkeeping requirements for large operations. Any Large Operation

Notification or AQMD-approved dust control plan which has been accepted prior to the date of adoption of these amendments shall remain in effect and the Large Operation Notification or AQMD-approved dust control plan annual resubmittal date shall be one year from adoption of this Rule amendment.

(g) Exemptions

(1) The provisions of this Rule shall not apply to:

(A) Dairy farms.

(B) Confined animal facilities provided that the combined disturbed surface area within one continuous property line is one acre or less.

(C) Agricultural vegetative crop operations provided that the combined disturbed surface area within one continuous property line and not separated by a paved public road is 10 acres or less.

(D) Agricultural vegetative crop operations within the South Coast Air Basin, whose combined disturbed surface area includes more than 10 acres provided that the person responsible for such operations:

(i) voluntarily implements the conservation management practices contained in the Rule 403 Agricultural Handbook;

(ii) completes and maintains the self-monitoring form documenting sufficient conservation management practices, as described in the Rule 403 Agricultural Handbook; and

(iii) makes the completed self-monitoring form available to the Executive Officer upon request.

(E) Agricultural vegetative crop operations outside the South Coast Air Basin whose combined disturbed surface area includes more than 10 acres provided that the person responsible for such operations:

(i) voluntarily implements the conservation management practices contained in the Rule 403 Coachella Valley Agricultural Handbook; and

(ii) completes and maintains the self-monitoring form documenting sufficient conservation management practices, as described in the Rule 403 Coachella Valley Agricultural Handbook; and

(iii) makes the completed self-monitoring form available to the Executive Officer upon request.

(F) Active operations conducted during emergency life-threatening situations, or in conjunction with any officially declared disaster or state of emergency.

(G) Active operations conducted by essential service utilities to provide electricity, natural gas, telephone, water and sewer during periods of service outages and emergency disruptions.

(H) Any contractor subsequent to the time the contract ends, provided that such contractor implemented the required control measures during the contractual period.

(I) Any grading contractor, for a phase of active operations, subsequent to the contractual completion of that phase of earth-moving activities, provided that the required control measures have been implemented during the entire phase of earth-moving activities, through and including five days after the final grading inspection.

(J) Weed abatement operations ordered by a county agricultural commissioner or any state, county, or municipal fire department, provided that:

(i) mowing, cutting or other similar process is used which maintains weed stubble at least three inches above the soil; and

(ii) any discing or similar operation which cuts into and disturbs the soil, where watering is used prior to initiation of these activities, and a determination is made by the agency issuing the weed abatement order that, due to fire hazard conditions, rocks, or other physical obstructions, it is not practical to meet the conditions specified in clause (g)(1)(H)(i). The provisions this clause shall not exempt the owner of any property from stabilizing, in accordance with paragraph (d)(2), disturbed surface areas which have been created as a result of the weed abatement actions.

(K) sandblasting operations.

(2) The provisions of paragraphs (d)(1) and (d)(3) shall not apply:

(A) When wind gusts exceed 25 miles per hour, provided that:

(i) The required Table 3 contingency measures in this Rule are implemented for each applicable fugitive dust source type, and;

(ii) records are maintained in accordance with subparagraph (e)(1)(C).

(B) To unpaved roads, provided such roads:

(i) are used solely for the maintenance of wind-generating equipment; or

(ii) are unpaved public alleys as defined in Rule 1186; or

(iii) are service roads that meet all of the following criteria:

(a) are less than 50 feet in width at all points along the road;

(b) are within 25 feet of the property line; and

(c) have a traffic volume less than 20 vehicle-trips per day.

(C) To any active operation, open storage pile, or disturbed surface area for which necessary fugitive dust preventive or mitigative actions are in conflict with the federal Endangered Species Act, as determined in writing by the State or federal agency responsible for making such determinations.

(3) The provisions of (d)(2) shall not apply to any aggregate-related plant or cement manufacturing facility that implements the applicable actions specified in Table 2 of this Rule at all times and shall implement the applicable actions specified in Table 3 of this Rule when the applicable performance standards of paragraphs (d)(1) and (d)(3) can not be met through use of Table 2 actions.

(4) The provisions of paragraphs (d)(1), (d)(2), and (d)(3) shall not apply to:

(A) Blasting operations which have been permitted by the California Division of Industrial Safety; and

(B) Motion picture, television, and video production activities when dust emissions are required for visual effects. In order to obtain this exemption, the Executive Officer must receive notification in writing at least 72 hours in advance of any such activity and no nuisance results from such activity.

(5) The provisions of paragraph (d)(3) shall not apply if the dust control actions, as specified in Table 2, are implemented on a routine basis for

each applicable fugitive dust source type. To qualify for this exemption, a person must maintain records in accordance with subparagraph (e)(1)(C).

(6) The provisions of paragraph (d)(4) shall not apply to earth coverings of public paved roadways where such coverings are approved by a local government agency for the protection of the roadway, and where such coverings are used as roadway crossings for haul vehicles provided that such roadway is closed to through traffic and visible roadway dust is removed within one day following the cessation of activities.

(7) The provisions of subdivision (e) shall not apply to:

(A) officially-designated public parks and recreational areas, including national parks, national monuments, national forests, state parks, state recreational areas, and county regional parks.

(B) any large operation which is required to submit a dust control plan to any city or county government which has adopted a District-approved dust control ordinance.

(C) any large operation subject to Rule 1158, which has an approved dust control plan pursuant to Rule 1158, provided that all sources of fugitive dust are included in the Rule 1158 plan.

(8) The provisions of subparagraph (e)(1)(A) through (e)(1)(C) shall not apply to any large operation with an AQMD-approved fugitive dust control plan provided that there is no change to the sources and controls as identified in the AQMD-approved fugitive dust control plan.

(h) Fees

Any person conducting active operations for which the Executive Officer conducts upwind/downwind monitoring for PM_{10} pursuant to paragraph (d)(3) shall be assessed applicable Ambient Air Analysis Fees pursuant to Rule 304.1. Applicable fees shall be waived for any facility which is exempted from paragraph (d)(3) or meets the requirements of paragraph (d)(3).

TABLE 1
BEST AVAILABLE CONTROL MEASURES
(Applicable to All Construction Activity Sources)

Source Category	Control Measure	Guidance
Backfilling	01-1 Stabilize backfill material when not actively handling; and 01-2 Stabilize backfill material during handling; and 01-3 Stabilize soil at completion of activity.	✓ Mix backfill soil with water prior to moving ✓ Dedicate water truck or high capacity hose to backfilling equipment ✓ Empty loader bucket slowly so that no dust plumes are generated ✓ Minimize drop height from loader bucket
Clearing and grubbing	02-1 Maintain stability of soil through pre-watering of site prior to clearing and grubbing; and 02-2 Stabilize soil during clearing and grubbing activities; and 02-3 Stabilize soil immediately after clearing and grubbing activities.	✓ Maintain live perennial vegetation where possible ✓ Apply water in sufficient quantity to prevent generation of dust plumes
Clearing forms	03-1 Use water spray to clear forms; or 03-2 Use sweeping and water spray to clear forms; or 03-3 Use vacuum system to clear forms.	✓ Use of high pressure air to clear forms may cause exceedance of Rule requirements
Crushing	04-1 Stabilize surface soils prior to operation of support equipment; and 04-2 Stabilize material after crushing.	✓ Follow permit conditions for crushing equipment ✓ Pre-water material prior to loading into crusher ✓ Monitor crusher emissions opacity ✓ Apply water to crushed material to prevent dust plumes

TABLE 1
BEST AVAILABLE CONTROL MEASURES
(Applicable to All Construction Activity Sources)

Source Category	Control Measure	Guidance
Cut and fill	05-1 Pre-water soils prior to cut and fill activities; and 05-2 Stabilize soil during and after cut and fill activities.	✓ For large sites, pre-water with sprinklers or water trucks and allow time for penetration ✓ Use water trucks/pulls to water soils to depth of cut prior to subsequent cuts
Demolition – mechanical/manual	06-1 Stabilize wind erodible surfaces to reduce dust; and 06-2 Stabilize surface soil where support equipment and vehicles will operate; and 06-3 Stabilize loose soil and demolition debris; and 06-4 Comply with AQMD Rule 1403.	✓ Apply water in sufficient quantities to prevent the generation of visible dust plumes
Disturbed soil	07-1 Stabilize disturbed soil throughout the construction site; and 07-2 Stabilize disturbed soil between structures	✓ Limit vehicular traffic and disturbances on soils where possible ✓ If interior block walls are planned, install as early as possible ✓ Apply water or a stabilizing agent in sufficient quantities to prevent the generation of visible dust plumes
Earth-moving activities	08-1 Pre-apply water to depth of proposed cuts; and 08-2 Re-apply water as necessary to maintain soils in a damp condition and to ensure that visible emissions do not exceed 100 feet in any direction; and 08-3 Stabilize soils once earth-moving activities are complete.	✓ Grade each project phase separately, timed to coincide with construction phase ✓ Upwind fencing can prevent material movement on site ✓ Apply water or a stabilizing agent in sufficient quantities to prevent the generation of visible dust plumes

TABLE 1
BEST AVAILABLE CONTROL MEASURES
(Applicable to All Construction Activity Sources)

Source Category	Control Measure	Guidance
Importing/exporting of bulk materials	09-1 Stabilize material while loading to reduce fugitive dust emissions; and 09-2 Maintain at least six inches of freeboard on haul vehicles; and 09-3 Stabilize material while transporting to reduce fugitive dust emissions; and 09-4 Stabilize material while unloading to reduce fugitive dust emissions; and 09-5 Comply with Vehicle Code Section 23114.	✓ Use tarps or other suitable enclosures on haul trucks ✓ Check belly-dump truck seals regularly and remove any trapped rocks to prevent spillage ✓ Comply with track-out prevention/mitigation requirements ✓ Provide water while loading and unloading to reduce visible dust plumes
Landscaping	10-1 Stabilize soils, materials, slopes	✓ Apply water to materials to stabilize ✓ Maintain materials in a crusted condition ✓ Maintain effective cover over materials ✓ Stabilize sloping surfaces using soil binders until vegetation or ground cover can effectively stabilize the slopes ✓ Hydroseed prior to rain season
Road shoulder maintenance	11-1 Apply water to unpaved shoulders prior to clearing; and 11-2 Apply chemical dust suppressants and/or washed gravel to maintain a stabilized surface after completing road shoulder maintenance.	✓ Installation of curbing and/or paving of road shoulders can reduce recurring maintenance costs ✓ Use of chemical dust suppressants can inhibit vegetation growth and reduce future road shoulder maintenance costs

TABLE 1
BEST AVAILABLE CONTROL MEASURES
(Applicable to All Construction Activity Sources)

Source Category	Control Measure	Guidance
Screening	12-1 Pre-water material prior to screening; and 12-2 Limit fugitive dust emissions to opacity and plume length standards; and 12-3 Stabilize material immediately after screening.	✓ Dedicate water truck or high capacity hose to screening operation ✓ Drop material through the screen slowly and minimize drop height ✓ Install wind barrier with a porosity of no more than 50% upwind of screen to the height of the drop point
Staging areas	13-1 Stabilize staging areas during use; and 13-2 Stabilize staging area soils at project completion.	✓ Limit size of staging area ✓ Limit vehicle speeds to 15 miles per hour ✓ Limit number and size of staging area entrances/exists
Stockpiles/ Bulk Material Handling	14-1 Stabilize stockpiled materials. 14-2 Stockpiles within 100 yards of off-site occupied buildings must not be greater than eight feet in height; or must have a road bladed to the top to allow water truck access or must have an operational water irrigation system that is capable of complete stockpile coverage.	✓ Add or remove material from the downwind portion of the storage pile ✓ Maintain storage piles to avoid steep sides or faces

TABLE 1
BEST AVAILABLE CONTROL MEASURES
(Applicable to All Construction Activity Sources)

Source Category	Control Measure	Guidance
Traffic areas for construction activities	15-1 Stabilize all off-road traffic and parking areas; and 15-2 Stabilize all haul routes; and 15-3 Direct construction traffic over established haul routes.	✓ Apply gravel/paving to all haul routes as soon as possible to all future roadway areas ✓ Barriers can be used to ensure vehicles are only used on established parking areas/haul routes
Trenching	16-1 Stabilize surface soils where trencher or excavator and support equipment will operate; and 16-2 Stabilize soils at the completion of trenching activities.	✓ Pre-watering of soils prior to trenching is an effective preventive measure. For deep trenching activities, pre-trench to 18 inches soak soils via the pre-trench and resuming trenching ✓ Washing mud and soils from equipment at the conclusion of trenching activities can prevent crusting and drying of soil on equipment
Truck loading	17-1 Pre-water material prior to loading; and 17-2 Ensure that freeboard exceeds six inches (CVC 23114)	✓ Empty loader bucket such that no visible dust plumes are created ✓ Ensure that the loader bucket is close to the truck to minimize drop height while loading
Turf Overseeding	18-1 Apply sufficient water immediately prior to conducting turf vacuuming activities to meet opacity and plume length standards; and 18-2 Cover haul vehicles prior to exiting the site.	✓ Haul waste material immediately off-site

TABLE 1
BEST AVAILABLE CONTROL MEASURES
(Applicable to All Construction Activity Sources)

Source Category	Control Measure		Guidance
Unpaved roads/parking lots	19-1	Stabilize soils to meet the applicable performance standards; and	✓ Restricting vehicular access to established unpaved travel paths and parking lots can reduce stabilization requirements
	19-2	Limit vehicular travel to established unpaved roads (haul routes) and unpaved parking lots.	
Vacant land	20-1	In instances where vacant lots are 0.10 acre or larger and have a cumulative area of 500 square feet or more that are driven over and/or used by motor vehicles and/or off-road vehicles, prevent motor vehicle and/or off-road vehicle trespassing, parking and/or access by installing barriers, curbs, fences, gates, posts, signs, shrubs, trees or other effective control measures.	

Table 2
DUST CONTROL MEASURES FOR LARGE OPERATIONS

FUGITIVE DUST SOURCE CATEGORY	CONTROL ACTIONS	
Earth-moving (except construction cutting and filling areas, and mining operations)	(1a)	Maintain soil moisture content at a minimum of 12 percent, as determined by ASTM method D-2216, or other equivalent method approved by the Executive Officer, the California Air Resources Board, and the U.S. EPA. Two soil moisture evaluations must be conducted during the first three hours of active operations during a calendar day, and two such evaluations each subsequent four-hour period of active operations; OR
	(1a-1)	For any earth-moving which is more than 100 feet from all property lines, conduct watering as necessary to prevent visible dust emissions from exceeding 100 feet in length in any direction.
Earth-moving: Construction fill areas:	(1b)	Maintain soil moisture content at a minimum of 12 percent, as determined by ASTM method D-2216, or other equivalent method approved by the Executive Officer, the California Air Resources Board, and the U.S. EPA. For areas which have an optimum moisture content for compaction of less than 12 percent, as determined by ASTM Method 1557 or other equivalent method approved by the Executive Officer and the California Air Resources Board and the U.S. EPA, complete the compaction process as expeditiously as possible after achieving at least 70 percent of the optimum soil moisture content. Two soil moisture evaluations must be conducted during the first three hours of active operations during a calendar day, and two such evaluations during each subsequent four-hour period of active operations.

Table 2 (Continued)

FUGITIVE DUST SOURCE CATEGORY	CONTROL ACTIONS	
Earth-moving: Construction cut areas and mining operations:	(1c)	Conduct watering as necessary to prevent visible emissions from extending more than 100 feet beyond the active cut or mining area unless the area is inaccessible to watering vehicles due to slope conditions or other safety factors.
Disturbed surface areas (except completed grading areas)	(2a/b)	Apply dust suppression in sufficient quantity and frequency to maintain a stabilized surface. Any areas which cannot be stabilized, as evidenced by wind driven fugitive dust must have an application of water at least twice per day to at least 80 percent of the unstabilized area.
Disturbed surface areas: Completed grading areas	(2c)	Apply chemical stabilizers within five working days of grading completion; OR
	(2d)	Take actions (3a) or (3c) specified for inactive disturbed surface areas.
Inactive disturbed surface areas	(3a)	Apply water to at least 80 percent of all inactive disturbed surface areas on a daily basis when there is evidence of wind driven fugitive dust, excluding any areas which are inaccessible to watering vehicles due to excessive slope or other safety conditions; OR
	(3b)	Apply dust suppressants in sufficient quantity and frequency to maintain a stabilized surface; OR
	(3c)	Establish a vegetative ground cover within 21 days after active operations have ceased. Ground cover must be of sufficient density to expose less than 30 percent of unstabilized ground within 90 days of planting, and at all times thereafter; OR
	(3d)	Utilize any combination of control actions (3a), (3b), and (3c) such that, in total, these actions apply to all inactive disturbed surface areas.

Table 2 (Continued)

FUGITIVE DUST SOURCE CATEGORY	CONTROL ACTIONS	
Unpaved Roads	(4a)	Water all roads used for any vehicular traffic at least once per every two hours of active operations [3 times per normal 8 hour work day]; OR
	(4b)	Water all roads used for any vehicular traffic once daily and restrict vehicle speeds to 15 miles per hour; OR
	(4c)	Apply a chemical stabilizer to all unpaved road surfaces in sufficient quantity and frequency to maintain a stabilized surface.
Open storage piles	(5a)	Apply chemical stabilizers; OR
	(5b)	Apply water to at least 80 percent of the surface area of all open storage piles on a daily basis when there is evidence of wind driven fugitive dust; OR
	(5c)	Install temporary coverings; OR
	(5d)	Install a three-sided enclosure with walls with no more than 50 percent porosity which extend, at a minimum, to the top of the pile. This option may only be used at aggregate-related plants or at cement manufacturing facilities.
All Categories	(6a)	Any other control measures approved by the Executive Officer and the U.S. EPA as equivalent to the methods specified in Table 2 may be used.

TABLE 3
CONTINGENCY CONTROL MEASURES FOR LARGE OPERATIONS

FUGITIVE DUST SOURCE CATEGORY	CONTROL MEASURES
Earth-moving	(1A) Cease all active operations; OR (2A) Apply water to soil not more than 15 minutes prior to moving such soil.
Disturbed surface areas	(0B) On the last day of active operations prior to a weekend, holiday, or any other period when active operations will not occur for not more than four consecutive days: apply water with a mixture of chemical stabilizer diluted to not less than 1/20 of the concentration required to maintain a stabilized surface for a period of six months; OR (1B) Apply chemical stabilizers prior to wind event; OR (2B) Apply water to all unstabilized disturbed areas 3 times per day. If there is any evidence of wind driven fugitive dust, watering frequency is increased to a minimum of four times per day; OR (3B) Take the actions specified in Table 2, Item (3c); OR (4B) Utilize any combination of control actions (1B), (2B), and (3B) such that, in total, these actions apply to all disturbed surface areas.
Unpaved roads	(1C) Apply chemical stabilizers prior to wind event; OR (2C) Apply water twice per hour during active operation; OR (3C) Stop all vehicular traffic.
Open storage piles	(1D) Apply water twice per hour; OR (2D) Install temporary coverings.
Paved road track-out	(1E) Cover all haul vehicles; OR (2E) Comply with the vehicle freeboard requirements of Section 23114 of the California Vehicle Code for both public and private roads.
All Categories	(1F) Any other control measures approved by the Executive Officer and the U.S. EPA as equivalent to the methods specified in Table 3 may be used.

Table 4
(Conservation Management Practices for Confined Animal Facilities)

SOURCE CATEGORY	CONSERVATION MANAGEMENT PRACTICES
Manure Handling **(Only applicable to Commercial Poultry Ranches)**	(1a) Cover manure prior to removing material off-site; AND (1b) Spread the manure before 11:00 AM and when wind conditions are less than 25 miles per hour; AND (1c) Utilize coning and drying manure management by removing manure at laying hen houses at least twice per year and maintain a base of no less than 6 inches of dry manure after clean out; or in lieu of complying with conservation management practice (1c), comply with conservation management practice (1d). (1d) Utilize frequent manure removal by removing the manure from laying hen houses at least every seven days and immediately thin bed dry the material.
Feedstock Handling	(2a) Utilize a sock or boot on the feed truck auger when filling feed storage bins.
Disturbed Surfaces	(3a) Maintain at least 70 percent vegetative cover on vacant portions of the facility; OR (3b) Utilize conservation tillage practices to manage the amount, orientation and distribution of crop and other plant residues on the soil surface year-round, while growing crops (if applicable) in narrow slots or tilled strips; OR (3c) Apply dust suppressants in sufficient concentrations and frequencies to maintain a stabilized surface.
Unpaved Roads	(4a) Restrict access to private unpaved roads either through signage or physical access restrictions and control vehicular speeds to no more than 15 miles per hour through worker notifications, signage, or any other necessary means; OR (4b) Cover frequently traveled unpaved roads with low silt content material (i.e., asphalt, concrete, recycled road base, or gravel to a minimum depth of four inches); OR (4c) Treat unpaved roads with water, mulch, chemical dust suppressants or other cover to maintain a stabilized surface.
Equipment Parking Areas	(5a) Apply dust suppressants in sufficient quantity and frequency to maintain a stabilized surface; OR (5b) Apply material with low silt content (i.e., asphalt, concrete, recycled road base, or gravel to a depth of four inches).

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Appendix B-1

- Operation Emissions Inventory
  - Regional Operation Emissions
    - Regional Emission Summary Sheet
    - Stationary Source Emissions
    - Area Source Emissions
    - URBEMIS2007 Output Files
  - Local Operation Emissions
    - One-hour CO Summary Sheet
    - Eight-hour CO Summary Sheet
    - CALINE4 Output Files
    - EMFAC2007 Emission Rates

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Lytle Creek Ranch

Regional Emission Calculations (lbs/day)

	VOC	NOx	CO	SO2	PM10	PM2.5
Project						
Mobile	394	436	3755	10	1596	311
Area	0	0	0	0	0	0
Stationary	2	220	38	23	8	8
Total Project	**395**	**657**	**3793**	**33**	**1604**	**319**
Net Project						
Net Mobile	394	436	3755	10	1596	311
Net Area	0	0	0	0	0	0
Net Stationary	2	220	38	23	8	8
Total Net	395	657	3793	33	1604	319
SCAQMD Significance Threshold	55	55	550	150	150	55
Difference	**340**	**602**	**3243**	**(117)**	**1454**	**264**
Significant?	**Yes**	**Yes**	**Yes**	**No**	**Yes**	**Yes**

Electricity Usage

Land Use	1,000 Sqft	Electricity Usage Rate [a] (kWh\sq.ft\yr)	Total Electricity Usage (KWh\year)	Total Electricity Usage (MWh\Day)	CO 0.2	ROC 0.01	NOx 1.15	PM10 0.04	SOx 0.12	CO2 804.54	CH4 0.0067	NO2 0.0037
					Emission Factors (lbs/MWh) [b]							
Project												
Retail	849.4	13.55	10,934,159	29.957	5.991	0.300	34.450	1.198	3.595	24101.283	0.201	0.111
Elementary School	1950.0	5.9	10,929,750	29.945	5.989	0.299	34.436	1.198	3.593	24091.565	0.201	0.111
Miscellaneous	318.0	10.5	3,172,050	8.691	1.738	0.087	9.994	0.348	1.043	6991.893	0.058	0.032
Residential (DU)	8407.0	5,627	44,936,886	123.115	24.623	1.231	141.582	4.925	14.774	99050.746	0.825	0.456
Total Project			**69,972,845**	**191.706**	**38.34**	**1.92**	**220.46**	**7.67**	**23.01**	**154,235.49**	**1.29**	**0.71**
Net Emissions From Electricity Usage					**38.34**	**1.92**	**220.46**	**7.67**	**23.01**	**154235.49**	**1.29**	**0.71**

Summary of Stationary Emissions

	CO	ROC	NOx	PM10	SOx
Total Existing Emissions (lbs/day)	0.00	0.00	0.00	0.00	0.00
Total Project Emissions (lbs/day)	38.34	1.92	220.46	7.67	23.01
Total Net Emissions (lbs/day)	**38.34**	**1.92**	**220.46**	**7.67**	**23.01**

[a] Electricity Usage Rates from Table A9-11-A, CEQA Air Quality Handbook, SCAQMD, 1993.

[b] Emission Factors from Table A9-11-B, CEQA Air Quality Handbook, SCAQMD, 1993.

[c] Natural Gas Usage Rates from Table A9-12-A, CEQA Air Quality Handbook, SCAQMD, 1993.

[d] Emission Factors from URBEMIS2002 Version 8.7 (US EPA 1995)

[e] The emission factors for NOx in lbs per million cuft of natural gas are 100 for nonresidential uses and 94 for residential uses.

Lytle Creek Rialto - URBEMIS Inputs

Neighborhood	End Date	DU	School Use (Acres)	Retail (KSF)
I	8/31/2015	924		19.0
II	5/31/2018	2,430		39.5
III	2/28/2020	2,691	24	764.1
IV	6/30/2021	2,362		26.9
Total		8,407	24	849.4

ITE Trip Rate

Land Use	Trip Rate	Units
Single Family Residential	9.57	per DU
Multi Family Residential	6.9	per DU
Retail	42.94	per KSF
Elementary School	1.29	per Student
Middle School	1.62	per Student

Trip Rate Adjustment

Ratio	0.6714	0.0243	0.3044
Revised Totals	55005	1720	24936
Trip Rates	6.54	0.88	29.36

URBEMIS2007 Output File:
Winter Operations

Urbemis 2007 Version 9.2.4

Combined Winter Emissions Reports (Pounds/Day)

File Name: V:\AQNOISE DIVISION\Active Projects\Rialto Specific Plan\Operations\Urbemis OPS.urb924

Project Name: Lytle Creek Ranch Final Buildout

Project Location: San Bernadino County

On-Road Vehicle Emissions Based on: Version : Emfac2007 V2.3 Nov 1 2006

Off-Road Vehicle Emissions Based on: OFFROAD2007

Area Source Unmitigated Detail Report:

AREA SOURCE EMISSION ESTIMATES Winter Pounds Per Day, Unmitigated

Source	ROG	NOx	CO	SO2	PM10	PM2.5	CO2
Natural Gas	8.77	114.08	52.50	0.00	0.22	0.21	144,903.13
Hearth							
Landscaping - No Winter Emissions							
Consumer Products	431.28						
Architectural Coatings	26.63						
TOTALS (lbs/day, unmitigated)	466.68	114.08	52.50	0.00	0.22	0.21	144,903.13

URBEMIS2007 Output File:
Winter Operations

Area Source Changes to Defaults

Operational Unmitigated Detail Report:

OPERATIONAL EMISSION ESTIMATES Winter Pounds Per Day, Unmitigated

Source	ROG	NOX	CO	SO2	PM10	PM25	CO2
Single family housing	139.70	155.72	1,216.87	3.11	570.02	111.16	327,686.85
Condo/townhouse general	150.23	164.61	1,286.32	3.29	602.56	117.51	346,390.07
Elementary school	10.17	7.81	59.34	0.15	28.57	5.56	16,320.38
City park	2.42	2.18	16.41	0.04	7.94	1.54	4,526.12
Strip mall	91.06	106.09	798.78	2.09	386.80	75.27	220,455.51
TOTALS (lbs/day, unmitigated)	393.58	436.41	3,377.72	8.68	1,595.89	311.04	915,378.93

Operational Settings:

Does not include correction for passby trips

Does not include double counting adjustment for internal trips

Analysis Year: 2030 Temperature (F): 60 Season: Winter

Emfac: Version : Emfac2007 V2.3 Nov 1 2006

Summary of Land Uses

Land Use Type	Acreage	Trip Rate	Unit Type	No. Units	Total Trips	Total VMT
Single family housing	1,136.33	9.57	dwelling units	3,409.00	32,624.13	329,595.05
Condo/townhouse general	312.38	6.90	dwelling units	4,998.00	34,486.20	348,407.19
Elementary school		0.88	students	1,950.00	1,716.00	16,525.08
City park		1.59	acres	318.00	505.62	4,592.29
Strip mall		29.36	1000 sq ft	849.42	24,938.97	223,777.38
					94,270.92	922,896.99

URBEMIS2007 Output File:
Winter Operations

Vehicle Fleet Mix

Vehicle Type	Percent Type	Non-Catalyst	Catalyst	Diesel
Light Auto	44.2	0.0	100.0	0.0
Light Truck < 3750 lbs	9.9	0.0	99.0	1.0
Light Truck 3751-5750 lbs	21.8	0.0	100.0	0.0
Med Truck 5751-8500 lbs	12.1	0.0	100.0	0.0
Lite-Heavy Truck 8501-10,000 lbs	2.3	0.0	82.6	17.4
Lite-Heavy Truck 10,001-14,000 lbs	0.7	0.0	57.1	42.9
Med-Heavy Truck 14,001-33,000 lbs	1.1	0.0	18.2	81.8
Heavy-Heavy Truck 33,001-60,000 lbs	2.1	0.0	0.0	100.0
Other Bus	0.0	0.0	0.0	0.0
Urban Bus	0.0	0.0	0.0	0.0
Motorcycle	4.0	32.5	67.5	0.0
School Bus	0.1	0.0	0.0	100.0
Motor Home	1.7	0.0	88.2	11.8

Travel Conditions

	Residential			Commercial		
	Home-Work	Home-Shop	Home-Other	Commute	Non-Work	Customer
Urban Trip Length (miles)	12.7	7.0	9.5	13.3	7.4	8.9
Rural Trip Length (miles)	17.6	12.1	14.9	15.4	9.6	12.6
Trip speeds (mph)	30.0	30.0	30.0	30.0	30.0	30.0
% of Trips - Residential	32.9	18.0	49.1			
% of Trips - Commercial (by land use)						
Elementary school				20.0	10.0	70.0
City park				5.0	2.5	92.5
Strip mall				2.0	1.0	97.0

URBEMIS2007 Output File:
Summer Operations

Urbemis 2007 Version 9.2.4

Combined Summer Emissions Reports (Pounds/Day)

File Name: V:\AQNOISE DIVISION\Active Projects\Rialto Specific Plan\Operations\Urbemis OPS.urb924

Project Name: Lytle Creek Ranch Final Buildout

Project Location: San Bernadino County

On-Road Vehicle Emissions Based on: Version : Emfac2007 V2.3 Nov 1 2006

Off-Road Vehicle Emissions Based on: OFFROAD2007

Area Source Unmitigated Detail Report:

AREA SOURCE EMISSION ESTIMATES Summer Pounds Per Day, Unmitigated

Source	ROG	NOx	CO	SO2	PM10	PM2.5	CO2
Natural Gas	8.77	114.08	52.50	0.00	0.22	0.21	144,903.13
Hearth							
Landscape	28.00	1.80	158.36	0.01	0.42	0.42	255.58
Consumer Products	431.28						
Architectural Coatings	26.63						
TOTALS (lbs/day, unmitigated)	494.68	115.88	210.86	0.01	0.64	0.63	145,158.71

URBEMIS2007 Output File:
Summer Operations

Area Source Changes to Defaults

Operational Unmitigated Detail Report:

OPERATIONAL EMISSION ESTIMATES Summer Pounds Per Day, Unmitigated

Source	ROG	NOX	CO	SO2	PM10	PM25	CO2
Single family housing	137.52	125.70	1,354.24	3.75	570.02	111.16	374,032.92
Condo/townhouse general	151.73	132.87	1,431.53	3.96	602.56	117.51	395,381.41
Elementary school	14.92	6.30	66.00	0.19	28.57	5.56	18,644.06
City park	3.13	1.76	18.19	0.05	7.94	1.54	5,171.86
Strip mall	85.61	85.69	884.76	2.52	386.80	75.27	251,922.00
TOTALS (lbs/day, unmitigated)	392.91	352.32	3,754.72	10.47	1,595.89	311.04	1,045,152.25

Operational Settings:

Does not include correction for passby trips

Does not include double counting adjustment for internal trips

Analysis Year: 2030 Temperature (F): 85 Season: Summer

Emfac: Version : Emfac2007 V2.3 Nov 1 2006

Summary of Land Uses

Land Use Type	Acreage	Trip Rate	Unit Type	No. Units	Total Trips	Total VMT
Single family housing	1,136.33	9.57	dwelling units	3,409.00	32,624.13	329,595.05
Condo/townhouse general	312.38	6.90	dwelling units	4,998.00	34,486.20	348,407.19
Elementary school		0.88	students	1,950.00	1,716.00	16,525.08
City park		1.59	acres	318.00	505.62	4,592.29
Strip mall		29.36	1000 sq ft	849.42	24,938.97	223,777.38
					94,270.92	922,896.99

URBEMIS2007 Output File:
Summer Operations

Vehicle Fleet Mix

Vehicle Type	Percent Type	Non-Catalyst	Catalyst	Diesel
Light Auto	44.2	0.0	100.0	0.0
Light Truck < 3750 lbs	9.9	0.0	99.0	1.0
Light Truck 3751-5750 lbs	21.8	0.0	100.0	0.0
Med Truck 5751-8500 lbs	12.1	0.0	100.0	0.0
Lite-Heavy Truck 8501-10,000 lbs	2.3	0.0	82.6	17.4
Lite-Heavy Truck 10,001-14,000 lbs	0.7	0.0	57.1	42.9
Med-Heavy Truck 14,001-33,000 lbs	1.1	0.0	18.2	81.8
Heavy-Heavy Truck 33,001-60,000 lbs	2.1	0.0	0.0	100.0
Other Bus	0.0	0.0	0.0	0.0
Urban Bus	0.0	0.0	0.0	0.0
Motorcycle	4.0	32.5	67.5	0.0
School Bus	0.1	0.0	0.0	100.0
Motor Home	1.7	0.0	88.2	11.8

Travel Conditions

	Residential			Commercial		
	Home-Work	Home-Shop	Home-Other	Commute	Non-Work	Customer
Urban Trip Length (miles)	12.7	7.0	9.5	13.3	7.4	8.9
Rural Trip Length (miles)	17.6	12.1	14.9	15.4	9.6	12.6
Trip speeds (mph)	30.0	30.0	30.0	30.0	30.0	30.0
% of Trips - Residential	32.9	18.0	49.1			
% of Trips - Commercial (by land use)						
Elementary school				20.0	10.0	70.0
City park				5.0	2.5	92.5
Strip mall				2.0	1.0	97.0

Lytle Creek Ranch

CALINE4 Modeling Results and Estimated Local 1-Hour Carbon Monoxide Concentrations (ppm)

Projected Background 1-Hour CO Concentrations (ppm) [a]

Monitoring Station: San Bernardino

Year	1-Hr Concentration
2030	3.6

Intersection and Receptor Locations	Future Without Project		Future With Project		
	Traffic CO Contribution [b]	Estimated Local CO Concentration [c]	Traffic CO Contribution [b]	Estimated Local CO Concentration [c]	Exceedance of Significance Threshold [d]
Glen Helen Parkway and Cajon Boulevard					
NE	0.3	3.9	0.3	3.9	NO
SE	0.2	3.8	0.2	3.8	NO
SW	0.3	3.9	0.3	3.9	NO
NW	0.2	3.8	0.2	3.8	NO
Glen Helen Parkway and Cajon Boulevard					
NE	0.4	4.0	0.5	4.1	NO
SE	0.4	4.0	0.5	4.1	NO
SW	0.3	3.9	0.3	3.9	NO
NW	0.3	3.9	0.3	3.9	NO
I-15 SB On/Off Ramps and Sierra Avenue					
NE	0.4	4.0	0.4	4.0	NO
SE	0.5	4.1	0.5	4.1	NO
SW	0.5	4.1	0.6	4.2	NO
NW	0.5	4.1	0.5	4.1	NO
I-15 SB On/Off Ramps and Sierra Avenue					
NE	0.4	4.0	0.5	4.1	NO
SE	0.5	4.1	0.6	4.2	NO
SW	0.4	4.0	0.4	4.0	NO
NW	0.4	4.0	0.4	4.0	NO
I-215 NB On/Off Ramps and University Parkway					
NE	0.3	3.9	0.5	4.1	NO
SE	0.3	3.9	0.6	4.2	NO
SW	0.3	3.9	0.6	4.2	NO
NW	0.3	3.9	0.5	4.1	NO
I-215 NB On/Off Ramps and University Parkway					
NE	0.4	4.0	0.6	4.2	NO
SE	0.4	4.0	0.6	4.2	NO
SW	0.6	4.2	0.9	4.5	NO
NW	0.5	4.1	0.7	4.3	NO
I-215 SB On/Off Ramps and Palm Avenue					
NE	0.6	4.2	0.6	4.2	NO
SE	0.6	4.2	0.6	4.2	NO
SW	0.5	4.1	0.5	4.1	NO
NW	0.8	4.4	0.8	4.4	NO
I-215 SB On/Off Ramps and Palm Avenue					
NE	0.7	4.3	0.7	4.3	NO
SE	0.8	4.4	0.8	4.4	NO
SW	0.7	4.3	0.7	4.3	NO
NW	1.0	4.6	1.0	4.6	NO
Lytle Creek Road and Sierra Avenue					
NE	0.6	4.2	0.7	4.3	NO
SE	0.3	3.9	0.4	4.0	NO
SW	0.3	3.9	0.4	4.0	NO
NW	0.6	4.2	0.8	4.4	NO
Lytle Creek Road and Sierra Avenue					
NE	0.6	4.2	0.8	4.4	NO
SE	0.6	4.2	0.8	4.4	NO
SW	0.6	4.2	0.8	4.4	NO
NW	0.7	4.3	0.8	4.4	NO

a Based on guidance provided by the AQMD Air Quality Analysis Guidance Handbook.

b The 1-hour traffic contribution (ppm) is determined by inputing total traffic volumes into the CALINE4 model.

c The estimated local concentration is the traffic contribution + the background concentration.

Lytle Creek Ranch

CALINE4 Modeling Results and Estimated Local 8-Hour Carbon Monoxide Concentrations (ppm)

Projected Background 8-Hour CO Concentrations (ppm)[a]

Monitoring Station: San Bernardinc

Year	8-Hr Concentration
2030	2.9

Average Persistence Factor = 0.70

Intersection and Receptor Locations	Future Without Project		Future With Project		
	Traffic CO Contribution[b]	Estimated Local CO Concentration[c]	Traffic CO Contribution[b]	Estimated Local CO Concentration[c]	Exceedance of Significance Threshold[d]
Glen Helen Parkway and Cajon Boulevarc					
NE	0.1	3.0	0.1	3.0	NO
SE	0.1	3.0	0.1	3.0	NO
SW	0.1	3.0	0.1	3.0	NO
NW	0.1	3.0	0.1	3.0	NO
Glen Helen Parkway and Cajon Boulevarc					
NE	0.2	3.1	0.2	3.1	NO
SE	0.2	3.1	0.2	3.1	NO
SW	0.1	3.0	0.1	3.0	NO
NW	0.1	3.0	0.1	3.0	NO
I-15 SB On/Off Ramps and Sierra Avenue					
NE	0.2	3.1	0.2	3.1	NO
SE	0.3	3.2	0.3	3.2	NO
SW	0.3	3.2	0.3	3.2	NO
NW	0.3	3.2	0.3	3.2	NO
I-15 SB On/Off Ramps and Sierra Avenue					
NE	0.2	3.1	0.2	3.1	NO
SE	0.2	3.1	0.3	3.2	NO
SW	0.2	3.1	0.2	3.1	NO
NW	0.2	3.1	0.2	3.1	NO
I-215 NB On/Off Ramps and University Parkway					
NE	0.1	3.0	0.2	3.1	NO
SE	0.1	3.0	0.2	3.1	NO
SW	0.1	3.0	0.3	3.2	NO
NW	0.1	3.0	0.3	3.2	NO
I-215 NB On/Off Ramps and University Parkway					
NE	0.2	3.1	0.4	3.3	NO
SE	0.1	3.0	0.3	3.2	NO
SW	0.3	3.2	0.4	3.3	NO
NW	0.2	3.1	0.3	3.2	NO
I-215 SB On/Off Ramps and Palm Avenue					
NE	0.3	3.2	0.3	3.2	NO
SE	0.3	3.2	0.3	3.2	NO
SW	0.3	3.2	0.3	3.2	NO
NW	0.4	3.3	0.4	3.3	NO
I-215 SB On/Off Ramps and Palm Avenue					
NE	0.4	3.3	0.4	3.3	NO
SE	0.4	3.3	0.4	3.3	NO
SW	0.4	3.3	0.4	3.3	NO
NW	0.5	3.4	0.5	3.4	NO
Lytle Creek Road and Sierra Avenue					
NE	0.2	3.1	0.3	3.2	NO
SE	0.1	3.0	0.2	3.1	NO
SW	0.1	3.0	0.2	3.1	NO
NW	0.2	3.1	0.3	3.2	NO
Lytle Creek Road and Sierra Avenue					
NE	0.3	3.2	0.4	3.3	NO
SE	0.3	3.2	0.4	3.3	NO
SW	0.3	3.2	0.4	3.3	NO
NW	0.3	3.2	0.4	3.3	NO

a Based on guidance provided by the AQMD Air Quality Analysis Guidance Handbook.

b The persistence factor is calculated as recommended in Table B.15 in the Transportation Project-Level Carbon Monoxide Protocol (Institute of Transportation Studies, UC Davis, Revised 1997). This is a generalized persistence factor likely to provide a conservative estimate in most situations.

c The estimated local concentration is the traffic contribution + the background concentration.

d The California Ambient Air Quality Standard for 8-hour CO concentrations is 9 ppm.

Lytle Creek Ranch

CALINE4 Modeling Results and Estimated Local 1-Hour Carbon Monoxide Concentrations (ppm)

Projected Background 1-Hour CO Concentrations (ppm) [a]

Monitoring Station: San Bernardino

Year	1-Hr Concentration
2030	3.6

Intersection and Receptor Locations	Future Without Project		Future With Project		
	Traffic CO Contribution [b]	Estimated Local CO Concentration [c]	Traffic CO Contribution [b]	Estimated Local CO Concentration [c]	Exceedance of Significance Threshold [d]
Casmalia Street and Alder Avenue					
NE	0.3	3.9	0.3	3.9	NO
SE	0.2	3.8	0.2	3.8	NO
SW	0.3	3.9	0.3	3.9	NO
NW	0.3	3.9	0.4	4.0	NO
Casmalia Street and Alder Avenue					
NE	0.4	4.0	0.4	4.0	NO
SE	0.3	3.9	0.3	3.9	NO
SW	0.4	4.0	0.4	4.0	NO
NW	0.4	4.0	0.5	4.1	NO
I-15 NB On/Off Ramps and Sierra Avenue					
NE	0.3	3.9	0.5	4.1	NO
SE	0.3	3.9	0.5	4.1	NO
SW	0.4	4.0	0.6	4.2	NO
NW	0.4	4.0	0.6	4.2	NO
I-15 NB On/Off Ramps and Sierra Avenue					
NE	0.4	4.0	0.7	4.3	NO
SE	0.5	4.1	0.9	4.5	NO
SW	0.6	4.2	0.9	4.5	NO
NW	0.5	4.1	0.9	4.5	NO
I-15 SB On/Off Ramps and Summit Avenue					
NE	0.4	4.0	0.4	4.0	NO
SE	0.3	3.9	0.3	3.9	NO
SW	0.3	3.9	0.3	3.9	NO
NW	0.4	4.0	0.4	4.0	NO
I-15 SB On/Off Ramps and Summit Avenue					
NE	0.4	4.0	0.4	4.0	NO
SE	0.3	3.9	0.4	4.0	NO
SW	0.3	3.9	0.3	3.9	NO
NW	0.5	4.1	0.5	4.1	NO
Riverside Avenue and Linden Avenue					
NE	0.3	3.9	0.5	4.1	NO
SE	0.3	3.9	0.5	4.1	NO
SW	0.4	4.0	0.5	4.1	NO
NW	0.4	4.0	0.6	4.2	NO
Riverside Avenue and Linden Avenue					
NE	0.3	3.9	0.6	4.2	NO
SE	0.3	3.9	0.7	4.3	NO
SW	0.3	3.9	0.7	4.3	NO
NW	0.3	3.9	0.7	4.3	NO
Riverside Avenue and Sierra Avenue					
NE	0.4	4.0	0.7	4.3	NO
SE	0.5	4.1	0.8	4.4	NO
SW	0.3	3.9	0.5	4.1	NO
NW	0.4	4.0	0.7	4.3	NO
Riverside Avenue and Sierra Avenue					
NE	0.4	4.0	0.8	4.4	NO
SE	0.5	4.1	1.0	4.6	NO
SW	0.4	4.0	0.6	4.2	NO
NW	0.4	4.0	0.8	4.4	NO

a Based on guidance provided by the AQMD Air Quality Analysis Guidance Handbook.

b The 1-hour traffic contribution (ppm) is determined by inputing total traffic volumes into the CALINE4 model.

c The estimated local concentration is the traffic contribution + the background concentration.

Lytle Creek Ranch

CALINE4 Modeling Results and Estimated Local 8-Hour Carbon Monoxide Concentrations (ppm)

Projected Background 8-Hour CO Concentrations (ppm)[a]	
Monitoring Station: San Bernardinc	Average Persistence Factor = 0.70
Year 2030 — 8-Hr Concentration 2.9	

Intersection and Receptor Locations	Future Without Project: Traffic CO Contribution[b]	Future Without Project: Estimated Local CO Concentration[c]	Future With Project: Traffic CO Contribution[b]	Future With Project: Estimated Local CO Concentration[c]	Future With Project: Exceedance of Significance Threshold[d]
Casmalia Street and Alder Avenue					
NE	0.1	3.0	0.1	3.0	NO
SE	0.1	3.0	0.1	3.0	NO
SW	0.1	3.0	0.1	3.0	NO
NW	0.1	3.0	0.2	3.1	NO
Casmalia Street and Alder Avenue					
NE	0.2	3.1	0.2	3.1	NO
SE	0.1	3.0	0.1	3.0	NO
SW	0.2	3.1	0.2	3.1	NO
NW	0.2	3.1	0.2	3.1	NO
I-15 NB On/Off Ramps and Sierra Avenue					
NE	0.1	3.0	0.3	3.2	NO
SE	0.1	3.0	0.2	3.1	NO
SW	0.1	3.0	0.3	3.2	NO
NW	0.1	3.0	0.3	3.2	NO
I-15 NB On/Off Ramps and Sierra Avenue					
NE	0.2	3.1	0.4	3.3	NO
SE	0.3	3.2	0.4	3.3	NO
SW	0.3	3.2	0.4	3.3	NO
NW	0.3	3.2	0.4	3.3	NO
I-15 SB On/Off Ramps and Summit Avenue					
NE	0.1	3.0	0.2	3.1	NO
SE	0.1	3.0	0.1	3.0	NO
SW	0.1	3.0	0.1	3.0	NO
NW	0.2	3.1	0.2	3.1	NO
I-15 SB On/Off Ramps and Summit Avenue					
NE	0.2	3.1	0.2	3.1	NO
SE	0.2	3.1	0.2	3.1	NO
SW	0.2	3.1	0.2	3.1	NO
NW	0.3	3.2	0.3	3.2	NO
Riverside Avenue and Linden Avenue					
NE	0.1	3.0	0.3	3.2	NO
SE	0.1	3.0	0.2	3.1	NO
SW	0.1	3.0	0.3	3.2	NO
NW	0.2	3.1	0.3	3.2	NO
Riverside Avenue and Linden Avenue					
NE	0.2	3.1	0.4	3.3	NO
SE	0.1	3.0	0.4	3.3	NO
SW	0.1	3.0	0.4	3.3	NO
NW	0.1	3.0	0.4	3.3	NO
Riverside Avenue and Sierra Avenue					
NE	0.1	3.0	0.3	3.2	NO
SE	0.2	3.1	0.4	3.3	NO
SW	0.1	3.0	0.3	3.2	NO
NW	0.2	3.1	0.4	3.3	NO
Riverside Avenue and Sierra Avenue					
NE	0.2	3.1	0.4	3.3	NO
SE	0.2	3.1	0.5	3.4	NO
SW	0.2	3.1	0.4	3.3	NO
NW	0.2	3.1	0.4	3.3	NO

a Based on guidance provided by the AQMD Air Quality Analysis Guidance Handbook.

b The persistence factor is calculated as recommended in Table B.15 in the Transportation Project-Level Carbon Monoxide Protocol (Institute of Transportation Studies, UC Davis, Revised 1997). This is a generalized persistence factor likely to provide a conservative estimate in most situations.

c The estimated local concentration is the traffic contribution + the background concentration.

d The California Ambient Air Quality Standard for 8-hour CO concentrations is 9 ppm.

Lytle Creek Ranch

CALINE4 Modeling Results and Estimated Local 1-Hour Carbon Monoxide Concentrations (ppm)

Projected Background 1-Hour CO Concentrations (ppm) [a]

Monitoring Station: San Bernardino

Year	1-Hr Concentration
2030	3.6

Intersection and Receptor Locations	Future Without Project		Future With Project		
	Traffic CO Contribution [b]	Estimated Local CO Concentration [c]	Traffic CO Contribution [b]	Estimated Local CO Concentration [c]	Exceedance of Significance Threshold [d]
SR-210 FREEWAY EB ON/OFF RAMPS AND STATE STREET					
NE	0.3	3.9	0.4	4.0	NO
SE	0.4	4.0	0.4	4.0	NO
SW	0.3	3.9	0.4	4.0	NO
NW	0.3	3.9	0.3	3.9	NO
SR-210 FREEWAY EB ON/OFF RAMPS AND STATE STREET					
NE	0.5	4.1	0.5	4.1	NO
SE	0.6	4.2	0.6	4.2	NO
SW	0.6	4.2	0.6	4.2	NO
NW	0.5	4.1	0.6	4.2	NO
HIGHLAND AVENUE/EASTON STREET AND ALDER AVENUE					
NE	0.4	4.0	0.4	4.0	NO
SE	0.3	3.9	0.4	4.0	NO
SW	0.5	4.1	0.5	4.1	NO
NW	0.6	4.2	0.6	4.2	NO
HIGHLAND AVENUE/EASTON STREET AND ALDER AVENUE					
NE	0.5	4.1	0.5	4.1	NO
SE	0.4	4.0	0.4	4.0	NO
SW	0.6	4.2	0.7	4.3	NO
NW	0.7	4.3	0.7	4.3	NO
HIGHLAND AVENUE AND STATE STREET					
NE	0.6	4.2	0.6	4.2	NO
SE	0.7	4.3	0.9	4.5	NO
SW	0.7	4.3	0.8	4.4	NO
NW	0.5	4.1	0.6	4.2	NO
HIGHLAND AVENUE AND STATE STREET					
NE	0.5	4.1	0.6	4.2	NO
SE	0.6	4.2	0.8	4.4	NO
SW	0.7	4.3	0.8	4.4	NO
NW	0.4	4.0	0.5	4.1	NO
SR-210 FREEWAY EB ON/OFF RAMPS AND RIVERSIDE AVENUE					
NE	0.7	4.3	0.7	4.3	NO
SE	0.7	4.3	0.7	4.3	NO
SW	0.6	4.2	0.6	4.2	NO
NW	0.6	4.2	0.6	4.2	NO
SR-210 FREEWAY EB ON/OFF RAMPS AND RIVERSIDE AVENUE					
NE	0.7	4.3	0.8	4.4	NO
SE	0.8	4.4	0.9	4.5	NO
SW	0.7	4.3	0.7	4.3	NO
NW	0.7	4.3	0.8	4.4	NO
SR-210 FREEWAY WB ON/OFF RAMPS AND RIVERSIDE AVENUE					
NE	0.2	3.8	0.3	3.9	NO
SE	0.2	3.8	0.3	3.9	NO
SW	0.3	3.9	0.4	4.0	NO
NW	0.2	3.8	0.4	4.0	NO
SR-210 FREEWAY WB ON/OFF RAMPS AND RIVERSIDE AVENUE					
NE	0.3	3.9	0.5	4.1	NO
SE	0.4	4.0	0.5	4.1	NO
SW	0.3	3.9	0.5	4.1	NO
NW	0.3	3.9	0.4	4.0	NO

a Based on guidance provided by the AQMD Air Quality Analysis Guidance Handbook.

b The 1-hour traffic contribution (ppm) is determined by inputing total traffic volumes into the CALINE4 model.

c The estimated local concentration is the traffic contribution + the background concentration.

Lytle Creek Ranch

CALINE4 Modeling Results and Estimated Local 8-Hour Carbon Monoxide Concentrations (ppm)

Projected Background 8-Hour CO Concentrations (ppm)[a]	
Monitoring Station: San Bernardinc	Average Persistence Factor = 0.70
Year 2030 — 8-Hr Concentration 2.9	

Intersection and Receptor Locations	Future Without Project: Traffic CO Contribution[b]	Future Without Project: Estimated Local CO Concentration[c]	Future With Project: Traffic CO Contribution[b]	Future With Project: Estimated Local CO Concentration[c]	Future With Project: Exceedance of Significance Threshold[d]
SR-210 FREEWAY EB ON/OFF RAMPS AND STATE STREET					
NE	0.1	3.0	0.2	3.1	NO
SE	0.1	3.0	0.2	3.1	NO
SW	0.1	3.0	0.2	3.1	NO
NW	0.1	3.0	0.2	3.1	NO
SR-210 FREEWAY EB ON/OFF RAMPS AND STATE STREET					
NE	0.2	3.1	0.2	3.1	NO
SE	0.3	3.2	0.3	3.2	NO
SW	0.3	3.2	0.3	3.2	NO
NW	0.2	3.1	0.3	3.2	NO
HIGHLAND AVENUE/EASTON STREET AND ALDER AVENUE					
NE	0.3	3.2	0.3	3.2	NO
SE	0.2	3.1	0.2	3.1	NO
SW	0.3	3.2	0.3	3.2	NO
NW	0.3	3.2	0.3	3.2	NO
HIGHLAND AVENUE/EASTON STREET AND ALDER AVENUE					
NE	0.3	3.2	0.3	3.2	NO
SE	0.2	3.1	0.2	3.1	NO
SW	0.4	3.3	0.4	3.3	NO
NW	0.4	3.3	0.4	3.3	NO
HIGHLAND AVENUE AND STATE STREET					
NE	0.3	3.2	0.4	3.3	NO
SE	0.3	3.2	0.4	3.3	NO
SW	0.4	3.3	0.4	3.3	NO
NW	0.3	3.2	0.3	3.2	NO
HIGHLAND AVENUE AND STATE STREET					
NE	0.3	3.2	0.3	3.2	NO
SE	0.3	3.2	0.4	3.3	NO
SW	0.4	3.3	0.4	3.3	NO
NW	0.2	3.1	0.3	3.2	NO
SR-210 FREEWAY EB ON/OFF RAMPS AND RIVERSIDE AVENUE					
NE	0.4	3.3	0.4	3.3	NO
SE	0.4	3.3	0.4	3.3	NO
SW	0.4	3.3	0.4	3.3	NO
NW	0.4	3.3	0.4	3.3	NO
SR-210 FREEWAY EB ON/OFF RAMPS AND RIVERSIDE AVENUE					
NE	0.4	3.3	0.4	3.3	NO
SE	0.4	3.3	0.4	3.3	NO
SW	0.4	3.3	0.4	3.3	NO
NW	0.4	3.3	0.4	3.3	NO
SR-210 FREEWAY WB ON/OFF RAMPS AND RIVERSIDE AVENUE					
NE	0.1	3.0	0.1	3.0	NO
SE	0.1	3.0	0.1	3.0	NO
SW	0.1	3.0	0.2	3.1	NO
NW	0.1	3.0	0.2	3.1	NO
SR-210 FREEWAY WB ON/OFF RAMPS AND RIVERSIDE AVENUE					
NE	0.1	3.0	0.3	3.2	NO
SE	0.1	3.0	0.3	3.2	NO
SW	0.1	3.0	0.2	3.1	NO
NW	0.1	3.0	0.2	3.1	NO

a Based on guidance provided by the AQMD Air Quality Analysis Guidance Handbook.

b The persistence factor is calculated as recommended in Table B.15 in the Transportation Project-Level Carbon Monoxide Protocol (Institute of Transportation Studies, UC Davis, Revised 1997). This is a generalized persistence factor likely to provide a conservative estimate in most situations.

c The estimated local concentration is the traffic contribution + the background concentration.

d The California Ambient Air Quality Standard for 8-hour CO concentrations is 9 ppm.

Lytle Creek Ranch

CALINE4 Modeling Results and Estimated Local 1-Hour Carbon Monoxide Concentrations (ppm)

Projected Background 1-Hour CO Concentrations (ppm) [a]

Monitoring Station: San Bernardino

Year	1-Hr Concentration
2030	3.6

Intersection and Receptor Locations	Future Without Project		Future With Project		
	Traffic CO Contribution [b]	Estimated Local CO Concentration [c]	Traffic CO Contribution [b]	Estimated Local CO Concentration [c]	Exceedance of Significance Threshold [d]
BASELINE ROAD AND ALDER AVENUE					
NE	0.3	3.9	0.3	3.9	NO
SE	0.4	4.0	0.4	4.0	NO
SW	0.3	3.9	0.3	3.9	NO
NW	0.3	3.9	0.3	3.9	NO
BASELINE ROAD AND ALDER AVENUE					
NE	0.5	4.1	0.6	4.2	NO
SE	0.5	4.1	0.5	4.1	NO
SW	0.5	4.1	0.6	4.2	NO
NW	0.6	4.2	0.6	4.2	NO
EASTON STREET AND AYALA DRIVE					
NE	0.3	3.9	0.3	3.9	NO
SE	0.4	4.0	0.4	4.0	NO
SW	0.4	4.0	0.4	4.0	NO
NW	0.5	4.1	0.5	4.1	NO
EASTON STREET AND AYALA DRIVE					
NE	0.5	4.1	0.5	4.1	NO
SE	0.6	4.2	0.6	4.2	NO
SW	0.6	4.2	0.6	4.2	NO
NW	0.7	4.3	0.7	4.3	NO
EASTON STREET AND RIVERSIDE AVENUE					
NE	0.3	3.9	0.4	4.0	NO
SE	0.4	4.0	0.5	4.1	NO
SW	0.4	4.0	0.4	4.0	NO
NW	0.3	3.9	0.4	4.0	NO
EASTON STREET AND RIVERSIDE AVENUE					
NE	0.5	4.1	0.5	4.1	NO
SE	0.6	4.2	0.6	4.2	NO
SW	0.5	4.1	0.6	4.2	NO
NW	0.4	4.0	0.5	4.1	NO

a Based on guidance provided by the AQMD Air Quality Analysis Guidance Handbook.

b The 1-hour traffic contribution (ppm) is determined by inputing total traffic volumes into the CALINE4 model.

c The estimated local concentration is the traffic contribution + the background concentration.

d The California Ambient Air Quality Standard for 1-hour CO concentrations is 20 ppm.

Lytle Creek Ranch

CALINE4 Modeling Results and Estimated Local 8-Hour Carbon Monoxide Concentrations (ppm)

Projected Background 8-Hour CO Concentrations (ppm) [a]	
Monitoring Station: San Bernardino	Average Persistence Factor = 0.70
Year: 2030 — 8-Hr Concentration: 2.9	

Intersection and Receptor Locations	Future Without Project: Traffic CO Contribution [b]	Future Without Project: Estimated Local CO Concentration [c]	Future With Project: Traffic CO Contribution [b]	Future With Project: Estimated Local CO Concentration [c]	Future With Project: Exceedance of Significance Threshold [d]
BASELINE ROAD AND ALDER AVENUE					
NE	0.1	3.0	0.1	3.0	NO
SE	0.1	3.0	0.1	3.0	NO
SW	0.1	3.0	0.1	3.0	NO
NW	0.1	3.0	0.1	3.0	NO
BASELINE ROAD AND ALDER AVENUE					
NE	0.2	3.1	0.3	3.2	NO
SE	0.2	3.1	0.3	3.2	NO
SW	0.3	3.2	0.3	3.2	NO
NW	0.3	3.2	0.3	3.2	NO
EASTON STREET AND AYALA DRIVE					
NE	0.2	3.1	0.2	3.1	NO
SE	0.2	3.1	0.2	3.1	NO
SW	0.2	3.1	0.2	3.1	NO
NW	0.2	3.1	0.2	3.1	NO
EASTON STREET AND AYALA DRIVE					
NE	0.3	3.2	0.3	3.2	NO
SE	0.4	3.3	0.4	3.3	NO
SW	0.4	3.3	0.4	3.3	NO
NW	0.4	3.3	0.4	3.3	NO
EASTON STREET AND RIVERSIDE AVENUE					
NE	0.2	3.1	0.2	3.1	NO
SE	0.2	3.1	0.2	3.1	NO
SW	0.2	3.1	0.2	3.1	NO
NW	0.1	3.0	0.2	3.1	NO
EASTON STREET AND RIVERSIDE AVENUE					
NE	0.3	3.2	0.3	3.2	NO
SE	0.3	3.2	0.3	3.2	NO
SW	0.3	3.2	0.3	3.2	NO
NW	0.3	3.2	0.3	3.2	NO

a Based on guidance provided by the AQMD Air Quality Analysis Guidance Handbook.

b The persistence factor is calculated as recommended in Table B.15 in the Transportation Project-Level Carbon Monoxide Protocol (Institute of Transportation Studies, UC Davis, Revised 1997). This is a generalized persistence factor likely to provide a conservative estimate in most situations.

c The estimated local concentration is the traffic contribution + the background concentration.

d The California Ambient Air Quality Standard for 8-hour CO concentrations is 9 ppm.

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 1

JOB: GLEN HELEN PARKWAY AND CAJON BOULEVARD AM NP
RUN: (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

I. SITE VARIABLES

U= .5 M/S Z0= 100. CM ALT= 0. (FT)
BRG= WORST CASE VD= .0 CM/S
CLAS= 7 (G) VS= .0 CM/S
MIXH= 1000. M AMB= .0 PPM
SIGTH= 5. DEGREES TEMP= 15.6 DEGREE (C)

II. LINK VARIABLES

LINK DESCRIPTION	LINK COORDINATES (FT) X1	Y1	X2	Y2	TYPE	VPH	EF (G/MI)	H (FT)	W (FT)
A. NF	15	-1500	15	-500	AG	478	.9	.0	35.0
B. NA	15	-500	15	0	AG	459	1.4	.0	33.0
C. ND	15	0	15	500	AG	210	1.0	.0	33.0
D. NE	15	500	15	1500	AG	210	.9	.0	35.0
E. SF	-15	1500	-15	500	AG	390	.9	.0	35.0
F. SA	-15	500	-15	0	AG	168	1.3	.0	33.0
G. SD	-15	0	-15	-500	AG	295	1.0	.0	33.0
H. SE	-15	-500	-15	-1500	AG	295	.9	.0	35.0
I. WF	1500	15	500	15	AG	190	.9	.0	50.0
J. WA	500	15	0	15	AG	60	1.5	.0	33.0
K. WD	0	15	-500	15	AG	39	1.1	.0	33.0
L. WE	-500	15	-1500	15	AG	39	.9	.0	50.0
M. EF	-1500	-15	-500	-15	AG	471	.9	.0	50.0
N. EA	-500	-15	0	-15	AG	413	1.5	.0	33.0
O. ED	0	-15	500	-15	AG	985	1.1	.0	33.0
P. EE	500	-15	1500	-15	AG	985	.9	.0	50.0
Q. NL	0	0	15	-500	AG	19	1.3	.0	33.0
R. SL	0	0	-15	500	AG	222	1.3	.0	33.0
S. WL	0	0	500	8	AG	130	1.5	.0	33.0
T. EL	0	0	-500	-8	AG	58	1.5	.0	33.0

III. RECEPTOR LOCATIONS

RECEPTOR	COORDINATES (FT) X	Y	Z
1. NE3	33	40	6.0
2. SE3	33	-40	6.0
3. SW3	-33	-40	6.0
4. NW3	-33	40	6.0
5. NE7	46	53	6.0
6. SE7	46	-53	6.0
7. SW7	-46	-53	6.0
8. NW7	-46	53	6.0

IV. MODEL RESULTS (WORST CASE WIND ANGLE)

RECEPTOR	BRG (DEG)	PRED CONC (PPM)	CONC/LINK (PPM) A	B	C	D	E	F	G	H
1. NE3	184.	.3	.0	.1	.0	.0	.0	.0	.0	.0
2. SE3	354.	.2	.0	.0	.0	.0	.0	.0	.0	.0
3. SW3	85.	.3	.0	.0	.0	.0	.0	.0	.0	.0
4. NW3	96.	.2	.0	.0	.0	.0	.0	.0	.0	.0
5. NE7	186.	.2	.0	.0	.0	.0	.0	.0	.0	.0
6. SE7	353.	.2	.0	.0	.0	.0	.0	.0	.0	.0
7. SW7	84.	.2	.0	.0	.0	.0	.0	.0	.0	.0
8. NW7	97.	.2	.0	.0	.0	.0	.0	.0	.0	.0

IV. MODEL RESULTS (WORST CASE WIND ANGLE) (CONT.)

RECEPTOR	CONC/LINK (PPM) I	J	K	L	M	N	O	P	Q	R	S	T
1. NE3	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
2. SE3	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
3. SW3	.0	.0	.0	.0	.0	.0	.1	.0	.0	.0	.0	.0
4. NW3	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
5. NE7	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
6. SE7	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
7. SW7	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
8. NW7	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 1

JOB: GLEN HELEN PARKWAY AND CAJON BOULEVARD AM WP
RUN: (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

I. SITE VARIABLES

U= .5 M/S Z0= 100. CM ALT= 0. (FT)
BRG= WORST CASE VD= .0 CM/S
CLAS= 7 (G) VS= .0 CM/S
MIXH= 1000. M AMB= .0 PPM
SIGTH= 5. DEGREES TEMP= 15.6 DEGREE (C)

II. LINK VARIABLES

LINK DESCRIPTION	LINK COORDINATES (FT) X1	Y1	X2	Y2	TYPE	VPH	EF (G/MI)	H (FT)	W (FT)
A. NF	15	-1500	15	-500	AG	566	.9	.0	35.0
B. NA	15	-500	15	0	AG	546	1.4	.0	33.0
C. ND	15	0	15	500	AG	226	1.0	.0	33.0
D. NE	15	500	15	1500	AG	226	.9	.0	35.0
E. SF	-15	1500	-15	500	AG	404	.9	.0	35.0
F. SA	-15	500	-15	0	AG	182	1.3	.0	33.0
G. SD	-15	0	-15	-500	AG	322	1.0	.0	33.0
H. SE	-15	-500	-15	-1500	AG	322	.9	.0	35.0
I. WF	1500	15	500	15	AG	200	.9	.0	50.0
J. WA	500	15	0	15	AG	60	1.5	.0	33.0
K. WD	0	15	-500	15	AG	40	1.1	.0	33.0
L. WE	-500	15	-1500	15	AG	40	.9	.0	50.0
M. EF	-1500	-15	-500	-15	AG	500	.9	.0	50.0
N. EA	-500	-15	0	-15	AG	434	1.5	.0	33.0
O. ED	0	-15	500	-15	AG	1082	1.1	.0	33.0
P. EE	500	-15	1500	-15	AG	1082	.9	.0	50.0
Q. NL	0	0	15	-500	AG	20	1.3	.0	33.0
R. SL	0	0	-15	500	AG	222	1.3	.0	33.0
S. WL	0	0	500	8	AG	140	1.5	.0	33.0
T. EL	0	0	-500	-8	AG	66	1.5	.0	33.0

III. RECEPTOR LOCATIONS

RECEPTOR	COORDINATES (FT) X	Y	Z
1. NE3	33	40	6.0
2. SE3	33	-40	6.0
3. SW3	-33	-40	6.0
4. NW3	-33	40	6.0
5. NE7	46	53	6.0
6. SE7	46	-53	6.0
7. SW7	-46	-53	6.0
8. NW7	-46	53	6.0

IV. MODEL RESULTS (WORST CASE WIND ANGLE)

RECEPTOR	BRG (DEG)	PRED CONC (PPM)	CONC/LINK (PPM) A	B	C	D	E	F	G	H
1. NE3	184.	.3	.0	.1	.0	.0	.0	.0	.0	.0
2. SE3	354.	.2	.0	.0	.0	.0	.0	.0	.0	.0
3. SW3	85.	.3	.0	.0	.0	.0	.0	.0	.0	.0
4. NW3	96.	.2	.0	.0	.0	.0	.0	.0	.0	.0
5. NE7	186.	.2	.0	.0	.0	.0	.0	.0	.0	.0
6. SE7	353.	.2	.0	.0	.0	.0	.0	.0	.0	.0
7. SW7	84.	.2	.0	.0	.0	.0	.0	.0	.0	.0
8. NW7	97.	.2	.0	.0	.0	.0	.0	.0	.0	.0

IV. MODEL RESULTS (WORST CASE WIND ANGLE) (CONT.)

RECEPTOR	CONC/LINK (PPM) I	J	K	L	M	N	O	P	Q	R	S	T
1. NE3	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
2. SE3	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
3. SW3	.0	.0	.0	.0	.0	.0	.2	.0	.0	.0	.0	.0
4. NW3	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
5. NE7	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
6. SE7	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
7. SW7	.0	.0	.0	.0	.0	.0	.1	.0	.0	.0	.0	.0
8. NW7	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 1

JOB: GLEN HELEN PARKWAY AND CAJON BOULEVARD PM NP
RUN: (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

I. SITE VARIABLES

U=	.5 M/S	Z0=	100. CM	ALT=	0. (FT)
BRG=	WORST CASE	VD=	.0 CM/S		
CLAS=	7 (G)	VS=	.0 CM/S		
MIXH=	1000. M	AMB=	.0 PPM		
SIGTH=	5. DEGREES	TEMP=	15.6 DEGREE (C)		

II. LINK VARIABLES

LINK DESCRIPTION	LINK COORDINATES (FT) X1	Y1	X2	Y2	TYPE	VPH	EF (G/MI)	H (FT)	W (FT)
A. NF	15	-1500	15	-500	AG	784	.9	.0	35.0
B. NA	15	-500	15	0	AG	726	1.6	.0	33.0
C. ND	15	0	15	500	AG	890	1.3	.0	33.0
D. NE	15	500	15	1500	AG	890	.9	.0	35.0
E. SF	-15	1500	-15	500	AG	371	.9	.0	35.0
F. SA	-15	500	-15	0	AG	246	1.4	.0	33.0
G. SD	-15	0	-15	-500	AG	484	1.0	.0	33.0
H. SE	-15	-500	-15	-1500	AG	484	.9	.0	35.0
I. WF	1500	15	500	15	AG	577	.9	.0	50.0
J. WA	500	15	0	15	AG	390	1.5	.0	33.0
K. WD	0	15	-500	15	AG	111	1.0	.0	33.0
L. WE	-500	15	-1500	15	AG	111	.9	.0	50.0
M. EF	-1500	-15	-500	-15	AG	400	.9	.0	50.0
N. EA	-500	-15	0	-15	AG	236	1.5	.0	33.0
O. ED	0	-15	500	-15	AG	647	1.1	.0	33.0
P. EE	500	-15	1500	-15	AG	647	.9	.0	50.0
Q. NL	0	0	15	-500	AG	58	1.4	.0	33.0
R. SL	0	0	-15	500	AG	125	1.4	.0	33.0
S. WL	0	0	500	8	AG	187	1.5	.0	33.0
T. EL	0	0	-500	-8	AG	164	1.5	.0	33.0

III. RECEPTOR LOCATIONS

RECEPTOR	COORDINATES (FT) X	Y	Z
1. NE3	33	40	6.0
2. SE3	33	-40	6.0
3. SW3	-33	-40	6.0
4. NW3	-33	40	6.0
5. NE7	46	53	6.0
6. SE7	46	-53	6.0
7. SW7	-46	-53	6.0
8. NW7	-46	53	6.0

IV. MODEL RESULTS (WORST CASE WIND ANGLE)

RECEPTOR	BRG (DEG)	PRED CONC (PPM)	CONC/LINK (PPM) A	B	C	D	E	F	G	H
1. NE3	184.	.4	.0	.2	.0	.0	.0	.0	.0	.0
2. SE3	355.	.4	.0	.0	.2	.0	.0	.0	.0	.0
3. SW3	84.	.3	.0	.0	.0	.0	.0	.0	.0	.0
4. NW3	96.	.3	.0	.0	.0	.0	.0	.0	.0	.0
5. NE7	186.	.3	.0	.1	.0	.0	.0	.0	.0	.0
6. SE7	354.	.3	.0	.0	.1	.0	.0	.0	.0	.0
7. SW7	83.	.2	.0	.0	.0	.0	.0	.0	.0	.0
8. NW7	97.	.2	.0	.0	.0	.0	.0	.0	.0	.0

IV. MODEL RESULTS (WORST CASE WIND ANGLE) (CONT.)

RECEPTOR	CONC/LINK (PPM) I	J	K	L	M	N	O	P	Q	R	S	T
1. NE3	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
2. SE3	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
3. SW3	.0	.0	.0	.0	.0	.0	.1	.0	.0	.0	.0	.0
4. NW3	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
5. NE7	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
6. SE7	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
7. SW7	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
8. NW7	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 1

JOB: GLEN HELEN PARKWAY AND CAJON BOULEVARD PM WP
RUN: (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

I. SITE VARIABLES

U=	.5 M/S	Z0=	100. CM	ALT=	0. (FT)
BRG=	WORST CASE	VD=	.0 CM/S		
CLAS=	7 (G)	VS=	.0 CM/S		
MIXH=	1000. M	AMB=	.0 PPM		
SIGTH=	5. DEGREES	TEMP=	15.6 DEGREE (C)		

II. LINK VARIABLES

LINK DESCRIPTION	LINK COORDINATES (FT) X1	Y1	X2	Y2	TYPE	VPH	EF (G/MI)	H (FT)	W (FT)
A. NF	15	-1500	15	-500	AG	841	.9	.0	35.0
B. NA	15	-500	15	0	AG	783	1.7	.0	33.0
C. ND	15	0	15	500	AG	947	1.3	.0	33.0
D. NE	15	500	15	1500	AG	947	.9	.0	35.0
E. SF	-15	1500	-15	500	AG	404	.9	.0	35.0
F. SA	-15	500	-15	0	AG	279	1.4	.0	33.0
G. SD	-15	0	-15	-500	AG	560	1.1	.0	33.0
H. SE	-15	-500	-15	-1500	AG	560	.9	.0	35.0
I. WF	1500	15	500	15	AG	632	.9	.0	50.0
J. WA	500	15	0	15	AG	408	1.5	.0	33.0
K. WD	0	15	-500	15	AG	111	1.0	.0	33.0
L. WE	-500	15	-1500	15	AG	111	.9	.0	50.0
M. EF	-1500	-15	-500	-15	AG	431	.9	.0	50.0
N. EA	-500	-15	0	-15	AG	250	1.5	.0	33.0
O. ED	0	-15	500	-15	AG	690	1.1	.0	33.0
P. EE	500	-15	1500	-15	AG	690	.9	.0	50.0
Q. NL	0	0	15	-500	AG	58	1.4	.0	33.0
R. SL	0	0	-15	500	AG	125	1.4	.0	33.0
S. WL	0	0	500	8	AG	224	1.5	.0	33.0
T. EL	0	0	-500	-8	AG	181	1.5	.0	33.0

III. RECEPTOR LOCATIONS

RECEPTOR	COORDINATES (FT) X	Y	Z
1. NE3	33	40	6.0
2. SE3	33	-40	6.0
3. SW3	-33	-40	6.0
4. NW3	-33	40	6.0
5. NE7	46	53	6.0
6. SE7	46	-53	6.0
7. SW7	-46	-53	6.0
8. NW7	-46	53	6.0

IV. MODEL RESULTS (WORST CASE WIND ANGLE)

RECEPTOR	BRG (DEG)	PRED CONC (PPM)	CONC/LINK (PPM) A	B	C	D	E	F	G	H
1. NE3	184.	.5	.0	.2	.0	.0	.0	.0	.0	.0
2. SE3	355.	.5	.0	.0	.2	.0	.0	.0	.0	.0
3. SW3	84.	.3	.0	.0	.0	.0	.0	.0	.0	.0
4. NW3	96.	.3	.0	.0	.0	.0	.0	.0	.0	.0
5. NE7	186.	.3	.0	.2	.0	.0	.0	.0	.0	.0
6. SE7	354.	.3	.0	.0	.1	.0	.0	.0	.0	.0
7. SW7	83.	.2	.0	.0	.0	.0	.0	.0	.0	.0
8. NW7	97.	.2	.0	.0	.0	.0	.0	.0	.0	.0

IV. MODEL RESULTS (WORST CASE WIND ANGLE) (CONT.)

RECEPTOR	CONC/LINK (PPM) I	J	K	L	M	N	O	P	Q	R	S	T
1. NE3	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
2. SE3	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
3. SW3	.0	.0	.0	.0	.0	.0	.1	.0	.0	.0	.0	.0
4. NW3	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
5. NE7	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
6. SE7	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
7. SW7	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
8. NW7	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 1

JOB: I-15 SB ON/OFF RAMPS AND SIERRA AVENUE AM NP
RUN: (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

I. SITE VARIABLES

U=	.5 M/S	Z0=	100. CM	ALT=	0. (FT)
BRG=	WORST CASE	VD=	.0 CM/S		
CLAS=	7 (G)	VS=	.0 CM/S		
MIXH=	1000. M	AMB=	.0 PPM		
SIGTH=	5. DEGREES	TEMP=	15.6 DEGREE (C)		

II. LINK VARIABLES

LINK DESCRIPTION	LINK COORDINATES (FT) X1	Y1	X2	Y2	TYPE	VPH	EF (G/MI)	H (FT)	W (FT)
A. NF	15	-1500	15	-500	AG	543	.9	.0	50.0
B. NA	15	-500	15	0	AG	543	1.3	.0	45.0
C. ND	15	0	15	500	AG	372	1.0	.0	33.0
D. NE	15	500	15	1500	AG	372	.9	.0	50.0
E. SF	-23	1500	-23	500	AG	302	.9	.0	35.0
F. SA	-23	500	-23	0	AG	279	1.3	.0	33.0
G. SD	-23	0	-23	-500	AG	401	1.0	.0	33.0
H. SE	-23	-500	-23	-1500	AG	401	.9	.0	35.0
I. WF	1500	8	500	8	AG	494	.9	.0	35.0
J. WA	500	8	0	8	AG	372	1.6	.0	33.0
K. WD	0	8	-500	8	AG	0	1.1	.0	33.0
L. WE	-500	8	-1500	8	AG	0	.9	.0	35.0
M. EF	-1500	-8	-500	-8	AG	0	.9	.0	35.0
N. EA	-500	-8	0	-8	AG	0	1.5	.0	33.0
O. ED	0	-8	500	-8	AG	566	1.4	.0	33.0
P. EE	500	-8	1500	-8	AG	566	.9	.0	35.0
Q. NL	0	0	8	-500	AG	0	1.3	.0	33.0
R. SL	0	-1900	0	-1800	AG	23	1.3	.0	33.0
S. WL	0	0	500	8	AG	122	1.5	.0	33.0
T. EL	0	-1900	0	-1800	AG	0	1.5	.0	33.0

III. RECEPTOR LOCATIONS

RECEPTOR	COORDINATES (FT) X	Y	Z
1. NE3	40	25	6.0
2. SE3	40	-25	6.0
3. SW3	-40	-25	6.0
4. NW3	-40	25	6.0
5. NE7	53	38	6.0
6. SE7	53	-38	6.0
7. SW7	-53	-38	6.0
8. NW7	-53	38	6.0

IV. MODEL RESULTS (WORST CASE WIND ANGLE)

RECEPTOR	BRG (DEG)	PRED CONC (PPM)	CONC/LINK (PPM) A	B	C	D	E	F	G	H
1. NE3	95.	.3	.0	.0	.0	.0	.0	.0	.0	.0
2. SE3	85.	.3	.0	.0	.0	.0	.0	.0	.0	.0
3. SW3	86.	.3	.0	.0	.0	.0	.0	.0	.0	.0
4. NW3	94.	.3	.0	.0	.0	.0	.0	.0	.0	.0
5. NE7	186.	.2	.0	.0	.0	.0	.0	.0	.0	.0
6. SE7	83.	.2	.0	.0	.0	.0	.0	.0	.0	.0
7. SW7	84.	.2	.0	.0	.0	.0	.0	.0	.0	.0
8. NW7	96.	.2	.0	.0	.0	.0	.0	.0	.0	.0

IV. MODEL RESULTS (WORST CASE WIND ANGLE) (CONT.)

RECEPTOR	CONC/LINK (PPM) I	J	K	L	M	N	O	P	Q	R	S	T
1. NE3	.0	.1	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
2. SE3	.0	.0	.0	.0	.0	.0	.2	.0	.0	.0	.0	.0
3. SW3	.0	.0	.0	.0	.0	.0	.1	.0	.0	.0	.0	.0
4. NW3	.0	.1	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
5. NE7	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
6. SE7	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
7. SW7	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
8. NW7	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 1

JOB: I-15 SB ON/OFF RAMPS AND SIERRA AVENUE AM WP
RUN: (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

I. SITE VARIABLES

U=	.5 M/S	Z0= 100. CM	ALT= 0. (FT)
BRG=	WORST CASE	VD= .0 CM/S	
CLAS=	7 (G)	VS= .0 CM/S	
MIXH=	1000. M	AMB= .0 PPM	
SIGTH=	5. DEGREES	TEMP= 15.6 DEGREE (C)	

II. LINK VARIABLES

LINK DESCRIPTION	LINK COORDINATES (FT) X1	Y1	X2	Y2	TYPE	VPH	EF (G/MI)	H (FT)	W (FT)
A. NF	15	-1500	15	-500	AG	910	.9	.0	50.0
B. NA	15	-500	15	0	AG	910	1.3	.0	45.0
C. ND	15	0	15	500	AG	486	1.0	.0	33.0
D. NE	15	500	15	1500	AG	486	.9	.0	50.0
E. SF	-23	1500	-23	500	AG	273	.9	.0	35.0
F. SA	-23	500	-23	0	AG	250	1.3	.0	33.0
G. SD	-23	0	-23	-500	AG	627	1.0	.0	33.0
H. SE	-23	-500	-23	-1500	AG	627	.9	.0	35.0
I. WF	1500	8	500	8	AG	863	.9	.0	35.0
J. WA	500	8	0	8	AG	486	1.6	.0	33.0
K. WD	0	8	-500	8	AG	0	1.1	.0	33.0
L. WE	-500	8	-1500	8	AG	0	.9	.0	35.0
M. EF	-1500	-8	-500	-8	AG	0	.9	.0	35.0
N. EA	-500	-8	0	-8	AG	0	1.5	.0	33.0
O. ED	0	-8	500	-8	AG	933	1.7	.0	33.0
P. EE	500	-8	1500	-8	AG	933	.9	.0	35.0
Q. NL	0	0	8	-500	AG	0	1.3	.0	33.0
R. SL	0	-1900	0	-1800	AG	23	1.3	.0	33.0
S. WL	0	0	500	8	AG	377	1.6	.0	33.0
T. EL	0	-1900	0	-1800	AG	0	1.5	.0	33.0

III. RECEPTOR LOCATIONS

RECEPTOR	COORDINATES (FT) X	Y	Z
1. NE3	40	25	6.0
2. SE3	40	-25	6.0
3. SW3	-40	-25	6.0
4. NW3	-40	25	6.0
5. NE7	53	38	6.0
6. SE7	53	-38	6.0
7. SW7	-53	-38	6.0
8. NW7	-53	38	6.0

IV. MODEL RESULTS (WORST CASE WIND ANGLE)

RECEPTOR	BRG (DEG)	PRED CONC (PPM)	CONC/LINK (PPM) A	B	C	D	E	F	G	H
1. NE3	95.	.5	.0	.0	.0	.0	.0	.0	.0	.0
2. SE3	85.	.6	.0	.0	.0	.0	.0	.0	.0	.0
3. SW3	86.	.6	.0	.0	.0	.0	.0	.0	.0	.0
4. NW3	95.	.5	.0	.0	.0	.0	.0	.0	.0	.0
5. NE7	186.	.3	.0	.1	.0	.0	.0	.0	.0	.0
6. SE7	82.	.3	.0	.0	.0	.0	.0	.0	.0	.0
7. SW7	83.	.4	.0	.0	.0	.0	.0	.0	.0	.0
8. NW7	97.	.4	.0	.0	.0	.0	.0	.0	.0	.0

IV. MODEL RESULTS (WORST CASE WIND ANGLE) (CONT.)

RECEPTOR	CONC/LINK (PPM) I	J	K	L	M	N	O	P	Q	R	S	T
1. NE3	.0	.2	.0	.0	.0	.0	.1	.0	.0	.0	.0	.0
2. SE3	.0	.0	.0	.0	.0	.0	.4	.0	.0	.0	.0	.0
3. SW3	.0	.0	.0	.0	.0	.0	.3	.0	.0	.0	.0	.0
4. NW3	.0	.1	.0	.0	.0	.0	.2	.0	.0	.0	.0	.0
5. NE7	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
6. SE7	.0	.0	.0	.0	.0	.0	.2	.0	.0	.0	.0	.0
7. SW7	.0	.0	.0	.0	.0	.0	.2	.0	.0	.0	.0	.0
8. NW7	.0	.1	.0	.0	.0	.0	.1	.0	.0	.0	.0	.0

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 1

JOB: I-15 SB ON/OFF RAMPS AND SIERRA AVENUE PM NP
RUN: (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

I. SITE VARIABLES

U= .5 M/S Z0= 100. CM ALT= 0. (FT)
BRG= WORST CASE VD= .0 CM/S
CLAS= 7 (G) VS= .0 CM/S
MIXH= 1000. M AMB= .0 PPM
SIGTH= 5. DEGREES TEMP= 15.6 DEGREE (C)

II. LINK VARIABLES

LINK DESCRIPTION	LINK COORDINATES (FT) X1	Y1	X2	Y2	TYPE	VPH	EF (G/MI)	H (FT)	W (FT)
A. NF	15	-1500	15	-500	AG	412	.9	.0	50.0
B. NA	15	-500	15	0	AG	412	1.5	.0	45.0
C. ND	15	0	15	500	AG	207	1.1	.0	33.0
D. NE	15	500	15	1500	AG	207	.9	.0	50.0
E. SF	-23	1500	-23	500	AG	313	.9	.0	35.0
F. SA	-23	500	-23	0	AG	308	1.6	.0	33.0
G. SD	-23	0	-23	-500	AG	1303	1.8	.0	33.0
H. SE	-23	-500	-23	-1500	AG	1303	.9	.0	35.0
I. WF	1500	8	500	8	AG	1202	.9	.0	35.0
J. WA	500	8	0	8	AG	207	1.3	.0	33.0
K. WD	0	8	-500	8	AG	0	1.0	.0	33.0
L. WE	-500	8	-1500	8	AG	0	.9	.0	35.0
M. EF	-1500	-8	-500	-8	AG	0	.9	.0	35.0
N. EA	-500	-8	0	-8	AG	0	1.3	.0	33.0
O. ED	0	-8	500	-8	AG	417	1.0	.0	33.0
P. EE	500	-8	1500	-8	AG	417	.9	.0	35.0
Q. NL	0	0	8	-500	AG	0	1.5	.0	33.0
R. SL	0	-1900	0	-1800	AG	5	1.5	.0	33.0
S. WL	0	0	500	8	AG	995	1.8	.0	33.0
T. EL	0	-1900	0	-1800	AG	0	1.3	.0	33.0

III. RECEPTOR LOCATIONS

RECEPTOR	COORDINATES (FT) X	Y	Z
1. NE3	40	25	6.0
2. SE3	40	-25	6.0
3. SW3	-40	-25	6.0
4. NW3	-40	25	6.0
5. NE7	53	38	6.0
6. SE7	53	-38	6.0
7. SW7	-53	-38	6.0
8. NW7	-53	38	6.0

IV. MODEL RESULTS (WORST CASE WIND ANGLE)

RECEPTOR	BRG (DEG)	PRED CONC (PPM)	CONC/LINK (PPM) A	B	C	D	E	F	G	H
1. NE3	188.	.4	.0	.1	.0	.0	.0	.0	.1	.0
2. SE3	84.	.4	.0	.0	.0	.0	.0	.0	.0	.0
3. SW3	85.	.6	.0	.0	.0	.0	.0	.0	.2	.0
4. NW3	176.	.5	.0	.0	.0	.0	.0	.0	.4	.0
5. NE7	190.	.3	.0	.0	.0	.0	.0	.0	.1	.0
6. SE7	82.	.2	.0	.0	.0	.0	.0	.0	.0	.0
7. SW7	83.	.4	.0	.0	.0	.0	.0	.0	.1	.0
8. NW7	173.	.3	.0	.0	.0	.0	.0	.0	.3	.0

IV. MODEL RESULTS (WORST CASE WIND ANGLE) (CONT.)

RECEPTOR	CONC/LINK (PPM) I	J	K	L	M	N	O	P	Q	R	S	T
1. NE3	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.1	.0
2. SE3	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.2	.0
3. SW3	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.2	.0
4. NW3	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
5. NE7	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
6. SE7	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.1	.0
7. SW7	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.2	.0
8. NW7	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 1

JOB: I-15 SB ON/OFF RAMPS AND SIERRA AVENUE PM WP
RUN: (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

I. SITE VARIABLES

U= .5 M/S Z0= 100. CM ALT= 0. (FT)
BRG= WORST CASE VD= .0 CM/S
CLAS= 7 (G) VS= .0 CM/S
MIXH= 1000. M AMB= .0 PPM
SIGTH= 5. DEGREES TEMP= 15.6 DEGREE (C)

II. LINK VARIABLES

LINK DESCRIPTION	LINK COORDINATES (FT) X1	Y1	X2	Y2	TYPE	VPH	EF (G/MI)	H (FT)	W (FT)
A. NF	15	-1500	15	-500	AG	786	.9	.0	50.0
B. NA	15	-500	15	0	AG	786	1.6	.0	45.0
C. ND	15	0	15	500	AG	398	1.1	.0	33.0
D. NE	15	500	15	1500	AG	398	.9	.0	50.0
E. SF	-23	1500	-23	500	AG	383	.9	.0	35.0
F. SA	-23	500	-23	0	AG	378	1.6	.0	33.0
G. SD	-23	0	-23	-500	AG	1973	1.8	.0	33.0
H. SE	-23	-500	-23	-1500	AG	1973	.9	.0	35.0
I. WF	1500	8	500	8	AG	1993	.9	.0	35.0
J. WA	500	8	0	8	AG	398	1.3	.0	33.0
K. WD	0	8	-500	8	AG	0	1.0	.0	33.0
L. WE	-500	8	-1500	8	AG	0	.9	.0	35.0
M. EF	-1500	-8	-500	-8	AG	0	.9	.0	35.0
N. EA	-500	-8	0	-8	AG	0	1.3	.0	33.0
O. ED	0	-8	500	-8	AG	791	1.1	.0	33.0
P. EE	500	-8	1500	-8	AG	791	.9	.0	35.0
Q. NL	0	0	8	-500	AG	0	1.5	.0	33.0
R. SL	0	-1900	0	-1800	AG	5	1.5	.0	33.0
S. WL	0	0	500	8	AG	1595	1.8	.0	33.0
T. EL	0	-1900	0	-1800	AG	0	1.3	.0	33.0

III. RECEPTOR LOCATIONS

RECEPTOR	COORDINATES (FT) X	Y	Z
1. NE3	40	25	6.0
2. SE3	40	-25	6.0
3. SW3	-40	-25	6.0
4. NW3	-40	25	6.0
5. NE7	53	38	6.0
6. SE7	53	-38	6.0
7. SW7	-53	-38	6.0
8. NW7	-53	38	6.0

IV. MODEL RESULTS (WORST CASE WIND ANGLE)

RECEPTOR	BRG (DEG)	PRED CONC (PPM)	CONC/LINK (PPM) A	B	C	D	E	F	G	H
1. NE3	187.	.6	.0	.2	.0	.0	.0	.0	.1	.0
2. SE3	84.	.6	.0	.0	.0	.0	.0	.0	.0	.0
3. SW3	84.	.9	.0	.0	.0	.0	.0	.0	.2	.0
4. NW3	175.	.7	.0	.0	.0	.0	.0	.0	.6	.0
5. NE7	190.	.5	.0	.1	.0	.0	.0	.0	.1	.0
6. SE7	81.	.4	.0	.0	.0	.0	.0	.0	.0	.0
7. SW7	83.	.6	.0	.0	.0	.0	.0	.0	.2	.0
8. NW7	173.	.4	.0	.0	.0	.0	.0	.0	.3	.0

IV. MODEL RESULTS (WORST CASE WIND ANGLE) (CONT.)

RECEPTOR	CONC/LINK (PPM) I	J	K	L	M	N	O	P	Q	R	S	T
1. NE3	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.2	.0
2. SE3	.0	.0	.0	.0	.0	.0	.2	.0	.0	.0	.3	.0
3. SW3	.0	.0	.0	.0	.0	.0	.1	.0	.0	.0	.4	.0
4. NW3	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
5. NE7	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.1	.0
6. SE7	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.2	.0
7. SW7	.0	.0	.0	.0	.0	.0	.1	.0	.0	.0	.2	.0
8. NW7	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 1

JOB: I-215 NB ON/OFF RAMPS AND UNIVERSITY PARKWAY AM NP
RUN: (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

I. SITE VARIABLES

U= .5 M/S Z0= 100. CM ALT= 0. (FT)
BRG= WORST CASE VD= .0 CM/S
CLAS= 7 (G) VS= .0 CM/S
MIXH= 1000. M AMB= .0 PPM
SIGTH= 5. DEGREES TEMP= 15.6 DEGREE (C)

II. LINK VARIABLES

LINK DESCRIPTION	LINK COORDINATES (FT) X1	Y1	X2	Y2	TYPE	VPH	EF (G/MI)	H (FT)	W (FT)
A. NF	30	-1500	30	-500	AG	656	.9	.0	50.0
B. NA	30	-500	30	0	AG	572	1.3	.0	45.0
C. ND	30	0	30	500	AG	1741	1.1	.0	33.0
D. NE	30	500	30	1500	AG	1741	.9	.0	50.0
E. SF	-23	1500	-23	500	AG	2040	.9	.0	65.0
F. SA	-23	500	-23	0	AG	2040	1.5	.0	45.0
G. SD	-23	0	-23	-500	AG	1981	1.0	.0	45.0
H. SE	-23	-500	-23	-1500	AG	1981	.9	.0	65.0
I. WF	1500	8	500	8	AG	1648	.9	.0	35.0
J. WA	500	8	0	8	AG	1169	1.8	.0	33.0
K. WD	0	8	-500	8	AG	622	1.3	.0	33.0
L. WE	-500	8	-1500	8	AG	622	.9	.0	35.0
M. EF	-1500	-8	-500	-8	AG	0	.9	.0	35.0
N. EA	-500	-8	0	-8	AG	0	1.5	.0	33.0
O. ED	0	-8	500	-8	AG	0	1.1	.0	33.0
P. EE	500	-8	1500	-8	AG	0	.9	.0	35.0
Q. NL	0	0	23	-500	AG	84	1.3	.0	33.0
R. SL	0	-1900	0	-1800	AG	0	1.3	.0	33.0
S. WL	0	0	500	8	AG	479	1.7	.0	33.0
T. EL	0	-1900	0	-1800	AG	0	1.5	.0	33.0

III. RECEPTOR LOCATIONS

RECEPTOR	COORDINATES (FT) X	Y	Z
1. NE3	55	25	6.0
2. SE3	55	-25	6.0
3. SW3	-55	-25	6.0
4. NW3	-55	25	6.0
5. NE7	68	38	6.0
6. SE7	68	-38	6.0
7. SW7	-68	-38	6.0
8. NW7	-68	38	6.0

IV. MODEL RESULTS (WORST CASE WIND ANGLE)

RECEPTOR	BRG (DEG)	PRED CONC (PPM)	CONC/LINK (PPM) A	B	C	D	E	F	G	H
1. NE3	95.	.6	.0	.0	.0	.0	.0	.0	.0	.0
2. SE3	352.	.6	.0	.0	.3	.0	.0	.0	.0	.0
3. SW3	84.	.5	.0	.0	.0	.0	.0	.0	.1	.0
4. NW3	94.	.8	.0	.0	.0	.0	.0	.2	.0	.0
5. NE7	188.	.4	.0	.0	.0	.0	.0	.0	.0	.0
6. SE7	351.	.4	.0	.0	.2	.0	.0	.0	.0	.0
7. SW7	82.	.4	.0	.0	.0	.0	.0	.0	.0	.0
8. NW7	96.	.5	.0	.0	.0	.0	.0	.1	.0	.0

IV. MODEL RESULTS (WORST CASE WIND ANGLE) (CONT.)

RECEPTOR	CONC/LINK (PPM) I	J	K	L	M	N	O	P	Q	R	S	T
1. NE3	.0	.4	.0	.0	.0	.0	.0	.0	.0	.0	.1	.0
2. SE3	.0	.1	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
3. SW3	.0	.2	.0	.0	.0	.0	.0	.0	.0	.0	.1	.0
4. NW3	.0	.3	.0	.0	.0	.0	.0	.0	.0	.0	.1	.0
5. NE7	.0	.1	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
6. SE7	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
7. SW7	.0	.2	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
8. NW7	.0	.2	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 1

JOB: I-215 NB ON/OFF RAMPS AND UNIVERSITY PARKWAY AM WP
RUN: (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

I. SITE VARIABLES

U= .5 M/S Z0= 100. CM ALT= 0. (FT)
BRG= WORST CASE VD= .0 CM/S
CLAS= 7 (G) VS= .0 CM/S
MIXH= 1000. M AMB= .0 PPM
SIGTH= 5. DEGREES TEMP= 15.6 DEGREE (C)

II. LINK VARIABLES

LINK DESCRIPTION	LINK COORDINATES (FT) X1	Y1	X2	Y2	TYPE	VPH	EF (G/MI)	H (FT)	W (FT)
A. NF	30	-1500	30	-500	AG	668	.9	.0	50.0
B. NA	30	-500	30	0	AG	582	1.3	.0	45.0
C. ND	30	0	30	500	AG	1759	1.1	.0	33.0
D. NE	30	500	30	1500	AG	1759	.9	.0	50.0
E. SF	-23	1500	-23	500	AG	2061	.9	.0	65.0
F. SA	-23	500	-23	0	AG	2061	1.5	.0	45.0
G. SD	-23	0	-23	-500	AG	1992	1.0	.0	45.0
H. SE	-23	-500	-23	-1500	AG	1992	.9	.0	65.0
I. WF	1500	8	500	8	AG	1656	.9	.0	35.0
J. WA	500	8	0	8	AG	1177	1.8	.0	33.0
K. WD	0	8	-500	8	AG	634	1.3	.0	33.0
L. WE	-500	8	-1500	8	AG	634	.9	.0	35.0
M. EF	-1500	-8	-500	-8	AG	0	.9	.0	35.0
N. EA	-500	-8	0	-8	AG	0	1.5	.0	33.0
O. ED	0	-8	500	-8	AG	0	1.1	.0	33.0
P. EE	500	-8	1500	-8	AG	0	.9	.0	35.0
Q. NL	0	0	23	-500	AG	86	1.3	.0	33.0
R. SL	0	-1900	0	-1800	AG	0	1.3	.0	33.0
S. WL	0	0	500	8	AG	479	1.7	.0	33.0
T. EL	0	-1900	0	-1800	AG	0	1.5	.0	33.0

III. RECEPTOR LOCATIONS

RECEPTOR	COORDINATES (FT) X	Y	Z
1. NE3	55	25	6.0
2. SE3	55	-25	6.0
3. SW3	-55	-25	6.0
4. NW3	-55	25	6.0
5. NE7	68	38	6.0
6. SE7	68	-38	6.0
7. SW7	-68	-38	6.0
8. NW7	-68	38	6.0

IV. MODEL RESULTS (WORST CASE WIND ANGLE)

RECEPTOR	BRG (DEG)	PRED CONC (PPM)	CONC/LINK (PPM) A	B	C	D	E	F	G	H
1. NE3	95.	.6	.0	.0	.0	.0	.0	.0	.0	.0
2. SE3	352.	.6	.0	.0	.3	.0	.0	.0	.0	.0
3. SW3	84.	.5	.0	.0	.0	.0	.0	.0	.1	.0
4. NW3	94.	.8	.0	.0	.0	.0	.0	.2	.0	.0
5. NE7	188.	.4	.0	.0	.0	.0	.0	.0	.0	.0
6. SE7	349.	.4	.0	.0	.2	.0	.0	.1	.0	.0
7. SW7	82.	.4	.0	.0	.0	.0	.0	.0	.0	.0
8. NW7	96.	.5	.0	.0	.0	.0	.0	.1	.0	.0

IV. MODEL RESULTS (WORST CASE WIND ANGLE) (CONT.)

RECEPTOR	CONC/LINK (PPM) I	J	K	L	M	N	O	P	Q	R	S	T
1. NE3	.0	.4	.0	.0	.0	.0	.0	.0	.0	.0	.1	.0
2. SE3	.0	.1	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
3. SW3	.0	.2	.0	.0	.0	.0	.0	.0	.0	.0	.1	.0
4. NW3	.0	.3	.0	.0	.0	.0	.0	.0	.0	.0	.1	.0
5. NE7	.0	.1	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
6. SE7	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
7. SW7	.0	.2	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
8. NW7	.0	.2	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 1

JOB: I-215 NB ON/OFF RAMPS AND UNIVERSITY PARKWAY PM NP
RUN: (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

I. SITE VARIABLES

U= .5 M/S Z0= 100. CM ALT= 0. (FT)
BRG= WORST CASE VD= .0 CM/S
CLAS= 7 (G) VS= .0 CM/S
MIXH= 1000. M AMB= .0 PPM
SIGTH= 5. DEGREES TEMP= 15.6 DEGREE (C)

II. LINK VARIABLES

LINK DESCRIPTION	LINK COORDINATES (FT) X1	Y1	X2	Y2	TYPE	VPH	EF (G/MI)	H (FT)	W (FT)
A. NF	30	-1500	30	-500	AG	785	.9	.0	50.0
B. NA	30	-500	30	0	AG	663	1.3	.0	45.0
C. ND	30	0	30	500	AG	2374	1.4	.0	33.0
D. NE	30	500	30	1500	AG	2374	.9	.0	50.0
E. SF	-23	1500	-23	500	AG	2161	.9	.0	65.0
F. SA	-23	500	-23	0	AG	2161	1.6	.0	45.0
G. SD	-23	0	-23	-500	AG	2403	1.2	.0	45.0
H. SE	-23	-500	-23	-1500	AG	2403	.9	.0	65.0
I. WF	1500	8	500	8	AG	2351	.9	.0	35.0
J. WA	500	8	0	8	AG	1718	1.8	.0	33.0
K. WD	0	8	-500	8	AG	520	1.1	.0	33.0
L. WE	-500	8	-1500	8	AG	520	.9	.0	35.0
M. EF	-1500	-8	-500	-8	AG	0	.9	.0	35.0
N. EA	-500	-8	0	-8	AG	0	1.5	.0	33.0
O. ED	0	-8	500	-8	AG	0	1.0	.0	33.0
P. EE	500	-8	1500	-8	AG	0	.9	.0	35.0
Q. NL	0	0	23	-500	AG	122	1.3	.0	33.0
R. SL	0	-1900	0	-1800	AG	0	1.3	.0	33.0
S. WL	0	0	500	8	AG	633	1.7	.0	33.0
T. EL	0	-1900	0	-1800	AG	0	1.5	.0	33.0

III. RECEPTOR LOCATIONS

RECEPTOR	COORDINATES (FT) X	Y	Z
1. NE3	55	25	6.0
2. SE3	55	-25	6.0
3. SW3	-55	-25	6.0
4. NW3	-55	25	6.0
5. NE7	68	38	6.0
6. SE7	68	-38	6.0
7. SW7	-68	-38	6.0
8. NW7	-68	38	6.0

IV. MODEL RESULTS (WORST CASE WIND ANGLE)

RECEPTOR	BRG (DEG)	PRED CONC (PPM)	CONC/LINK (PPM) A	B	C	D	E	F	G	H
1. NE3	239.	.7	.0	.0	.2	.0	.0	.0	.0	.0
2. SE3	351.	.8	.0	.0	.4	.0	.0	.1	.0	.0
3. SW3	83.	.7	.0	.0	.0	.0	.0	.0	.2	.0
4. NW3	94.	1.0	.0	.0	.0	.0	.0	.2	.0	.0
5. NE7	234.	.5	.0	.0	.2	.0	.0	.0	.0	.0
6. SE7	349.	.6	.0	.0	.3	.0	.0	.1	.0	.0
7. SW7	81.	.5	.0	.0	.0	.0	.0	.0	.1	.0
8. NW7	96.	.7	.0	.0	.0	.0	.0	.2	.0	.0

IV. MODEL RESULTS (WORST CASE WIND ANGLE) (CONT.)

RECEPTOR	CONC/LINK (PPM) I	J	K	L	M	N	O	P	Q	R	S	T
1. NE3	.0	.3	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
2. SE3	.0	.2	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
3. SW3	.0	.3	.0	.0	.0	.0	.0	.0	.0	.0	.2	.0
4. NW3	.0	.4	.0	.0	.0	.0	.0	.0	.0	.0	.1	.0
5. NE7	.0	.2	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
6. SE7	.0	.1	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
7. SW7	.0	.2	.0	.0	.0	.0	.0	.0	.0	.0	.1	.0
8. NW7	.0	.3	.0	.0	.0	.0	.0	.0	.0	.0	.1	.0

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 1

JOB: I-215 NB ON/OFF RAMPS AND UNIVERSITY PARKWAY PM WP
RUN: (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

I. SITE VARIABLES

U= .5 M/S Z0= 100. CM ALT= 0. (FT)
BRG= WORST CASE VD= .0 CM/S
CLAS= 7 (G) VS= .0 CM/S
MIXH= 1000. M AMB= .0 PPM
SIGTH= 5. DEGREES TEMP= 15.6 DEGREE (C)

II. LINK VARIABLES

LINK DESCRIPTION	LINK COORDINATES (FT) X1	Y1	X2	Y2	TYPE	VPH	EF (G/MI)	H (FT)	W (FT)
A. NF	30	-1500	30	-500	AG	803	.9	.0	50.0
B. NA	30	-500	30	0	AG	674	1.3	.0	45.0
C. ND	30	0	30	500	AG	2399	1.4	.0	33.0
D. NE	30	500	30	1500	AG	2399	.9	.0	50.0
E. SF	-23	1500	-23	500	AG	2199	.9	.0	65.0
F. SA	-23	500	-23	0	AG	2199	1.6	.0	45.0
G. SD	-23	0	-23	-500	AG	2422	1.2	.0	45.0
H. SE	-23	-500	-23	-1500	AG	2422	.9	.0	65.0
I. WF	1500	8	500	8	AG	2365	.9	.0	35.0
J. WA	500	8	0	8	AG	1732	1.8	.0	33.0
K. WD	0	8	-500	8	AG	546	1.1	.0	33.0
L. WE	-500	8	-1500	8	AG	546	.9	.0	35.0
M. EF	-1500	-8	-500	-8	AG	0	.9	.0	35.0
N. EA	-500	-8	0	-8	AG	0	1.5	.0	33.0
O. ED	0	-8	500	-8	AG	0	1.0	.0	33.0
P. EE	500	-8	1500	-8	AG	0	.9	.0	35.0
Q. NL	0	0	23	-500	AG	129	1.3	.0	33.0
R. SL	0	-1900	0	-1800	AG	0	1.3	.0	33.0
S. WL	0	0	500	8	AG	633	1.7	.0	33.0
T. EL	0	-1900	0	-1800	AG	0	1.5	.0	33.0

III. RECEPTOR LOCATIONS

RECEPTOR	COORDINATES (FT) X	Y	Z
1. NE3	55	25	6.0
2. SE3	55	-25	6.0
3. SW3	-55	-25	6.0
4. NW3	-55	25	6.0
5. NE7	68	38	6.0
6. SE7	68	-38	6.0
7. SW7	-68	-38	6.0
8. NW7	-68	38	6.0

IV. MODEL RESULTS (WORST CASE WIND ANGLE)

RECEPTOR	BRG (DEG)	PRED CONC (PPM)	CONC/LINK (PPM) A	B	C	D	E	F	G	H
1. NE3	239.	.7	.0	.0	.2	.0	.0	.0	.0	.0
2. SE3	351.	.8	.0	.0	.4	.0	.0	.1	.0	.0
3. SW3	83.	.7	.0	.0	.0	.0	.0	.0	.2	.0
4. NW3	94.	1.0	.0	.0	.0	.0	.0	.2	.0	.0
5. NE7	234.	.5	.0	.0	.2	.0	.0	.0	.0	.0
6. SE7	349.	.6	.0	.0	.3	.0	.0	.1	.0	.0
7. SW7	81.	.5	.0	.0	.0	.0	.0	.0	.1	.0
8. NW7	96.	.7	.0	.0	.0	.0	.0	.2	.0	.0

IV. MODEL RESULTS (WORST CASE WIND ANGLE) (CONT.)

RECEPTOR	CONC/LINK (PPM) I	J	K	L	M	N	O	P	Q	R	S	T
1. NE3	.0	.3	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
2. SE3	.0	.2	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
3. SW3	.0	.3	.0	.0	.0	.0	.0	.0	.0	.0	.2	.0
4. NW3	.0	.4	.0	.0	.0	.0	.0	.0	.0	.0	.1	.0
5. NE7	.0	.2	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
6. SE7	.0	.1	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
7. SW7	.0	.2	.0	.0	.0	.0	.0	.0	.0	.0	.1	.0
8. NW7	.0	.3	.0	.0	.0	.0	.0	.0	.0	.0	.1	.0

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 1

JOB: I-215 SB ON/OFF RAMPS AND PALM AVENUE AM NP
RUN: (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

I. SITE VARIABLES

U=	.5 M/S	Z0=	100. CM	ALT=	0. (FT)
BRG=	WORST CASE	VD=	.0 CM/S		
CLAS=	7 (G)	VS=	.0 CM/S		
MIXH=	1000. M	AMB=	.0 PPM		
SIGTH=	5. DEGREES	TEMP=	15.6 DEGREE (C)		

II. LINK VARIABLES

LINK DESCRIPTION	LINK COORDINATES (FT) X1	Y1	X2	Y2	TYPE	VPH	EF (G/MI)	H (FT)	W (FT)
A. NF	23	-1500	23	-500	AG	230	.9	.0	35.0
B. NA	23	-500	23	0	AG	143	1.4	.0	33.0
C. ND	23	0	23	500	AG	730	1.1	.0	33.0
D. NE	23	500	23	1500	AG	730	.9	.0	35.0
E. SF	-15	1500	-15	500	AG	1157	.9	.0	50.0
F. SA	-15	500	-15	0	AG	504	1.4	.0	45.0
G. SD	-15	0	-15	-500	AG	459	1.0	.0	33.0
H. SE	-15	-500	-15	-1500	AG	459	.9	.0	50.0
I. WF	1500	8	500	8	AG	573	.9	.0	35.0
J. WA	500	8	0	8	AG	464	1.6	.0	33.0
K. WD	0	8	-500	8	AG	353	1.1	.0	33.0
L. WE	-500	8	-1500	8	AG	353	.9	.0	35.0
M. EF	-1500	-8	-500	-8	AG	622	.9	.0	35.0
N. EA	-500	-8	0	-8	AG	444	1.5	.0	33.0
O. ED	0	-8	500	-8	AG	1040	1.7	.0	33.0
P. EE	500	-8	1500	-8	AG	1040	.9	.0	35.0
Q. NL	0	0	23	-500	AG	87	1.4	.0	33.0
R. SL	0	0	-8	500	AG	653	1.6	.0	33.0
S. WL	0	0	500	8	AG	109	1.5	.0	33.0
T. EL	0	0	-500	-8	AG	178	1.5	.0	33.0

III. RECEPTOR LOCATIONS

RECEPTOR	COORDINATES (FT) X	Y	Z
1. NE3	40	25	6.0
2. SE3	40	-25	6.0
3. SW3	-40	-25	6.0
4. NW3	-40	25	6.0
5. NE7	53	38	6.0
6. SE7	53	-38	6.0
7. SW7	-53	-38	6.0
8. NW7	-53	38	6.0

IV. MODEL RESULTS (WORST CASE WIND ANGLE)

RECEPTOR	BRG (DEG)	PRED CONC (PPM)	CONC/LINK (PPM) A	B	C	D	E	F	G	H
1. NE3	265.	.4	.0	.0	.0	.0	.0	.0	.0	.0
2. SE3	354.	.5	.0	.0	.2	.0	.0	.0	.0	.0
3. SW3	86.	.5	.0	.0	.0	.0	.0	.0	.0	.0
4. NW3	95.	.5	.0	.0	.0	.0	.0	.0	.0	.0
5. NE7	264.	.3	.0	.0	.0	.0	.0	.0	.0	.0
6. SE7	352.	.4	.0	.0	.0	.0	.0	.0	.0	.0
7. SW7	84.	.4	.0	.0	.0	.0	.0	.0	.0	.0
8. NW7	97.	.4	.0	.0	.0	.0	.0	.0	.0	.0

IV. MODEL RESULTS (WORST CASE WIND ANGLE) (CONT.)

RECEPTOR	CONC/LINK (PPM) I	J	K	L	M	N	O	P	Q	R	S	T
1. NE3	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
2. SE3	.0	.0	.0	.0	.0	.0	.1	.0	.0	.0	.0	.0
3. SW3	.0	.0	.0	.0	.0	.0	.3	.0	.0	.0	.0	.0
4. NW3	.0	.1	.0	.0	.0	.0	.2	.0	.0	.0	.0	.0
5. NE7	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
6. SE7	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
7. SW7	.0	.0	.0	.0	.0	.0	.2	.0	.0	.0	.0	.0
8. NW7	.0	.0	.0	.0	.0	.0	.1	.0	.0	.0	.0	.0

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 1

JOB: I-215 SB ON/OFF RAMPS AND PALM AVENUE AM WP
RUN: (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

I. SITE VARIABLES

U= .5 M/S Z0= 100. CM ALT= 0. (FT)
BRG= WORST CASE VD= .0 CM/S
CLAS= 7 (G) VS= .0 CM/S
MIXH= 1000. M AMB= .0 PPM
SIGTH= 5. DEGREES TEMP= 15.6 DEGREE (C)

II. LINK VARIABLES

LINK DESCRIPTION	LINK COORDINATES (FT) X1	Y1	X2	Y2	TYPE	VPH	EF (G/MI)	H (FT)	W (FT)
A. NF	23	-1500	23	-500	AG	211	.9	.0	35.0
B. NA	23	-500	23	0	AG	124	1.4	.0	33.0
C. ND	23	0	23	500	AG	728	1.1	.0	33.0
D. NE	23	500	23	1500	AG	728	.9	.0	35.0
E. SF	-15	1500	-15	500	AG	1160	.9	.0	50.0
F. SA	-15	500	-15	0	AG	505	1.4	.0	45.0
G. SD	-15	0	-15	-500	AG	463	1.0	.0	33.0
H. SE	-15	-500	-15	-1500	AG	463	.9	.0	50.0
I. WF	1500	8	500	8	AG	585	.9	.0	35.0
J. WA	500	8	0	8	AG	473	1.6	.0	33.0
K. WD	0	8	-500	8	AG	354	1.1	.0	33.0
L. WE	-500	8	-1500	8	AG	354	.9	.0	35.0
M. EF	-1500	-8	-500	-8	AG	653	.9	.0	35.0
N. EA	-500	-8	0	-8	AG	466	1.6	.0	33.0
O. ED	0	-8	500	-8	AG	1064	1.7	.0	33.0
P. EE	500	-8	1500	-8	AG	1064	.9	.0	35.0
Q. NL	0	0	23	-500	AG	87	1.4	.0	33.0
R. SL	0	0	-8	500	AG	655	1.6	.0	33.0
S. WL	0	0	500	8	AG	112	1.4	.0	33.0
T. EL	0	0	-500	-8	AG	187	1.4	.0	33.0

III. RECEPTOR LOCATIONS

RECEPTOR	COORDINATES (FT) X	Y	Z
1. NE3	40	25	6.0
2. SE3	40	-25	6.0
3. SW3	-40	-25	6.0
4. NW3	-40	25	6.0
5. NE7	53	38	6.0
6. SE7	53	-38	6.0
7. SW7	-53	-38	6.0
8. NW7	-53	38	6.0

IV. MODEL RESULTS (WORST CASE WIND ANGLE)

RECEPTOR	BRG (DEG)	PRED CONC (PPM)	CONC/LINK (PPM) A	B	C	D	E	F	G	H
1. NE3	265.	.4	.0	.0	.0	.0	.0	.0	.0	.0
2. SE3	354.	.5	.0	.0	.2	.0	.0	.0	.0	.0
3. SW3	86.	.6	.0	.0	.0	.0	.0	.0	.0	.0
4. NW3	95.	.5	.0	.0	.0	.0	.0	.0	.0	.0
5. NE7	264.	.3	.0	.0	.0	.0	.0	.0	.0	.0
6. SE7	352.	.4	.0	.0	.0	.0	.0	.0	.0	.0
7. SW7	84.	.4	.0	.0	.0	.0	.0	.0	.0	.0
8. NW7	97.	.4	.0	.0	.0	.0	.0	.0	.0	.0

IV. MODEL RESULTS (WORST CASE WIND ANGLE) (CONT.)

RECEPTOR	CONC/LINK (PPM) I	J	K	L	M	N	O	P	Q	R	S	T
1. NE3	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
2. SE3	.0	.0	.0	.0	.0	.0	.1	.0	.0	.0	.0	.0
3. SW3	.0	.0	.0	.0	.0	.0	.3	.0	.0	.0	.0	.0
4. NW3	.0	.1	.0	.0	.0	.0	.2	.0	.0	.0	.0	.0
5. NE7	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
6. SE7	.0	.0	.0	.0	.0	.0	.1	.0	.0	.0	.0	.0
7. SW7	.0	.0	.0	.0	.0	.0	.2	.0	.0	.0	.0	.0
8. NW7	.0	.0	.0	.0	.0	.0	.1	.0	.0	.0	.0	.0

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 1

JOB: I-215 SB ON/OFF RAMPS AND PALM AVENUE PM NP
RUN: (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

I. SITE VARIABLES

U= .5 M/S Z0= 100. CM ALT= 0. (FT)
BRG= WORST CASE VD= .0 CM/S
CLAS= 7 (G) VS= .0 CM/S
MIXH= 1000. M AMB= .0 PPM
SIGTH= 5. DEGREES TEMP= 15.6 DEGREE (C)

II. LINK VARIABLES

LINK DESCRIPTION	LINK COORDINATES (FT) X1	Y1	X2	Y2	TYPE	VPH	EF (G/MI)	H (FT)	W (FT)
A. NF	23	-1500	23	-500	AG	574	.9	.0	35.0
B. NA	23	-500	23	0	AG	445	1.4	.0	33.0
C. ND	23	0	23	500	AG	936	1.4	.0	33.0
D. NE	23	500	23	1500	AG	936	.9	.0	35.0
E. SF	-15	1500	-15	500	AG	612	.9	.0	50.0
F. SA	-15	500	-15	0	AG	230	1.4	.0	45.0
G. SD	-15	0	-15	-500	AG	226	1.0	.0	33.0
H. SE	-15	-500	-15	-1500	AG	226	.9	.0	50.0
I. WF	1500	8	500	8	AG	325	.9	.0	35.0
J. WA	500	8	0	8	AG	294	1.5	.0	33.0
K. WD	0	8	-500	8	AG	266	1.0	.0	33.0
L. WE	-500	8	-1500	8	AG	266	.9	.0	35.0
M. EF	-1500	-8	-500	-8	AG	781	.9	.0	35.0
N. EA	-500	-8	0	-8	AG	412	1.5	.0	33.0
O. ED	0	-8	500	-8	AG	864	1.6	.0	33.0
P. EE	500	-8	1500	-8	AG	864	.9	.0	35.0
Q. NL	0	0	23	-500	AG	129	1.4	.0	33.0
R. SL	0	0	-8	500	AG	382	1.5	.0	33.0
S. WL	0	0	500	8	AG	31	1.4	.0	33.0
T. EL	0	0	-500	-8	AG	369	1.5	.0	33.0

III. RECEPTOR LOCATIONS

RECEPTOR	COORDINATES (FT) X	Y	Z
1. NE3	40	25	6.0
2. SE3	40	-25	6.0
3. SW3	-40	-25	6.0
4. NW3	-40	25	6.0
5. NE7	53	38	6.0
6. SE7	53	-38	6.0
7. SW7	-53	-38	6.0
8. NW7	-53	38	6.0

IV. MODEL RESULTS (WORST CASE WIND ANGLE)

RECEPTOR	BRG (DEG)	PRED CONC (PPM)	CONC/LINK (PPM) A	B	C	D	E	F	G	H
1. NE3	265.	.4	.0	.0	.0	.0	.0	.0	.0	.0
2. SE3	355.	.5	.0	.0	.3	.0	.0	.0	.0	.0
3. SW3	86.	.4	.0	.0	.0	.0	.0	.0	.0	.0
4. NW3	95.	.4	.0	.0	.0	.0	.0	.0	.0	.0
5. NE7	263.	.3	.0	.0	.0	.0	.0	.0	.0	.0
6. SE7	353.	.3	.0	.0	.2	.0	.0	.0	.0	.0
7. SW7	84.	.3	.0	.0	.0	.0	.0	.0	.0	.0
8. NW7	96.	.3	.0	.0	.0	.0	.0	.0	.0	.0

IV. MODEL RESULTS (WORST CASE WIND ANGLE) (CONT.)

RECEPTOR	CONC/LINK (PPM) I	J	K	L	M	N	O	P	Q	R	S	T
1. NE3	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
2. SE3	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
3. SW3	.0	.0	.0	.0	.0	.0	.2	.0	.0	.0	.0	.0
4. NW3	.0	.0	.0	.0	.0	.0	.1	.0	.0	.0	.0	.0
5. NE7	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
6. SE7	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
7. SW7	.0	.0	.0	.0	.0	.0	.2	.0	.0	.0	.0	.0
8. NW7	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 1

JOB: I-215 SB ON/OFF RAMPS AND PALM AVENUE PM WP
RUN: (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

I. SITE VARIABLES

U= .5 M/S Z0= 100. CM ALT= 0. (FT)
BRG= WORST CASE VD= .0 CM/S
CLAS= 7 (G) VS= .0 CM/S
MIXH= 1000. M AMB= .0 PPM
SIGTH= 5. DEGREES TEMP= 15.6 DEGREE (C)

II. LINK VARIABLES

LINK DESCRIPTION	LINK COORDINATES (FT) X1	Y1	X2	Y2	TYPE	VPH	EF (G/MI)	H (FT)	W (FT)
A. NF	23	-1500	23	-500	AG	577	.9	.0	35.0
B. NA	23	-500	23	0	AG	448	1.4	.0	33.0
C. ND	23	0	23	500	AG	971	1.6	.0	33.0
D. NE	23	500	23	1500	AG	971	.9	.0	35.0
E. SF	-15	1500	-15	500	AG	616	.9	.0	50.0
F. SA	-15	500	-15	0	AG	234	1.4	.0	45.0
G. SD	-15	0	-15	-500	AG	228	1.0	.0	33.0
H. SE	-15	-500	-15	-1500	AG	228	.9	.0	50.0
I. WF	1500	8	500	8	AG	351	.9	.0	35.0
J. WA	500	8	0	8	AG	318	1.5	.0	33.0
K. WD	0	8	-500	8	AG	270	1.0	.0	33.0
L. WE	-500	8	-1500	8	AG	270	.9	.0	35.0
M. EF	-1500	-8	-500	-8	AG	803	.9	.0	35.0
N. EA	-500	-8	0	-8	AG	425	1.5	.0	33.0
O. ED	0	-8	500	-8	AG	878	1.5	.0	33.0
P. EE	500	-8	1500	-8	AG	878	.9	.0	35.0
Q. NL	0	0	23	-500	AG	129	1.4	.0	33.0
R. SL	0	0	-8	500	AG	382	1.5	.0	33.0
S. WL	0	0	500	8	AG	33	1.4	.0	33.0
T. EL	0	0	-500	-8	AG	378	1.5	.0	33.0

III. RECEPTOR LOCATIONS

RECEPTOR	COORDINATES (FT) X	Y	Z
1. NE3	40	25	6.0
2. SE3	40	-25	6.0
3. SW3	-40	-25	6.0
4. NW3	-40	25	6.0
5. NE7	53	38	6.0
6. SE7	53	-38	6.0
7. SW7	-53	-38	6.0
8. NW7	-53	38	6.0

IV. MODEL RESULTS (WORST CASE WIND ANGLE)

RECEPTOR	BRG (DEG)	PRED CONC (PPM)	CONC/LINK (PPM) A	B	C	D	E	F	G	H
1. NE3	355.	.5	.0	.0	.3	.0	.0	.0	.0	.0
2. SE3	355.	.6	.0	.0	.3	.0	.0	.0	.0	.0
3. SW3	86.	.4	.0	.0	.0	.0	.0	.0	.0	.0
4. NW3	95.	.4	.0	.0	.0	.0	.0	.0	.0	.0
5. NE7	263.	.3	.0	.0	.0	.0	.0	.0	.0	.0
6. SE7	353.	.4	.0	.0	.2	.0	.0	.0	.0	.0
7. SW7	84.	.3	.0	.0	.0	.0	.0	.0	.0	.0
8. NW7	96.	.3	.0	.0	.0	.0	.0	.0	.0	.0

IV. MODEL RESULTS (WORST CASE WIND ANGLE) (CONT.)

RECEPTOR	CONC/LINK (PPM) I	J	K	L	M	N	O	P	Q	R	S	T
1. NE3	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
2. SE3	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
3. SW3	.0	.0	.0	.0	.0	.0	.2	.0	.0	.0	.0	.0
4. NW3	.0	.0	.0	.0	.0	.0	.1	.0	.0	.0	.0	.0
5. NE7	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
6. SE7	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
7. SW7	.0	.0	.0	.0	.0	.0	.2	.0	.0	.0	.0	.0
8. NW7	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 1

JOB: LYTLE CREEK ROAD AND SIERRA AVENUE AM NP
RUN: (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

I. SITE VARIABLES

U=	.5 M/S	Z0=	100. CM	ALT=	0. (FT)
BRG=	WORST CASE	VD=	.0 CM/S		
CLAS=	7 (G)	VS=	.0 CM/S		
MIXH=	1000. M	AMB=	.0 PPM		
SIGTH=	5. DEGREES	TEMP=	15.6 DEGREE (C)		

II. LINK VARIABLES

LINK DESCRIPTION	LINK COORDINATES (FT) X1	Y1	X2	Y2	TYPE	VPH	EF (G/MI)	H (FT)	W (FT)
A. NF	8	-1500	8	-500	AG	294	.9	.0	35.0
B. NA	8	-500	8	0	AG	278	1.2	.0	33.0
C. ND	1800	0	1900	0	AG	1	1.0	.0	33.0
D. NE	1800	0	1900	0	AG	1	.9	.0	35.0
E. SF	1800	0	1900	0	AG	1644	.9	.0	35.0
F. SA	1800	0	1900	0	AG	1644	1.6	.0	33.0
G. SD	-8	0	-8	-500	AG	0	1.0	.0	33.0
H. SE	-8	-500	-8	-1500	AG	0	.9	.0	35.0
I. WF	1500	8	500	8	AG	0	.9	.0	35.0
J. WA	500	8	0	8	AG	0	1.8	.0	33.0
K. WD	0	8	-500	8	AG	1660	1.8	.0	33.0
L. WE	-500	8	-1500	8	AG	1660	.9	.0	35.0
M. EF	-1500	-8	-500	-8	AG	2	.9	.0	35.0
N. EA	-500	-8	0	-8	AG	2	1.8	.0	33.0
O. ED	0	-8	500	-8	AG	278	1.8	.0	33.0
P. EE	500	-8	1500	-8	AG	278	.9	.0	35.0
Q. NL	0	0	8	-500	AG	16	1.2	.0	33.0
R. SL	1900	0	1800	0	AG	0	1.2	.0	33.0
S. WL	0	0	500	8	AG	0	1.8	.0	33.0
T. EL	0	-1900	0	-1800	AG	0	1.8	.0	33.0

III. RECEPTOR LOCATIONS

RECEPTOR	COORDINATES (FT) X	Y	Z
1. NE3	25	25	6.0
2. SE3	25	-25	6.0
3. SW3	-25	-25	6.0
4. NW3	-25	25	6.0
5. NE7	38	38	6.0
6. SE7	38	-38	6.0
7. SW7	-38	-38	6.0
8. NW7	-38	38	6.0

IV. MODEL RESULTS (WORST CASE WIND ANGLE)

RECEPTOR	BRG (DEG)	PRED CONC (PPM)	CONC/LINK (PPM) A	B	C	D	E	F	G	H
1. NE3	266.	.6	.0	.0	.0	.0	.0	.0	.0	.0
2. SE3	278.	.3	.0	.0	.0	.0	.0	.0	.0	.0
3. SW3	278.	.3	.0	.0	.0	.0	.0	.0	.0	.0
4. NW3	265.	.6	.0	.0	.0	.0	.0	.0	.0	.0
5. NE7	264.	.3	.0	.0	.0	.0	.0	.0	.0	.0
6. SE7	279.	.2	.0	.0	.0	.0	.0	.0	.0	.0
7. SW7	279.	.2	.0	.0	.0	.0	.0	.0	.0	.0
8. NW7	263.	.3	.0	.0	.0	.0	.0	.0	.0	.0

IV. MODEL RESULTS (WORST CASE WIND ANGLE) (CONT.)

RECEPTOR	CONC/LINK (PPM) I	J	K	L	M	N	O	P	Q	R	S	T
1. NE3	.0	.0	.5	.0	.0	.0	.0	.0	.0	.0	.0	.0
2. SE3	.0	.0	.3	.0	.0	.0	.0	.0	.0	.0	.0	.0
3. SW3	.0	.0	.3	.0	.0	.0	.0	.0	.0	.0	.0	.0
4. NW3	.0	.0	.6	.0	.0	.0	.0	.0	.0	.0	.0	.0
5. NE7	.0	.0	.3	.0	.0	.0	.0	.0	.0	.0	.0	.0
6. SE7	.0	.0	.2	.0	.0	.0	.0	.0	.0	.0	.0	.0
7. SW7	.0	.0	.2	.0	.0	.0	.0	.0	.0	.0	.0	.0
8. NW7	.0	.0	.3	.0	.0	.0	.0	.0	.0	.0	.0	.0

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 1

JOB: LYTLE CREEK ROAD AND SIERRA AVENUE AM WP
RUN: (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

I. SITE VARIABLES

U= .5 M/S Z0= 100. CM ALT= 0. (FT)
BRG= WORST CASE VD= .0 CM/S
CLAS= 7 (G) VS= .0 CM/S
MIXH= 1000. M AMB= .0 PPM
SIGTH= 5. DEGREES TEMP= 15.6 DEGREE (C)

II. LINK VARIABLES

LINK DESCRIPTION	LINK COORDINATES (FT) X1	Y1	X2	Y2	TYPE	VPH	EF (G/MI)	H (FT)	W (FT)
A. NF	8	-1500	8	-500	AG	580	.9	.0	35.0
B. NA	8	-500	8	0	AG	564	1.3	.0	33.0
C. ND	1800	0	1900	0	AG	2	1.0	.0	33.0
D. NE	1800	0	1900	0	AG	2	.9	.0	35.0
E. SF	1800	0	1900	0	AG	2072	.9	.0	35.0
F. SA	1800	0	1900	0	AG	2072	1.6	.0	33.0
G. SD	-8	0	-8	-500	AG	0	1.0	.0	33.0
H. SE	-8	-500	-8	-1500	AG	0	.9	.0	35.0
I. WF	1500	8	500	8	AG	0	.9	.0	35.0
J. WA	500	8	0	8	AG	0	1.8	.0	33.0
K. WD	0	8	-500	8	AG	2088	1.8	.0	33.0
L. WE	-500	8	-1500	8	AG	2088	.9	.0	35.0
M. EF	-1500	-8	-500	-8	AG	14	.9	.0	35.0
N. EA	-500	-8	0	-8	AG	14	1.8	.0	33.0
O. ED	0	-8	500	-8	AG	576	1.8	.0	33.0
P. EE	500	-8	1500	-8	AG	576	.9	.0	35.0
Q. NL	0	0	8	-500	AG	16	1.2	.0	33.0
R. SL	1900	0	1800	0	AG	0	1.2	.0	33.0
S. WL	0	0	500	8	AG	0	1.8	.0	33.0
T. EL	0	-1900	0	-1800	AG	0	1.8	.0	33.0

III. RECEPTOR LOCATIONS

RECEPTOR	COORDINATES (FT) X	Y	Z
1. NE3	25	25	6.0
2. SE3	25	-25	6.0
3. SW3	-25	-25	6.0
4. NW3	-25	25	6.0
5. NE7	38	38	6.0
6. SE7	38	-38	6.0
7. SW7	-38	-38	6.0
8. NW7	-38	38	6.0

IV. MODEL RESULTS (WORST CASE WIND ANGLE)

RECEPTOR	BRG (DEG)	PRED CONC (PPM)	CONC/LINK (PPM) A	B	C	D	E	F	G	H
1. NE3	266.	.7	.0	.0	.0	.0	.0	.0	.0	.0
2. SE3	278.	.4	.0	.0	.0	.0	.0	.0	.0	.0
3. SW3	278.	.4	.0	.0	.0	.0	.0	.0	.0	.0
4. NW3	265.	.8	.0	.0	.0	.0	.0	.0	.0	.0
5. NE7	263.	.4	.0	.0	.0	.0	.0	.0	.0	.0
6. SE7	279.	.3	.0	.0	.0	.0	.0	.0	.0	.0
7. SW7	280.	.3	.0	.0	.0	.0	.0	.0	.0	.0
8. NW7	263.	.4	.0	.0	.0	.0	.0	.0	.0	.0

IV. MODEL RESULTS (WORST CASE WIND ANGLE) (CONT.)

RECEPTOR	CONC/LINK (PPM) I	J	K	L	M	N	O	P	Q	R	S	T
1. NE3	.0	.0	.6	.0	.0	.0	.0	.0	.0	.0	.0	.0
2. SE3	.0	.0	.3	.0	.0	.0	.0	.0	.0	.0	.0	.0
3. SW3	.0	.0	.3	.0	.0	.0	.0	.0	.0	.0	.0	.0
4. NW3	.0	.0	.7	.0	.0	.0	.0	.0	.0	.0	.0	.0
5. NE7	.0	.0	.4	.0	.0	.0	.0	.0	.0	.0	.0	.0
6. SE7	.0	.0	.3	.0	.0	.0	.0	.0	.0	.0	.0	.0
7. SW7	.0	.0	.2	.0	.0	.0	.0	.0	.0	.0	.0	.0
8. NW7	.0	.0	.3	.0	.0	.0	.0	.0	.0	.0	.0	.0

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 1

JOB: LYTLE CREEK ROAD AND SIERRA AVENUE PM NP
RUN: (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

I. SITE VARIABLES

U= .5 M/S Z0= 100. CM ALT= 0. (FT)
BRG= WORST CASE VD= .0 CM/S
CLAS= 7 (G) VS= .0 CM/S
MIXH= 1000. M AMB= .0 PPM
SIGTH= 5. DEGREES TEMP= 15.6 DEGREE (C)

II. LINK VARIABLES

LINK DESCRIPTION	LINK COORDINATES (FT) X1	Y1	X2	Y2	TYPE	VPH	EF (G/MI)	H (FT)	W (FT)
A. NF	8	-1500	8	-500	AG	1535	.9	.0	35.0
B. NA	8	-500	8	0	AG	1299	1.6	.0	33.0
C. ND	1800	0	1900	0	AG	8	1.0	.0	33.0
D. NE	1800	0	1900	0	AG	8	.9	.0	35.0
E. SF	1800	0	1900	0	AG	1408	.9	.0	35.0
F. SA	1800	0	1900	0	AG	1408	1.6	.0	33.0
G. SD	-8	0	-8	-500	AG	0	1.0	.0	33.0
H. SE	-8	-500	-8	-1500	AG	0	.9	.0	35.0
I. WF	1500	8	500	8	AG	0	.9	.0	35.0
J. WA	500	8	0	8	AG	0	1.8	.0	33.0
K. WD	0	8	-500	8	AG	1644	1.8	.0	33.0
L. WE	-500	8	-1500	8	AG	1644	.9	.0	35.0
M. EF	-1500	-8	-500	-8	AG	71	.9	.0	35.0
N. EA	-500	-8	0	-8	AG	71	1.8	.0	33.0
O. ED	0	-8	500	-8	AG	1362	1.8	.0	33.0
P. EE	500	-8	1500	-8	AG	1362	.9	.0	35.0
Q. NL	0	0	8	-500	AG	236	1.2	.0	33.0
R. SL	1900	0	1800	0	AG	0	1.2	.0	33.0
S. WL	0	0	500	8	AG	0	1.8	.0	33.0
T. EL	0	-1900	0	-1800	AG	0	1.8	.0	33.0

III. RECEPTOR LOCATIONS

RECEPTOR	COORDINATES (FT) X	Y	Z
1. NE3	25	25	6.0
2. SE3	25	-25	6.0
3. SW3	-25	-25	6.0
4. NW3	-25	25	6.0
5. NE7	38	38	6.0
6. SE7	38	-38	6.0
7. SW7	-38	-38	6.0
8. NW7	-38	38	6.0

IV. MODEL RESULTS (WORST CASE WIND ANGLE)

RECEPTOR	BRG (DEG)	PRED CONC (PPM)	CONC/LINK (PPM) A	B	C	D	E	F	G	H
1. NE3	184.	.6	.0	.4	.0	.0	.0	.0	.0	.0
2. SE3	278.	.6	.0	.1	.0	.0	.0	.0	.0	.0
3. SW3	86.	.6	.0	.1	.0	.0	.0	.0	.0	.0
4. NW3	265.	.7	.0	.0	.0	.0	.0	.0	.0	.0
5. NE7	186.	.4	.0	.2	.0	.0	.0	.0	.0	.0
6. SE7	278.	.4	.0	.1	.0	.0	.0	.0	.0	.0
7. SW7	84.	.4	.0	.0	.0	.0	.0	.0	.0	.0
8. NW7	172.	.4	.0	.2	.0	.0	.0	.0	.0	.0

IV. MODEL RESULTS (WORST CASE WIND ANGLE) (CONT.)

RECEPTOR	CONC/LINK (PPM) I	J	K	L	M	N	O	P	Q	R	S	T
1. NE3	.0	.0	.0	.0	.0	.0	.1	.0	.0	.0	.0	.0
2. SE3	.0	.0	.3	.0	.0	.0	.0	.0	.0	.0	.0	.0
3. SW3	.0	.0	.0	.0	.0	.0	.4	.0	.0	.0	.0	.0
4. NW3	.0	.0	.6	.0	.0	.0	.0	.0	.0	.0	.0	.0
5. NE7	.0	.0	.0	.0	.0	.0	.1	.0	.0	.0	.0	.0
6. SE7	.0	.0	.2	.0	.0	.0	.0	.0	.0	.0	.0	.0
7. SW7	.0	.0	.0	.0	.0	.0	.3	.0	.0	.0	.0	.0
8. NW7	.0	.0	.2	.0	.0	.0	.0	.0	.0	.0	.0	.0

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 1

JOB: LYTLE CREEK ROAD AND SIERRA AVENUE PM WP
RUN: (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

I. SITE VARIABLES

U= .5 M/S Z0= 100. CM ALT= 0. (FT)
BRG= WORST CASE VD= .0 CM/S
CLAS= 7 (G) VS= .0 CM/S
MIXH= 1000. M AMB= .0 PPM
SIGTH= 5. DEGREES TEMP= 15.6 DEGREE (C)

II. LINK VARIABLES

LINK DESCRIPTION	LINK COORDINATES (FT) X1	Y1	X2	Y2	TYPE	VPH	EF (G/MI)	H (FT)	W (FT)
A. NF	8	-1500	8	-500	AG	2204	.9	.0	35.0
B. NA	8	-500	8	0	AG	1968	1.6	.0	33.0
C. ND	1800	0	1900	0	AG	6	1.0	.0	33.0
D. NE	1800	0	1900	0	AG	6	.9	.0	35.0
E. SF	1800	0	1900	0	AG	1924	.9	.0	35.0
F. SA	1800	0	1900	0	AG	1924	1.6	.0	33.0
G. SD	-8	0	-8	-500	AG	0	1.0	.0	33.0
H. SE	-8	-500	-8	-1500	AG	0	.9	.0	35.0
I. WF	1500	8	500	8	AG	0	.9	.0	35.0
J. WA	500	8	0	8	AG	0	1.8	.0	33.0
K. WD	0	8	-500	8	AG	2160	1.8	.0	33.0
L. WE	-500	8	-1500	8	AG	2160	.9	.0	35.0
M. EF	-1500	-8	-500	-8	AG	87	.9	.0	35.0
N. EA	-500	-8	0	-8	AG	87	1.8	.0	33.0
O. ED	0	-8	500	-8	AG	2049	1.8	.0	33.0
P. EE	500	-8	1500	-8	AG	2049	.9	.0	35.0
Q. NL	0	0	8	-500	AG	236	1.2	.0	33.0
R. SL	1900	0	1800	0	AG	0	1.2	.0	33.0
S. WL	0	0	500	8	AG	0	1.8	.0	33.0
T. EL	0	-1900	0	-1800	AG	0	1.8	.0	33.0

III. RECEPTOR LOCATIONS

RECEPTOR	COORDINATES (FT) X	Y	Z
1. NE3	25	25	6.0
2. SE3	25	-25	6.0
3. SW3	-25	-25	6.0
4. NW3	-25	25	6.0
5. NE7	38	38	6.0
6. SE7	38	-38	6.0
7. SW7	-38	-38	6.0
8. NW7	-38	38	6.0

IV. MODEL RESULTS (WORST CASE WIND ANGLE)

RECEPTOR	BRG (DEG)	PRED CONC (PPM)	CONC/LINK (PPM) A	B	C	D	E	F	G	H
1. NE3	184.	.8	.0	.5	.0	.0	.0	.0	.0	.0
2. SE3	278.	.8	.0	.2	.0	.0	.0	.0	.0	.0
3. SW3	86.	.8	.0	.2	.0	.0	.0	.0	.0	.0
4. NW3	265.	.8	.0	.0	.0	.0	.0	.0	.0	.0
5. NE7	186.	.5	.0	.3	.0	.0	.0	.0	.0	.0
6. SE7	305.	.5	.0	.2	.0	.0	.0	.0	.0	.0
7. SW7	83.	.5	.0	.1	.0	.0	.0	.0	.0	.0
8. NW7	171.	.5	.0	.2	.0	.0	.0	.0	.0	.0

IV. MODEL RESULTS (WORST CASE WIND ANGLE) (CONT.)

RECEPTOR	CONC/LINK (PPM) I	J	K	L	M	N	O	P	Q	R	S	T
1. NE3	.0	.0	.0	.0	.0	.0	.2	.0	.0	.0	.0	.0
2. SE3	.0	.0	.4	.0	.0	.0	.1	.0	.0	.0	.0	.0
3. SW3	.0	.0	.0	.0	.0	.0	.6	.0	.0	.0	.0	.0
4. NW3	.0	.0	.7	.0	.0	.0	.0	.0	.0	.0	.0	.0
5. NE7	.0	.0	.0	.0	.0	.0	.2	.0	.0	.0	.0	.0
6. SE7	.0	.0	.2	.0	.0	.0	.1	.0	.0	.0	.0	.0
7. SW7	.0	.0	.0	.0	.0	.0	.4	.0	.0	.0	.0	.0
8. NW7	.0	.0	.2	.0	.0	.0	.0	.0	.0	.0	.0	.0

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 1

JOB: CASMALIA STREET AND ALDER AVENUE AM NP
RUN: (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

I. SITE VARIABLES

U= .5 M/S Z0= 100. CM ALT= 0. (FT)
BRG= WORST CASE VD= .0 CM/S
CLAS= 7 (G) VS= .0 CM/S
MIXH= 1000. M AMB= .0 PPM
SIGTH= 5. DEGREES TEMP= 15.6 DEGREE (C)

II. LINK VARIABLES

LINK DESCRIPTION	LINK COORDINATES (FT) X1	Y1	X2	Y2	TYPE	VPH	EF (G/MI)	H (FT)	W (FT)
A. NF	23	-1500	23	-500	AG	403	.9	.0	50.0
B. NA	23	-500	23	0	AG	208	1.5	.0	45.0
C. ND	23	0	23	500	AG	392	1.1	.0	33.0
D. NE	23	500	23	1500	AG	392	.9	.0	50.0
E. SF	-23	1500	-23	500	AG	234	.9	.0	50.0
F. SA	-23	500	-23	0	AG	80	1.5	.0	45.0
G. SD	-23	0	-23	-500	AG	499	1.1	.0	33.0
H. SE	-23	-500	-23	-1500	AG	499	.9	.0	50.0
I. WF	1500	15	500	15	AG	1080	.9	.0	35.0
J. WA	500	15	0	15	AG	648	1.3	.0	33.0
K. WD	0	15	-500	15	AG	509	1.0	.0	33.0
L. WE	-500	15	-1500	15	AG	509	.9	.0	35.0
M. EF	-1500	-15	-500	-15	AG	17	.9	.0	35.0
N. EA	-500	-15	0	-15	AG	17	1.3	.0	33.0
O. ED	0	-15	500	-15	AG	334	1.0	.0	33.0
P. EE	500	-15	1500	-15	AG	334	.9	.0	35.0
Q. NL	0	0	15	-500	AG	195	1.5	.0	33.0
R. SL	0	0	-15	500	AG	154	1.5	.0	33.0
S. WL	0	0	500	15	AG	432	1.3	.0	33.0
T. EL	0	0	-500	-15	AG	0	1.3	.0	33.0

III. RECEPTOR LOCATIONS

RECEPTOR	COORDINATES (FT) X	Y	Z
1. NE3	48	33	6.0
2. SE3	48	-33	6.0
3. SW3	-48	-33	6.0
4. NW3	-48	33	6.0
5. NE7	61	46	6.0
6. SE7	61	-46	6.0
7. SW7	-61	-46	6.0
8. NW7	-61	46	6.0

IV. MODEL RESULTS (WORST CASE WIND ANGLE)

RECEPTOR	BRG (DEG)	PRED CONC (PPM)	CONC/LINK (PPM) A	B	C	D	E	F	G	H
1. NE3	94.	.3	.0	.0	.0	.0	.0	.0	.0	.0
2. SE3	83.	.2	.0	.0	.0	.0	.0	.0	.0	.0
3. SW3	84.	.3	.0	.0	.0	.0	.0	.0	.0	.0
4. NW3	94.	.3	.0	.0	.0	.0	.0	.0	.0	.0
5. NE7	187.	.2	.0	.0	.0	.0	.0	.0	.0	.0
6. SE7	352.	.2	.0	.0	.0	.0	.0	.0	.0	.0
7. SW7	83.	.2	.0	.0	.0	.0	.0	.0	.0	.0
8. NW7	96.	.2	.0	.0	.0	.0	.0	.0	.0	.0

IV. MODEL RESULTS (WORST CASE WIND ANGLE) (CONT.)

RECEPTOR	CONC/LINK (PPM) I	J	K	L	M	N	O	P	Q	R	S	T
1. NE3	.0	.2	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
2. SE3	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
3. SW3	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
4. NW3	.0	.2	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
5. NE7	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
6. SE7	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
7. SW7	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
8. NW7	.0	.1	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 1

JOB: CASMALIA STREET AND ALDER AVENUE AM WP
RUN: (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

I. SITE VARIABLES

U= .5 M/S Z0= 100. CM ALT= 0. (FT)
BRG= WORST CASE VD= .0 CM/S
CLAS= 7 (G) VS= .0 CM/S
MIXH= 1000. M AMB= .0 PPM
SIGTH= 5. DEGREES TEMP= 15.6 DEGREE (C)

II. LINK VARIABLES

LINK DESCRIPTION	LINK COORDINATES (FT) X1	Y1	X2	Y2	TYPE	VPH	EF (G/MI)	H (FT)	W (FT)
A. NF	23	-1500	23	-500	AG	409	.9	.0	50.0
B. NA	23	-500	23	0	AG	208	1.6	.0	45.0
C. ND	23	0	23	500	AG	392	1.1	.0	33.0
D. NE	23	500	23	1500	AG	392	.9	.0	50.0
E. SF	-23	1500	-23	500	AG	234	.9	.0	50.0
F. SA	-23	500	-23	0	AG	80	1.6	.0	45.0
G. SD	-23	0	-23	-500	AG	621	1.1	.0	33.0
H. SE	-23	-500	-23	-1500	AG	621	.9	.0	50.0
I. WF	1500	15	500	15	AG	1202	.9	.0	35.0
J. WA	500	15	0	15	AG	648	1.3	.0	33.0
K. WD	0	15	-500	15	AG	515	1.0	.0	33.0
L. WE	-500	15	-1500	15	AG	515	.9	.0	35.0
M. EF	-1500	-15	-500	-15	AG	17	.9	.0	35.0
N. EA	-500	-15	0	-15	AG	17	1.3	.0	33.0
O. ED	0	-15	500	-15	AG	334	1.0	.0	33.0
P. EE	500	-15	1500	-15	AG	334	.9	.0	35.0
Q. NL	0	0	15	-500	AG	201	1.6	.0	33.0
R. SL	0	0	-15	500	AG	154	1.6	.0	33.0
S. WL	0	0	500	15	AG	554	1.4	.0	33.0
T. EL	0	0	-500	-15	AG	0	1.3	.0	33.0

III. RECEPTOR LOCATIONS

RECEPTOR	COORDINATES (FT) X	Y	Z
1. NE3	48	33	6.0
2. SE3	48	-33	6.0
3. SW3	-48	-33	6.0
4. NW3	-48	33	6.0
5. NE7	61	46	6.0
6. SE7	61	-46	6.0
7. SW7	-61	-46	6.0
8. NW7	-61	46	6.0

IV. MODEL RESULTS (WORST CASE WIND ANGLE)

RECEPTOR	BRG (DEG)	PRED CONC (PPM)	CONC/LINK (PPM) A	B	C	D	E	F	G	H
1. NE3	94.	.3	.0	.0	.0	.0	.0	.0	.0	.0
2. SE3	83.	.2	.0	.0	.0	.0	.0	.0	.0	.0
3. SW3	84.	.3	.0	.0	.0	.0	.0	.0	.0	.0
4. NW3	94.	.4	.0	.0	.0	.0	.0	.0	.0	.0
5. NE7	187.	.2	.0	.0	.0	.0	.0	.0	.0	.0
6. SE7	352.	.2	.0	.0	.0	.0	.0	.0	.0	.0
7. SW7	82.	.2	.0	.0	.0	.0	.0	.0	.0	.0
8. NW7	96.	.3	.0	.0	.0	.0	.0	.0	.0	.0

IV. MODEL RESULTS (WORST CASE WIND ANGLE) (CONT.)

RECEPTOR	CONC/LINK (PPM) I	J	K	L	M	N	O	P	Q	R	S	T
1. NE3	.0	.2	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
2. SE3	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
3. SW3	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
4. NW3	.0	.1	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
5. NE7	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
6. SE7	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
7. SW7	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
8. NW7	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 1

JOB: CASMALIA STREET AND ALDER AVENUE PM NP
RUN: (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

I. SITE VARIABLES

U= .5 M/S Z0= 100. CM ALT= 0. (FT)
BRG= WORST CASE VD= .0 CM/S
CLAS= 7 (G) VS= .0 CM/S
MIXH= 1000. M AMB= .0 PPM
SIGTH= 5. DEGREES TEMP= 15.6 DEGREE (C)

II. LINK VARIABLES

LINK DESCRIPTION	LINK COORDINATES (FT) X1	Y1	X2	Y2	TYPE	VPH	EF (G/MI)	H (FT)	W (FT)
A. NF	23	-1500	23	-500	AG	739	.9	.0	50.0
B. NA	23	-500	23	0	AG	308	1.5	.0	45.0
C. ND	23	0	23	500	AG	474	1.0	.0	33.0
D. NE	23	500	23	1500	AG	474	.9	.0	50.0
E. SF	-23	1500	-23	500	AG	309	.9	.0	50.0
F. SA	-23	500	-23	0	AG	130	1.5	.0	45.0
G. SD	-23	0	-23	-500	AG	700	1.1	.0	33.0
H. SE	-23	-500	-23	-1500	AG	700	.9	.0	50.0
I. WF	1500	15	500	15	AG	1251	.9	.0	35.0
J. WA	500	15	0	15	AG	662	1.4	.0	33.0
K. WD	0	15	-500	15	AG	782	1.2	.0	33.0
L. WE	-500	15	-1500	15	AG	782	.9	.0	35.0
M. EF	-1500	-15	-500	-15	AG	54	.9	.0	35.0
N. EA	-500	-15	0	-15	AG	54	1.4	.0	33.0
O. ED	0	-15	500	-15	AG	397	1.0	.0	33.0
P. EE	500	-15	1500	-15	AG	397	.9	.0	35.0
Q. NL	0	0	15	-500	AG	431	1.5	.0	33.0
R. SL	0	0	-15	500	AG	179	1.5	.0	33.0
S. WL	0	0	500	15	AG	589	1.5	.0	33.0
T. EL	0	0	-500	-15	AG	0	1.4	.0	33.0

III. RECEPTOR LOCATIONS

RECEPTOR	COORDINATES (FT) X	Y	Z
1. NE3	48	33	6.0
2. SE3	48	-33	6.0
3. SW3	-48	-33	6.0
4. NW3	-48	33	6.0
5. NE7	61	46	6.0
6. SE7	61	-46	6.0
7. SW7	-61	-46	6.0
8. NW7	-61	46	6.0

IV. MODEL RESULTS (WORST CASE WIND ANGLE)

RECEPTOR	BRG (DEG)	PRED CONC (PPM)	CONC/LINK (PPM) A	B	C	D	E	F	G	H
1. NE3	95.	.4	.0	.0	.0	.0	.0	.0	.0	.0
2. SE3	83.	.3	.0	.0	.0	.0	.0	.0	.0	.0
3. SW3	84.	.4	.0	.0	.0	.0	.0	.0	.0	.0
4. NW3	94.	.4	.0	.0	.0	.0	.0	.0	.0	.0
5. NE7	187.	.3	.0	.0	.0	.0	.0	.0	.0	.0
6. SE7	352.	.2	.0	.0	.0	.0	.0	.0	.0	.0
7. SW7	82.	.3	.0	.0	.0	.0	.0	.0	.0	.0
8. NW7	96.	.3	.0	.0	.0	.0	.0	.0	.0	.0

IV. MODEL RESULTS (WORST CASE WIND ANGLE) (CONT.)

RECEPTOR	CONC/LINK (PPM) I	J	K	L	M	N	O	P	Q	R	S	T
1. NE3	.0	.2	.0	.0	.0	.0	.0	.0	.0	.0	.1	.0
2. SE3	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
3. SW3	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
4. NW3	.0	.2	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
5. NE7	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
6. SE7	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
7. SW7	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
8. NW7	.0	.1	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 1

JOB: CASMALIA STREET AND ALDER AVENUE PM WP
RUN: (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

I. SITE VARIABLES

U= .5 M/S Z0= 100. CM ALT= 0. (FT)
BRG= WORST CASE VD= .0 CM/S
CLAS= 7 (G) VS= .0 CM/S
MIXH= 1000. M AMB= .0 PPM
SIGTH= 5. DEGREES TEMP= 15.6 DEGREE (C)

II. LINK VARIABLES

LINK DESCRIPTION	LINK COORDINATES (FT) X1	Y1	X2	Y2	TYPE	VPH	EF (G/MI)	H (FT)	W (FT)
A. NF	23	-1500	23	-500	AG	748	.9	.0	50.0
B. NA	23	-500	23	0	AG	311	1.5	.0	45.0
C. ND	23	0	23	500	AG	476	1.1	.0	33.0
D. NE	23	500	23	1500	AG	476	.9	.0	50.0
E. SF	-23	1500	-23	500	AG	309	.9	.0	50.0
F. SA	-23	500	-23	0	AG	130	1.5	.0	45.0
G. SD	-23	0	-23	-500	AG	934	1.1	.0	33.0
H. SE	-23	-500	-23	-1500	AG	934	.9	.0	50.0
I. WF	1500	15	500	15	AG	1485	.9	.0	35.0
J. WA	500	15	0	15	AG	662	1.3	.0	33.0
K. WD	0	15	-500	15	AG	788	1.1	.0	33.0
L. WE	-500	15	-1500	15	AG	788	.9	.0	35.0
M. EF	-1500	-15	-500	-15	AG	54	.9	.0	35.0
N. EA	-500	-15	0	-15	AG	54	1.3	.0	33.0
O. ED	0	-15	500	-15	AG	398	1.0	.0	33.0
P. EE	500	-15	1500	-15	AG	398	.9	.0	35.0
Q. NL	0	0	15	-500	AG	437	1.6	.0	33.0
R. SL	0	0	-15	500	AG	179	1.5	.0	33.0
S. WL	0	0	500	15	AG	823	1.6	.0	33.0
T. EL	0	0	-500	-15	AG	0	1.3	.0	33.0

III. RECEPTOR LOCATIONS

RECEPTOR	COORDINATES (FT) X	Y	Z
1. NE3	48	33	6.0
2. SE3	48	-33	6.0
3. SW3	-48	-33	6.0
4. NW3	-48	33	6.0
5. NE7	61	46	6.0
6. SE7	61	-46	6.0
7. SW7	-61	-46	6.0
8. NW7	-61	46	6.0

IV. MODEL RESULTS (WORST CASE WIND ANGLE)

RECEPTOR	BRG (DEG)	PRED CONC (PPM)	CONC/LINK (PPM) A	B	C	D	E	F	G	H
1. NE3	186.	.4	.0	.0	.0	.0	.0	.0	.0	.0
2. SE3	82.	.3	.0	.0	.0	.0	.0	.0	.0	.0
3. SW3	83.	.4	.0	.0	.0	.0	.0	.0	.0	.0
4. NW3	94.	.5	.0	.0	.0	.0	.0	.0	.0	.0
5. NE7	188.	.3	.0	.0	.0	.0	.0	.0	.0	.0
6. SE7	78.	.2	.0	.0	.0	.0	.0	.0	.0	.0
7. SW7	81.	.3	.0	.0	.0	.0	.0	.0	.0	.0
8. NW7	96.	.3	.0	.0	.0	.0	.0	.0	.0	.0

IV. MODEL RESULTS (WORST CASE WIND ANGLE) (CONT.)

RECEPTOR	CONC/LINK (PPM) I	J	K	L	M	N	O	P	Q	R	S	T
1. NE3	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
2. SE3	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.1	.0
3. SW3	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.1	.0
4. NW3	.0	.2	.0	.0	.0	.0	.0	.0	.0	.0	.1	.0
5. NE7	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
6. SE7	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.1	.0
7. SW7	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.1	.0
8. NW7	.0	.1	.0	.0	.0	.0	.0	.0	.0	.0	.1	.0

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 1

JOB: I-15 NB ON/OFF RAMPS AND SIERRA AVENUE AM NP
RUN: (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

I. SITE VARIABLES

U=	.5 M/S	Z0=	100. CM	ALT=	0. (FT)
BRG=	WORST CASE	VD=	.0 CM/S		
CLAS=	7 (G)	VS=	.0 CM/S		
MIXH=	1000. M	AMB=	.0 PPM		
SIGTH=	5. DEGREES	TEMP=	15.6 DEGREE (C)		

II. LINK VARIABLES

LINK DESCRIPTION	LINK COORDINATES (FT) X1	Y1	X2	Y2	TYPE	VPH	EF (G/MI)	H (FT)	W (FT)
A. NF	15	-1500	15	-500	AG	938	.9	.0	50.0
B. NA	15	-500	15	0	AG	938	1.3	.0	33.0
C. ND	15	0	15	500	AG	660	1.0	.0	33.0
D. NE	15	500	15	1500	AG	660	.9	.0	50.0
E. SF	-23	1500	-23	500	AG	976	.9	.0	35.0
F. SA	-23	500	-23	0	AG	831	1.2	.0	33.0
G. SD	-23	0	-23	-500	AG	1032	1.1	.0	33.0
H. SE	-23	-500	-23	-1500	AG	1032	.9	.0	35.0
I. WF	1500	15	500	15	AG	0	.9	.0	35.0
J. WA	500	15	0	15	AG	0	1.8	.0	33.0
K. WD	0	15	-500	15	AG	0	1.6	.0	33.0
L. WE	-500	15	-1500	15	AG	0	.9	.0	35.0
M. EF	-1500	-15	-500	-15	AG	303	.9	.0	35.0
N. EA	-500	-15	0	-15	AG	203	1.8	.0	33.0
O. ED	0	-15	500	-15	AG	525	1.8	.0	33.0
P. EE	500	-15	1500	-15	AG	525	.9	.0	35.0
Q. NL	0	-1900	0	-1800	AG	0	1.2	.0	33.0
R. SL	0	0	-23	500	AG	145	1.2	.0	33.0
S. WL	0	-1900	0	-1800	AG	0	1.8	.0	33.0
T. EL	0	0	-500	-15	AG	100	1.8	.0	33.0

III. RECEPTOR LOCATIONS

RECEPTOR	COORDINATES (FT) X	Y	Z
1. NE3	40	33	6.0
2. SE3	40	-33	6.0
3. SW3	-40	-33	6.0
4. NW3	-40	33	6.0
5. NE7	53	46	6.0
6. SE7	53	-46	6.0
7. SW7	-53	-46	6.0
8. NW7	-53	46	6.0

IV. MODEL RESULTS (WORST CASE WIND ANGLE)

RECEPTOR	BRG (DEG)	PRED CONC (PPM)	CONC/LINK (PPM) A	B	C	D	E	F	G	H
1. NE3	186.	.3	.0	.2	.0	.0	.0	.0	.0	.0
2. SE3	354.	.3	.0	.0	.0	.0	.0	.0	.0	.0
3. SW3	5.	.4	.0	.0	.0	.0	.0	.2	.0	.0
4. NW3	175.	.4	.0	.0	.0	.0	.0	.0	.2	.0
5. NE7	186.	.2	.0	.1	.0	.0	.0	.0	.0	.0
6. SE7	353.	.2	.0	.0	.0	.0	.0	.0	.0	.0
7. SW7	84.	.2	.0	.0	.0	.0	.0	.0	.0	.0
8. NW7	174.	.2	.0	.0	.0	.0	.0	.0	.1	.0

IV. MODEL RESULTS (WORST CASE WIND ANGLE) (CONT.)

RECEPTOR	CONC/LINK (PPM) I	J	K	L	M	N	O	P	Q	R	S	T
1. NE3	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
2. SE3	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
3. SW3	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
4. NW3	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
5. NE7	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
6. SE7	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
7. SW7	.0	.0	.0	.0	.0	.0	.1	.0	.0	.0	.0	.0
8. NW7	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 1

JOB: I-15 NB ON/OFF RAMPS AND SIERRA AVENUE AM WP
RUN: (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

I. SITE VARIABLES

U= .5 M/S Z0= 100. CM ALT= 0. (FT)
BRG= WORST CASE VD= .0 CM/S
CLAS= 7 (G) VS= .0 CM/S
MIXH= 1000. M AMB= .0 PPM
SIGTH= 5. DEGREES TEMP= 15.6 DEGREE (C)

II. LINK VARIABLES

LINK DESCRIPTION	LINK COORDINATES (FT) X1	Y1	X2	Y2	TYPE	VPH	EF (G/MI)	H (FT)	W (FT)
A. NF	15	-1500	15	-500	AG	1603	.9	.0	50.0
B. NA	15	-500	15	0	AG	1603	1.4	.0	33.0
C. ND	15	0	15	500	AG	1283	1.0	.0	33.0
D. NE	15	500	15	1500	AG	1283	.9	.0	50.0
E. SF	-23	1500	-23	500	AG	1370	.9	.0	35.0
F. SA	-23	500	-23	0	AG	1189	1.3	.0	33.0
G. SD	-23	0	-23	-500	AG	1621	1.1	.0	33.0
H. SE	-23	-500	-23	-1500	AG	1621	.9	.0	35.0
I. WF	1500	15	500	15	AG	0	.9	.0	35.0
J. WA	500	15	0	15	AG	0	1.8	.0	33.0
K. WD	0	15	-500	15	AG	0	1.3	.0	33.0
L. WE	-500	15	-1500	15	AG	0	.9	.0	35.0
M. EF	-1500	-15	-500	-15	AG	595	.9	.0	35.0
N. EA	-500	-15	0	-15	AG	434	1.8	.0	33.0
O. ED	0	-15	500	-15	AG	664	1.8	.0	33.0
P. EE	500	-15	1500	-15	AG	664	.9	.0	35.0
Q. NL	0	-1900	0	-1800	AG	0	1.2	.0	33.0
R. SL	0	0	-23	500	AG	181	1.2	.0	33.0
S. WL	0	-1900	0	-1800	AG	0	1.8	.0	33.0
T. EL	0	0	-500	-15	AG	161	1.8	.0	33.0

III. RECEPTOR LOCATIONS

RECEPTOR	COORDINATES (FT) X	Y	Z
1. NE3	40	33	6.0
2. SE3	40	-33	6.0
3. SW3	-40	-33	6.0
4. NW3	-40	33	6.0
5. NE7	53	46	6.0
6. SE7	53	-46	6.0
7. SW7	-53	-46	6.0
8. NW7	-53	46	6.0

IV. MODEL RESULTS (WORST CASE WIND ANGLE)

RECEPTOR	BRG (DEG)	PRED CONC (PPM)	CONC/LINK (PPM) A	B	C	D	E	F	G	H
1. NE3	186.	.5	.0	.3	.0	.0	.0	.0	.0	.0
2. SE3	274.	.5	.0	.1	.0	.0	.0	.0	.0	.0
3. SW3	5.	.6	.0	.0	.0	.0	.0	.3	.0	.0
4. NW3	175.	.6	.0	.0	.0	.0	.0	.0	.3	.0
5. NE7	187.	.4	.0	.2	.0	.0	.0	.0	.0	.0
6. SE7	353.	.3	.0	.0	.1	.0	.0	.0	.0	.0
7. SW7	6.	.4	.0	.0	.0	.0	.0	.2	.0	.0
8. NW7	173.	.4	.0	.0	.0	.0	.0	.0	.2	.0

IV. MODEL RESULTS (WORST CASE WIND ANGLE) (CONT.)

RECEPTOR	CONC/LINK (PPM) I	J	K	L	M	N	O	P	Q	R	S	T
1. NE3	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
2. SE3	.0	.0	.0	.0	.0	.1	.0	.0	.0	.0	.0	.0
3. SW3	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
4. NW3	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
5. NE7	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
6. SE7	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
7. SW7	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
8. NW7	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 1

JOB: I-15 NB ON/OFF RAMPS AND SIERRA AVENUE PM NP
RUN: (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

I. SITE VARIABLES

U=	.5 M/S	Z0= 100. CM	ALT= 0. (FT)
BRG=	WORST CASE	VD= .0 CM/S	
CLAS=	7 (G)	VS= .0 CM/S	
MIXH=	1000. M	AMB= .0 PPM	
SIGTH=	5. DEGREES	TEMP= 15.6 DEGREE (C)	

II. LINK VARIABLES

LINK DESCRIPTION	LINK COORDINATES (FT) X1	Y1	X2	Y2	TYPE	VPH	EF (G/MI)	H (FT)	W (FT)
A. NF	15	-1500	15	-500	AG	1153	.9	.0	50.0
B. NA	15	-500	15	0	AG	1153	1.4	.0	33.0
C. ND	15	0	15	500	AG	1399	1.0	.0	33.0
D. NE	15	500	15	1500	AG	1399	.9	.0	50.0
E. SF	-23	1500	-23	500	AG	1229	.9	.0	35.0
F. SA	-23	500	-23	0	AG	759	1.3	.0	33.0
G. SD	-23	0	-23	-500	AG	1154	1.2	.0	33.0
H. SE	-23	-500	-23	-1500	AG	1154	.9	.0	35.0
I. WF	1500	15	500	15	AG	0	.9	.0	35.0
J. WA	500	15	0	15	AG	0	1.6	.0	33.0
K. WD	0	15	-500	15	AG	0	1.1	.0	33.0
L. WE	-500	15	-1500	15	AG	0	.9	.0	35.0
M. EF	-1500	-15	-500	-15	AG	1259	.9	.0	35.0
N. EA	-500	-15	0	-15	AG	395	1.6	.0	33.0
O. ED	0	-15	500	-15	AG	1088	1.8	.0	33.0
P. EE	500	-15	1500	-15	AG	1088	.9	.0	35.0
Q. NL	0	-1900	0	-1800	AG	0	1.3	.0	33.0
R. SL	0	0	-23	500	AG	470	1.3	.0	33.0
S. WL	0	-1900	0	-1800	AG	0	1.6	.0	33.0
T. EL	0	0	-500	-15	AG	864	1.8	.0	33.0

III. RECEPTOR LOCATIONS

RECEPTOR	COORDINATES (FT) X	Y	Z
1. NE3	40	33	6.0
2. SE3	40	-33	6.0
3. SW3	-40	-33	6.0
4. NW3	-40	33	6.0
5. NE7	53	46	6.0
6. SE7	53	-46	6.0
7. SW7	-53	-46	6.0
8. NW7	-53	46	6.0

IV. MODEL RESULTS (WORST CASE WIND ANGLE)

RECEPTOR	BRG (DEG)	PRED CONC (PPM)	CONC/LINK (PPM) A	B	C	D	E	F	G	H
1. NE3	261.	.4	.0	.0	.0	.0	.0	.0	.0	.0
2. SE3	275.	.5	.0	.0	.0	.0	.0	.0	.0	.0
3. SW3	5.	.6	.0	.0	.0	.0	.0	.2	.0	.0
4. NW3	175.	.5	.0	.0	.0	.0	.0	.0	.2	.0
5. NE7	260.	.3	.0	.0	.0	.0	.0	.0	.0	.0
6. SE7	352.	.4	.0	.0	.1	.0	.0	.0	.0	.0
7. SW7	6.	.4	.0	.0	.0	.0	.0	.1	.0	.0
8. NW7	173.	.4	.0	.0	.0	.0	.0	.0	.2	.0

IV. MODEL RESULTS (WORST CASE WIND ANGLE) (CONT.)

RECEPTOR	CONC/LINK (PPM) I	J	K	L	M	N	O	P	Q	R	S	T
1. NE3	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.2
2. SE3	.0	.0	.0	.0	.0	.1	.0	.0	.0	.0	.0	.2
3. SW3	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
4. NW3	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
5. NE7	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.1
6. SE7	.0	.0	.0	.0	.0	.0	.1	.0	.0	.0	.0	.0
7. SW7	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
8. NW7	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 1

JOB: I-15 NB ON/OFF RAMPS AND SIERRA AVENUE PM WP
RUN: (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

I. SITE VARIABLES

U= .5 M/S Z0= 100. CM ALT= 0. (FT)
BRG= WORST CASE VD= .0 CM/S
CLAS= 7 (G) VS= .0 CM/S
MIXH= 1000. M AMB= .0 PPM
SIGTH= 5. DEGREES TEMP= 15.6 DEGREE (C)

II. LINK VARIABLES

LINK DESCRIPTION	LINK COORDINATES (FT) X1	Y1	X2	Y2	TYPE	VPH	EF (G/MI)	H (FT)	W (FT)
A. NF	15	-1500	15	-500	AG	2096	.9	.0	50.0
B. NA	15	-500	15	0	AG	2096	1.7	.0	33.0
C. ND	15	0	15	500	AG	2374	1.2	.0	33.0
D. NE	15	500	15	1500	AG	2374	.9	.0	50.0
E. SF	-23	1500	-23	500	AG	1810	.9	.0	35.0
F. SA	-23	500	-23	0	AG	1299	1.3	.0	33.0
G. SD	-23	0	-23	-500	AG	2195	1.2	.0	33.0
H. SE	-23	-500	-23	-1500	AG	2195	.9	.0	35.0
I. WF	1500	15	500	15	AG	0	.9	.0	35.0
J. WA	500	15	0	15	AG	0	1.6	.0	33.0
K. WD	0	15	-500	15	AG	0	1.1	.0	33.0
L. WE	-500	15	-1500	15	AG	0	.9	.0	35.0
M. EF	-1500	-15	-500	-15	AG	1948	.9	.0	35.0
N. EA	-500	-15	0	-15	AG	896	1.7	.0	33.0
O. ED	0	-15	500	-15	AG	1285	1.8	.0	33.0
P. EE	500	-15	1500	-15	AG	1285	.9	.0	35.0
Q. NL	0	-1900	0	-1800	AG	0	1.2	.0	33.0
R. SL	0	0	-23	500	AG	511	1.3	.0	33.0
S. WL	0	-1900	0	-1800	AG	0	1.6	.0	33.0
T. EL	0	0	-500	-15	AG	1052	1.8	.0	33.0

III. RECEPTOR LOCATIONS

RECEPTOR	COORDINATES (FT) X	Y	Z
1. NE3	40	33	6.0
2. SE3	40	-33	6.0
3. SW3	-40	-33	6.0
4. NW3	-40	33	6.0
5. NE7	53	46	6.0
6. SE7	53	-46	6.0
7. SW7	-53	-46	6.0
8. NW7	-53	46	6.0

IV. MODEL RESULTS (WORST CASE WIND ANGLE)

RECEPTOR	BRG (DEG)	PRED CONC (PPM)	CONC/LINK (PPM) A	B	C	D	E	F	G	H
1. NE3	186.	.7	.0	.4	.0	.0	.0	.0	.0	.0
2. SE3	275.	.9	.0	.2	.0	.0	.0	.0	.0	.0
3. SW3	5.	.9	.0	.0	.0	.0	.0	.3	.0	.0
4. NW3	175.	.9	.0	.0	.0	.0	.0	.0	.4	.0
5. NE7	188.	.5	.0	.3	.0	.0	.0	.0	.0	.0
6. SE7	276.	.6	.0	.2	.0	.0	.0	.0	.0	.0
7. SW7	7.	.6	.0	.0	.0	.0	.0	.2	.0	.0
8. NW7	172.	.6	.0	.1	.0	.0	.0	.0	.2	.0

IV. MODEL RESULTS (WORST CASE WIND ANGLE) (CONT.)

RECEPTOR	CONC/LINK (PPM) I	J	K	L	M	N	O	P	Q	R	S	T
1. NE3	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
2. SE3	.0	.0	.0	.0	.0	.3	.1	.0	.0	.0	.0	.2
3. SW3	.0	.0	.0	.0	.0	.1	.0	.0	.0	.0	.0	.1
4. NW3	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
5. NE7	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
6. SE7	.0	.0	.0	.0	.0	.2	.0	.0	.0	.0	.0	.1
7. SW7	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
8. NW7	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 1

JOB: I-15 SB ON/OFF RAMPS AND SUMMIT AVENUE AM NP
RUN: (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

I. SITE VARIABLES

U= .5 M/S Z0= 100. CM ALT= 0. (FT)
BRG= WORST CASE VD= .0 CM/S
CLAS= 7 (G) VS= .0 CM/S
MIXH= 1000. M AMB= .0 PPM
SIGTH= 5. DEGREES TEMP= 15.6 DEGREE (C)

II. LINK VARIABLES

LINK DESCRIPTION	LINK COORDINATES (FT) X1	Y1	X2	Y2	TYPE	VPH	EF (G/MI)	H (FT)	W (FT)
A. NF	1800	0	1900	0	AG	0	.9	.0	35.0
B. NA	1800	0	1900	0	AG	0	1.8	.0	33.0
C. ND	1800	0	1900	0	AG	1613	1.8	.0	33.0
D. NE	1800	0	1900	0	AG	1613	.9	.0	35.0
E. SF	-8	1500	-8	500	AG	541	.9	.0	35.0
F. SA	-8	500	-8	0	AG	259	1.8	.0	33.0
G. SD	1800	0	1900	0	AG	0	1.4	.0	33.0
H. SE	1800	0	1900	0	AG	0	.9	.0	35.0
I. WF	1500	23	500	23	AG	1511	.9	.0	50.0
J. WA	500	23	0	23	AG	1511	1.4	.0	33.0
K. WD	0	23	-500	23	AG	826	1.0	.0	33.0
L. WE	-500	23	-1500	23	AG	826	.9	.0	50.0
M. EF	-1500	-23	-500	-23	AG	1256	.9	.0	50.0
N. EA	-500	-23	0	-23	AG	587	1.2	.0	45.0
O. ED	0	-23	500	-23	AG	869	1.0	.0	33.0
P. EE	500	-23	1500	-23	AG	869	.9	.0	50.0
Q. NL	1900	0	1800	0	AG	0	1.8	.0	33.0
R. SL	0	0	-8	500	AG	282	1.8	.0	33.0
S. WL	0	-1900	0	-1800	AG	0	1.2	.0	33.0
T. EL	0	0	-500	-15	AG	669	1.4	.0	33.0

III. RECEPTOR LOCATIONS

RECEPTOR	COORDINATES (FT) X	Y	Z
1. NE3	25	48	6.0
2. SE3	25	-48	6.0
3. SW3	-25	-48	6.0
4. NW3	-25	48	6.0
5. NE7	38	61	6.0
6. SE7	38	-61	6.0
7. SW7	-38	-61	6.0
8. NW7	-38	61	6.0

IV. MODEL RESULTS (WORST CASE WIND ANGLE)

RECEPTOR	BRG (DEG)	PRED CONC (PPM)	CONC/LINK (PPM) A	B	C	D	E	F	G	H
1. NE3	96.	.4	.0	.0	.0	.0	.0	.0	.0	.0
2. SE3	354.	.3	.0	.0	.0	.0	.0	.0	.0	.0
3. SW3	4.	.3	.0	.0	.0	.0	.0	.0	.0	.0
4. NW3	95.	.4	.0	.0	.0	.0	.0	.0	.0	.0
5. NE7	261.	.2	.0	.0	.0	.0	.0	.0	.0	.0
6. SE7	353.	.2	.0	.0	.0	.0	.0	.0	.0	.0
7. SW7	6.	.2	.0	.0	.0	.0	.0	.0	.0	.0
8. NW7	96.	.3	.0	.0	.0	.0	.0	.0	.0	.0

IV. MODEL RESULTS (WORST CASE WIND ANGLE) (CONT.)

RECEPTOR	CONC/LINK (PPM) I	J	K	L	M	N	O	P	Q	R	S	T
1. NE3	.0	.3	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
2. SE3	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
3. SW3	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
4. NW3	.0	.3	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
5. NE7	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
6. SE7	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
7. SW7	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
8. NW7	.0	.2	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 1

JOB: I-15 SB ON/OFF RAMPS AND SUMMIT AVENUE AM WP
RUN: (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

I. SITE VARIABLES

U= .5 M/S Z0= 100. CM ALT= 0. (FT)
BRG= WORST CASE VD= .0 CM/S
CLAS= 7 (G) VS= .0 CM/S
MIXH= 1000. M AMB= .0 PPM
SIGTH= 5. DEGREES TEMP= 15.6 DEGREE (C)

II. LINK VARIABLES

LINK DESCRIPTION	LINK COORDINATES (FT) X1	Y1	X2	Y2	TYPE	VPH	EF (G/MI)	H (FT)	W (FT)
A. NF	1800	0	1900	0	AG	0	.9	.0	35.0
B. NA	1800	0	1900	0	AG	0	1.8	.0	33.0
C. ND	1800	0	1900	0	AG	1613	1.8	.0	33.0
D. NE	1800	0	1900	0	AG	1613	.9	.0	35.0
E. SF	-8	1500	-8	500	AG	563	.9	.0	35.0
F. SA	-8	500	-8	0	AG	275	1.8	.0	33.0
G. SD	1800	0	1900	0	AG	0	1.3	.0	33.0
H. SE	1800	0	1900	0	AG	0	.9	.0	35.0
I. WF	1500	23	500	23	AG	1511	.9	.0	50.0
J. WA	500	23	0	23	AG	1511	1.4	.0	33.0
K. WD	0	23	-500	23	AG	842	1.0	.0	33.0
L. WE	-500	23	-1500	23	AG	842	.9	.0	50.0
M. EF	-1500	-23	-500	-23	AG	1276	.9	.0	50.0
N. EA	-500	-23	0	-23	AG	607	1.2	.0	45.0
O. ED	0	-23	500	-23	AG	895	1.0	.0	33.0
P. EE	500	-23	1500	-23	AG	895	.9	.0	50.0
Q. NL	1900	0	1800	0	AG	0	1.8	.0	33.0
R. SL	0	0	-8	500	AG	288	1.8	.0	33.0
S. WL	0	-1900	0	-1800	AG	0	1.2	.0	33.0
T. EL	0	0	-500	-15	AG	669	1.4	.0	33.0

III. RECEPTOR LOCATIONS

RECEPTOR	COORDINATES (FT) X	Y	Z
1. NE3	25	48	6.0
2. SE3	25	-48	6.0
3. SW3	-25	-48	6.0
4. NW3	-25	48	6.0
5. NE7	38	61	6.0
6. SE7	38	-61	6.0
7. SW7	-38	-61	6.0
8. NW7	-38	61	6.0

IV. MODEL RESULTS (WORST CASE WIND ANGLE)

RECEPTOR	BRG (DEG)	PRED CONC (PPM)	CONC/LINK (PPM) A	B	C	D	E	F	G	H
1. NE3	96.	.4	.0	.0	.0	.0	.0	.0	.0	.0
2. SE3	354.	.3	.0	.0	.0	.0	.0	.0	.0	.0
3. SW3	4.	.3	.0	.0	.0	.0	.0	.0	.0	.0
4. NW3	95.	.4	.0	.0	.0	.0	.0	.0	.0	.0
5. NE7	261.	.3	.0	.0	.0	.0	.0	.0	.0	.0
6. SE7	353.	.2	.0	.0	.0	.0	.0	.0	.0	.0
7. SW7	6.	.2	.0	.0	.0	.0	.0	.0	.0	.0
8. NW7	96.	.3	.0	.0	.0	.0	.0	.0	.0	.0

IV. MODEL RESULTS (WORST CASE WIND ANGLE) (CONT.)

RECEPTOR	CONC/LINK (PPM) I	J	K	L	M	N	O	P	Q	R	S	T
1. NE3	.0	.3	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
2. SE3	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
3. SW3	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
4. NW3	.0	.3	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
5. NE7	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
6. SE7	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
7. SW7	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
8. NW7	.0	.2	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 1

JOB: I-15 SB ON/OFF RAMPS AND SUMMIT AVENUE PM NP
RUN: (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

I. SITE VARIABLES

U= .5 M/S Z0= 100. CM ALT= 0. (FT)
BRG= WORST CASE VD= .0 CM/S
CLAS= 7 (G) VS= .0 CM/S
MIXH= 1000. M AMB= .0 PPM
SIGTH= 5. DEGREES TEMP= 15.6 DEGREE (C)

II. LINK VARIABLES

LINK DESCRIPTION	LINK COORDINATES (FT) X1	Y1	X2	Y2	TYPE	VPH	EF (G/MI)	H (FT)	W (FT)
A. NF	1800	0	1900	0	AG	0	.9	.0	35.0
B. NA	1800	0	1900	0	AG	0	1.7	.0	33.0
C. ND	1800	0	1900	0	AG	678	1.8	.0	33.0
D. NE	1800	0	1900	0	AG	678	.9	.0	35.0
E. SF	-8	1500	-8	500	AG	659	.9	.0	35.0
F. SA	-8	500	-8	0	AG	253	1.8	.0	33.0
G. SD	1800	0	1900	0	AG	0	1.2	.0	33.0
H. SE	1800	0	1900	0	AG	0	.9	.0	35.0
I. WF	1500	23	500	23	AG	1703	.9	.0	50.0
J. WA	500	23	0	23	AG	1703	1.5	.0	33.0
K. WD	0	23	-500	23	AG	1500	1.0	.0	33.0
L. WE	-500	23	-1500	23	AG	1500	.9	.0	50.0
M. EF	-1500	-23	-500	-23	AG	926	.9	.0	50.0
N. EA	-500	-23	0	-23	AG	704	1.2	.0	45.0
O. ED	0	-23	500	-23	AG	1110	1.0	.0	33.0
P. EE	500	-23	1500	-23	AG	1110	.9	.0	50.0
Q. NL	1900	0	1800	0	AG	0	1.7	.0	33.0
R. SL	0	0	-8	500	AG	406	1.8	.0	33.0
S. WL	0	-1900	0	-1800	AG	0	1.2	.0	33.0
T. EL	0	0	-500	-15	AG	222	1.2	.0	33.0

III. RECEPTOR LOCATIONS

RECEPTOR	COORDINATES (FT) X	Y	Z
1. NE3	25	48	6.0
2. SE3	25	-48	6.0
3. SW3	-25	-48	6.0
4. NW3	-25	48	6.0
5. NE7	38	61	6.0
6. SE7	38	-61	6.0
7. SW7	-38	-61	6.0
8. NW7	-38	61	6.0

IV. MODEL RESULTS (WORST CASE WIND ANGLE)

RECEPTOR	BRG (DEG)	PRED CONC (PPM)	CONC/LINK (PPM) A	B	C	D	E	F	G	H
1. NE3	96.	.4	.0	.0	.0	.0	.0	.0	.0	.0
2. SE3	354.	.3	.0	.0	.0	.0	.0	.0	.0	.0
3. SW3	83.	.3	.0	.0	.0	.0	.0	.0	.0	.0
4. NW3	96.	.5	.0	.0	.0	.0	.0	.0	.0	.0
5. NE7	263.	.3	.0	.0	.0	.0	.0	.0	.0	.0
6. SE7	353.	.3	.0	.0	.0	.0	.0	.0	.0	.0
7. SW7	6.	.3	.0	.0	.0	.0	.0	.0	.0	.0
8. NW7	97.	.4	.0	.0	.0	.0	.0	.0	.0	.0

IV. MODEL RESULTS (WORST CASE WIND ANGLE) (CONT.)

RECEPTOR	CONC/LINK (PPM) I	J	K	L	M	N	O	P	Q	R	S	T
1. NE3	.0	.3	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
2. SE3	.0	.0	.0	.0	.0	.0	.0	.0	.0	.1	.0	.0
3. SW3	.0	.0	.0	.0	.0	.0	.2	.0	.0	.0	.0	.0
4. NW3	.0	.3	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
5. NE7	.0	.0	.1	.0	.0	.0	.0	.0	.0	.0	.0	.0
6. SE7	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
7. SW7	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
8. NW7	.0	.2	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 1

JOB: I-15 SB ON/OFF RAMPS AND SUMMIT AVENUE PM WP
RUN: (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

I. SITE VARIABLES

U=	.5 M/S	Z0= 100. CM	ALT= 0. (FT)
BRG=	WORST CASE	VD= .0 CM/S	
CLAS=	7 (G)	VS= .0 CM/S	
MIXH=	1000. M	AMB= .0 PPM	
SIGTH=	5. DEGREES	TEMP= 15.6 DEGREE (C)	

II. LINK VARIABLES

LINK DESCRIPTION	LINK COORDINATES (FT) X1	Y1	X2	Y2	TYPE	VPH	EF (G/MI)	H (FT)	W (FT)
A. NF	1800	0	1900	0	AG	0	.9	.0	35.0
B. NA	1800	0	1900	0	AG	0	1.7	.0	33.0
C. ND	1800	0	1900	0	AG	678	1.8	.0	33.0
D. NE	1800	0	1900	0	AG	678	.9	.0	35.0
E. SF	-8	1500	-8	500	AG	739	.9	.0	35.0
F. SA	-8	500	-8	0	AG	295	1.8	.0	33.0
G. SD	1800	0	1900	0	AG	0	1.1	.0	33.0
H. SE	1800	0	1900	0	AG	0	.9	.0	35.0
I. WF	1500	23	500	23	AG	1703	.9	.0	50.0
J. WA	500	23	0	23	AG	1703	1.5	.0	33.0
K. WD	0	23	-500	23	AG	1542	1.0	.0	33.0
L. WE	-500	23	-1500	23	AG	1542	.9	.0	50.0
M. EF	-1500	-23	-500	-23	AG	944	.9	.0	50.0
N. EA	-500	-23	0	-23	AG	722	1.2	.0	45.0
O. ED	0	-23	500	-23	AG	1166	1.0	.0	33.0
P. EE	500	-23	1500	-23	AG	1166	.9	.0	50.0
Q. NL	1900	0	1800	0	AG	0	1.7	.0	33.0
R. SL	0	0	-8	500	AG	444	1.8	.0	33.0
S. WL	0	-1900	0	-1800	AG	0	1.2	.0	33.0
T. EL	0	0	-500	-15	AG	222	1.2	.0	33.0

III. RECEPTOR LOCATIONS

RECEPTOR	COORDINATES (FT) X	Y	Z
1. NE3	25	48	6.0
2. SE3	25	-48	6.0
3. SW3	-25	-48	6.0
4. NW3	-25	48	6.0
5. NE7	38	61	6.0
6. SE7	38	-61	6.0
7. SW7	-38	-61	6.0
8. NW7	-38	61	6.0

IV. MODEL RESULTS (WORST CASE WIND ANGLE)

RECEPTOR	BRG (DEG)	PRED CONC (PPM)	CONC/LINK (PPM) A	B	C	D	E	F	G	H
1. NE3	96.	.4	.0	.0	.0	.0	.0	.0	.0	.0
2. SE3	354.	.4	.0	.0	.0	.0	.0	.0	.0	.0
3. SW3	83.	.3	.0	.0	.0	.0	.0	.0	.0	.0
4. NW3	96.	.5	.0	.0	.0	.0	.0	.0	.0	.0
5. NE7	263.	.3	.0	.0	.0	.0	.0	.0	.0	.0
6. SE7	352.	.3	.0	.0	.0	.0	.0	.0	.0	.0
7. SW7	6.	.3	.0	.0	.0	.0	.0	.0	.0	.0
8. NW7	97.	.4	.0	.0	.0	.0	.0	.0	.0	.0

IV. MODEL RESULTS (WORST CASE WIND ANGLE) (CONT.)

RECEPTOR	CONC/LINK (PPM) I	J	K	L	M	N	O	P	Q	R	S	T
1. NE3	.0	.3	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
2. SE3	.0	.0	.0	.0	.0	.0	.0	.0	.0	.1	.0	.0
3. SW3	.0	.0	.0	.0	.0	.0	.2	.0	.0	.0	.0	.0
4. NW3	.0	.3	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
5. NE7	.0	.0	.1	.0	.0	.0	.0	.0	.0	.0	.0	.0
6. SE7	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
7. SW7	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
8. NW7	.0	.2	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
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JOB: RIVERSIDE AVENUE AND LINDEN AVENUE AM NP
RUN: (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

I. SITE VARIABLES

U= .5 M/S Z0= 100. CM ALT= 0. (FT)
BRG= WORST CASE VD= .0 CM/S
CLAS= 7 (G) VS= .0 CM/S
MIXH= 1000. M AMB= .0 PPM
SIGTH= 5. DEGREES TEMP= 15.6 DEGREE (C)

II. LINK VARIABLES

LINK DESCRIPTION	LINK COORDINATES (FT) X1	Y1	X2	Y2	TYPE	VPH	EF (G/MI)	H (FT)	W (FT)
A. NF	15	-1500	15	-500	AG	81	.9	.0	35.0
B. NA	15	-500	15	0	AG	7	1.8	.0	33.0
C. ND	15	0	15	500	AG	580	1.8	.0	33.0
D. NE	15	500	15	1500	AG	580	.9	.0	35.0
E. SF	-15	1500	-15	500	AG	0	.9	.0	35.0
F. SA	-15	500	-15	0	AG	0	1.8	.0	33.0
G. SD	-15	0	-15	-500	AG	918	1.8	.0	33.0
H. SE	-15	-500	-15	-1500	AG	918	.9	.0	35.0
I. WF	1500	23	500	23	AG	635	.9	.0	35.0
J. WA	500	23	0	23	AG	633	1.3	.0	33.0
K. WD	0	23	-500	23	AG	134	1.0	.0	33.0
L. WE	-500	23	-1500	23	AG	134	.9	.0	35.0
M. EF	-1500	-15	-500	-15	AG	916	.9	.0	50.0
N. EA	-500	-15	0	-15	AG	916	1.2	.0	45.0
O. ED	0	-15	500	-15	AG	0	1.0	.0	33.0
P. EE	500	-15	1500	-15	AG	0	.9	.0	50.0
Q. NL	0	0	15	-500	AG	74	1.8	.0	33.0
R. SL	0	0	-15	500	AG	0	1.8	.0	33.0
S. WL	0	0	500	23	AG	2	1.2	.0	33.0
T. EL	0	0	-500	-8	AG	0	1.2	.0	33.0

III. RECEPTOR LOCATIONS

RECEPTOR	COORDINATES (FT) X	Y	Z
1. NE3	33	40	6.0
2. SE3	33	-40	6.0
3. SW3	-33	-40	6.0
4. NW3	-33	40	6.0
5. NE7	46	53	6.0
6. SE7	46	-53	6.0
7. SW7	-46	-53	6.0
8. NW7	-46	53	6.0

IV. MODEL RESULTS (WORST CASE WIND ANGLE)

RECEPTOR	BRG (DEG)	PRED CONC (PPM)	CONC/LINK (PPM) A	B	C	D	E	F	G	H
1. NE3	189.	.3	.0	.0	.0	.0	.0	.0	.1	.0
2. SE3	274.	.3	.0	.0	.0	.0	.0	.0	.0	.0
3. SW3	175.	.4	.0	.0	.0	.0	.0	.0	.4	.0
4. NW3	176.	.4	.0	.0	.0	.0	.0	.0	.3	.0
5. NE7	221.	.2	.0	.0	.0	.0	.0	.0	.0	.0
6. SE7	276.	.2	.0	.0	.0	.0	.0	.0	.0	.0
7. SW7	39.	.2	.0	.0	.0	.0	.0	.0	.1	.0
8. NW7	174.	.3	.0	.0	.0	.0	.0	.0	.2	.0

IV. MODEL RESULTS (WORST CASE WIND ANGLE) (CONT.)

RECEPTOR	CONC/LINK (PPM) I	J	K	L	M	N	O	P	Q	R	S	T
1. NE3	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
2. SE3	.0	.0	.0	.0	.0	.2	.0	.0	.0	.0	.0	.0
3. SW3	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
4. NW3	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
5. NE7	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
6. SE7	.0	.0	.0	.0	.0	.1	.0	.0	.0	.0	.0	.0
7. SW7	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
8. NW7	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
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JOB: RIVERSIDE AVENUE AND LINDEN AVENUE AM WP
RUN: (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

I. SITE VARIABLES

U=	.5 M/S	Z0=	100. CM	ALT=	0. (FT)
BRG=	WORST CASE	VD=	.0 CM/S		
CLAS=	7 (G)	VS=	.0 CM/S		
MIXH=	1000. M	AMB=	.0 PPM		
SIGTH=	5. DEGREES	TEMP=	15.6 DEGREE (C)		

II. LINK VARIABLES

LINK DESCRIPTION	LINK COORDINATES (FT) X1	Y1	X2	Y2	TYPE	VPH	EF (G/MI)	H (FT)	W (FT)
A. NF	15	-1500	15	-500	AG	121	.9	.0	35.0
B. NA	15	-500	15	0	AG	35	1.8	.0	33.0
C. ND	15	0	15	500	AG	948	1.8	.0	33.0
D. NE	15	500	15	1500	AG	948	.9	.0	35.0
E. SF	-15	1500	-15	500	AG	362	.9	.0	35.0
F. SA	-15	500	-15	0	AG	206	1.8	.0	33.0
G. SD	-15	0	-15	-500	AG	1540	1.8	.0	33.0
H. SE	-15	-500	-15	-1500	AG	1540	.9	.0	35.0
I. WF	1500	23	500	23	AG	996	.9	.0	35.0
J. WA	500	23	0	23	AG	989	1.6	.0	33.0
K. WD	0	23	-500	23	AG	176	1.0	.0	33.0
L. WE	-500	23	-1500	23	AG	176	.9	.0	35.0
M. EF	-1500	-15	-500	-15	AG	1421	.9	.0	50.0
N. EA	-500	-15	0	-15	AG	1421	1.3	.0	45.0
O. ED	0	-15	500	-15	AG	236	1.0	.0	33.0
P. EE	500	-15	1500	-15	AG	236	.9	.0	50.0
Q. NL	0	0	15	-500	AG	86	1.8	.0	33.0
R. SL	0	0	-15	500	AG	156	1.8	.0	33.0
S. WL	0	0	500	23	AG	7	1.2	.0	33.0
T. EL	0	0	-500	-8	AG	0	1.2	.0	33.0

III. RECEPTOR LOCATIONS

RECEPTOR	COORDINATES (FT) X	Y	Z
1. NE3	33	40	6.0
2. SE3	33	-40	6.0
3. SW3	-33	-40	6.0
4. NW3	-33	40	6.0
5. NE7	46	53	6.0
6. SE7	46	-53	6.0
7. SW7	-46	-53	6.0
8. NW7	-46	53	6.0

IV. MODEL RESULTS (WORST CASE WIND ANGLE)

RECEPTOR	BRG (DEG)	PRED CONC (PPM)	CONC/LINK (PPM) A	B	C	D	E	F	G	H
1. NE3	220.	.5	.0	.0	.2	.0	.0	.0	.1	.0
2. SE3	356.	.5	.0	.0	.3	.0	.0	.0	.0	.0
3. SW3	35.	.5	.0	.0	.0	.0	.0	.0	.2	.0
4. NW3	176.	.6	.0	.0	.0	.0	.0	.0	.4	.0
5. NE7	222.	.4	.0	.0	.1	.0	.0	.0	.1	.0
6. SE7	353.	.3	.0	.0	.2	.0	.0	.0	.0	.0
7. SW7	39.	.4	.0	.0	.0	.0	.0	.0	.2	.0
8. NW7	173.	.4	.0	.0	.0	.0	.0	.0	.3	.0

IV. MODEL RESULTS (WORST CASE WIND ANGLE) (CONT.)

RECEPTOR	CONC/LINK (PPM) I	J	K	L	M	N	O	P	Q	R	S	T
1. NE3	.0	.1	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
2. SE3	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
3. SW3	.0	.0	.0	.0	.0	.1	.0	.0	.0	.0	.0	.0
4. NW3	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
5. NE7	.0	.1	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
6. SE7	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
7. SW7	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
8. NW7	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 1

JOB: RIVERSIDE AVENUE AND LINDEN AVENUE PM NP
RUN: (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

I. SITE VARIABLES

U= .5 M/S Z0= 100. CM ALT= 0. (FT)
BRG= WORST CASE VD= .0 CM/S
CLAS= 7 (G) VS= .0 CM/S
MIXH= 1000. M AMB= .0 PPM
SIGTH= 5. DEGREES TEMP= 15.6 DEGREE (C)

II. LINK VARIABLES

LINK DESCRIPTION	LINK COORDINATES (FT) X1	Y1	X2	Y2	TYPE	VPH	EF (G/MI)	H (FT)	W (FT)
A. NF	15	-1500	15	-500	AG	81	.9	.0	35.0
B. NA	15	-500	15	0	AG	18	1.8	.0	33.0
C. ND	15	0	15	500	AG	760	1.8	.0	33.0
D. NE	15	500	15	1500	AG	760	.9	.0	35.0
E. SF	-15	1500	-15	500	AG	0	.9	.0	35.0
F. SA	-15	500	-15	0	AG	0	1.8	.0	33.0
G. SD	-15	0	-15	-500	AG	739	1.8	.0	33.0
H. SE	-15	-500	-15	-1500	AG	739	.9	.0	35.0
I. WF	1500	23	500	23	AG	826	.9	.0	35.0
J. WA	500	23	0	23	AG	806	1.4	.0	33.0
K. WD	0	23	-500	23	AG	127	1.0	.0	33.0
L. WE	-500	23	-1500	23	AG	127	.9	.0	35.0
M. EF	-1500	-15	-500	-15	AG	719	.9	.0	50.0
N. EA	-500	-15	0	-15	AG	719	1.2	.0	33.0
O. ED	0	-15	500	-15	AG	0	1.0	.0	33.0
P. EE	500	-15	1500	-15	AG	0	.9	.0	50.0
Q. NL	0	0	15	-500	AG	63	1.8	.0	33.0
R. SL	0	0	-15	500	AG	0	1.8	.0	33.0
S. WL	0	0	500	23	AG	20	1.2	.0	33.0
T. EL	0	0	-500	-8	AG	0	1.2	.0	33.0

III. RECEPTOR LOCATIONS

RECEPTOR	COORDINATES (FT) X	Y	Z
1. NE3	33	40	6.0
2. SE3	33	-40	6.0
3. SW3	-33	-40	6.0
4. NW3	-33	40	6.0
5. NE7	46	53	6.0
6. SE7	46	-53	6.0
7. SW7	-46	-53	6.0
8. NW7	-46	53	6.0

IV. MODEL RESULTS (WORST CASE WIND ANGLE)

RECEPTOR	BRG (DEG)	PRED CONC (PPM)	CONC/LINK (PPM) A	B	C	D	E	F	G	H
1. NE3	220.	.3	.0	.0	.1	.0	.0	.0	.0	.0
2. SE3	356.	.3	.0	.0	.2	.0	.0	.0	.0	.0
3. SW3	38.	.3	.0	.0	.0	.0	.0	.0	.1	.0
4. NW3	176.	.3	.0	.0	.0	.0	.0	.0	.2	.0
5. NE7	221.	.3	.0	.0	.0	.0	.0	.0	.0	.0
6. SE7	354.	.2	.0	.0	.2	.0	.0	.0	.0	.0
7. SW7	40.	.2	.0	.0	.0	.0	.0	.0	.0	.0
8. NW7	174.	.2	.0	.0	.0	.0	.0	.0	.2	.0

IV. MODEL RESULTS (WORST CASE WIND ANGLE) (CONT.)

RECEPTOR	CONC/LINK (PPM) I	J	K	L	M	N	O	P	Q	R	S	T
1. NE3	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
2. SE3	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
3. SW3	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
4. NW3	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
5. NE7	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
6. SE7	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
7. SW7	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
8. NW7	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 1

JOB: RIVERSIDE AVENUE AND LINDEN AVENUE PM WP
RUN: (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

I. SITE VARIABLES

U=	.5 M/S	Z0=	100. CM	ALT=	0. (FT)
BRG=	WORST CASE	VD=	.0 CM/S		
CLAS=	7 (G)	VS=	.0 CM/S		
MIXH=	1000. M	AMB=	.0 PPM		
SIGTH=	5. DEGREES	TEMP=	15.6 DEGREE (C)		

II. LINK VARIABLES

LINK DESCRIPTION	LINK COORDINATES (FT) X1	Y1	X2	Y2	TYPE	VPH	EF (G/MI)	H (FT)	W (FT)
A. NF	15	-1500	15	-500	AG	153	.9	.0	35.0
B. NA	15	-500	15	0	AG	66	1.6	.0	33.0
C. ND	15	0	15	500	AG	1322	1.8	.0	33.0
D. NE	15	500	15	1500	AG	1322	.9	.0	35.0
E. SF	-15	1500	-15	500	AG	1008	.9	.0	35.0
F. SA	-15	500	-15	0	AG	624	1.7	.0	33.0
G. SD	-15	0	-15	-500	AG	1832	1.8	.0	33.0
H. SE	-15	-500	-15	-1500	AG	1832	.9	.0	35.0
I. WF	1500	23	500	23	AG	1385	.9	.0	35.0
J. WA	500	23	0	23	AG	1355	1.6	.0	33.0
K. WD	0	23	-500	23	AG	188	1.0	.0	33.0
L. WE	-500	23	-1500	23	AG	188	.9	.0	35.0
M. EF	-1500	-15	-500	-15	AG	1333	.9	.0	50.0
N. EA	-500	-15	0	-15	AG	1333	1.2	.0	45.0
O. ED	0	-15	500	-15	AG	537	1.0	.0	33.0
P. EE	500	-15	1500	-15	AG	537	.9	.0	50.0
Q. NL	0	0	15	-500	AG	87	1.6	.0	33.0
R. SL	0	0	-15	500	AG	384	1.6	.0	33.0
S. WL	0	0	500	23	AG	30	1.2	.0	33.0
T. EL	0	0	-500	-8	AG	0	1.2	.0	33.0

III. RECEPTOR LOCATIONS

RECEPTOR	COORDINATES (FT) X	Y	Z
1. NE3	33	40	6.0
2. SE3	33	-40	6.0
3. SW3	-33	-40	6.0
4. NW3	-33	40	6.0
5. NE7	46	53	6.0
6. SE7	46	-53	6.0
7. SW7	-46	-53	6.0
8. NW7	-46	53	6.0

IV. MODEL RESULTS (WORST CASE WIND ANGLE)

RECEPTOR	BRG (DEG)	PRED CONC (PPM)	CONC/LINK (PPM) A	B	C	D	E	F	G	H
1. NE3	221.	.6	.0	.0	.2	.0	.0	.0	.1	.0
2. SE3	355.	.7	.0	.0	.4	.0	.0	.0	.0	.0
3. SW3	7.	.7	.0	.0	.2	.0	.0	.2	.2	.0
4. NW3	176.	.7	.0	.0	.0	.0	.0	.0	.5	.0
5. NE7	223.	.5	.0	.0	.2	.0	.0	.0	.1	.0
6. SE7	352.	.5	.0	.0	.3	.0	.0	.0	.0	.0
7. SW7	38.	.5	.0	.0	.1	.0	.0	.0	.2	.0
8. NW7	96.	.5	.0	.0	.0	.0	.0	.0	.0	.0

IV. MODEL RESULTS (WORST CASE WIND ANGLE) (CONT.)

RECEPTOR	CONC/LINK (PPM) I	J	K	L	M	N	O	P	Q	R	S	T
1. NE3	.0	.2	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
2. SE3	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
3. SW3	.0	.0	.0	.0	.0	.1	.0	.0	.0	.0	.0	.0
4. NW3	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
5. NE7	.0	.1	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
6. SE7	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
7. SW7	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
8. NW7	.0	.2	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 1

JOB: RIVERSIDE AVENUE AND SIERRA AVENUE AM NP
RUN: (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

I. SITE VARIABLES

U=	.5 M/S	Z0=	100. CM	ALT=	0. (FT)
BRG=	WORST CASE	VD=	.0 CM/S		
CLAS=	7 (G)	VS=	.0 CM/S		
MIXH=	1000. M	AMB=	.0 PPM		
SIGTH=	5. DEGREES	TEMP=	15.6 DEGREE (C)		

II. LINK VARIABLES

LINK DESCRIPTION	LINK COORDINATES (FT) X1	Y1	X2	Y2	TYPE	VPH	EF (G/MI)	H (FT)	W (FT)
A. NF	15	-1500	15	-500	AG	361	.9	.0	35.0
B. NA	15	-500	15	0	AG	361	1.3	.0	33.0
C. ND	15	0	15	500	AG	950	1.2	.0	33.0
D. NE	15	500	15	1500	AG	950	.9	.0	35.0
E. SF	-15	1500	-15	500	AG	1073	.9	.0	35.0
F. SA	-15	500	-15	0	AG	427	1.2	.0	33.0
G. SD	-15	0	-15	-500	AG	488	1.0	.0	33.0
H. SE	-15	-500	-15	-1500	AG	488	.9	.0	35.0
I. WF	1500	8	500	8	AG	716	.9	.0	35.0
J. WA	500	8	0	8	AG	655	1.8	.0	33.0
K. WD	0	1800	0	1900	AG	0	1.1	.0	33.0
L. WE	0	1800	0	1900	AG	0	.9	.0	35.0
M. EF	0	1800	0	1900	AG	0	.9	.0	35.0
N. EA	0	1800	0	1900	AG	0	1.6	.0	33.0
O. ED	0	1800	0	1900	AG	712	1.7	.0	33.0
P. EE	0	1800	0	1900	AG	712	.9	.0	35.0
Q. NL	0	-1900	0	-1800	AG	0	1.2	.0	33.0
R. SL	0	0	-15	500	AG	646	1.3	.0	33.0
S. WL	0	0	500	8	AG	61	1.6	.0	33.0
T. EL	0	-1900	0	-1800	AG	0	1.6	.0	33.0

III. RECEPTOR LOCATIONS

RECEPTOR	COORDINATES (FT) X	Y	Z
1. NE3	33	25	6.0
2. SE3	33	-25	6.0
3. SW3	-33	-25	6.0
4. NW3	-33	25	6.0
5. NE7	46	38	6.0
6. SE7	46	-38	6.0
7. SW7	-46	-38	6.0
8. NW7	-46	38	6.0

IV. MODEL RESULTS (WORST CASE WIND ANGLE)

RECEPTOR	BRG (DEG)	PRED CONC (PPM)	CONC/LINK (PPM) A	B	C	D	E	F	G	H
1. NE3	355.	.4	.0	.0	.2	.0	.0	.0	.0	.0
2. SE3	355.	.5	.0	.0	.2	.0	.0	.0	.0	.0
3. SW3	5.	.3	.0	.0	.0	.0	.0	.1	.0	.0
4. NW3	94.	.4	.0	.0	.0	.0	.0	.0	.0	.0
5. NE7	353.	.2	.0	.0	.1	.0	.0	.0	.0	.0
6. SE7	353.	.3	.0	.0	.1	.0	.0	.0	.0	.0
7. SW7	6.	.2	.0	.0	.0	.0	.0	.0	.0	.0
8. NW7	96.	.3	.0	.0	.0	.0	.0	.0	.0	.0

IV. MODEL RESULTS (WORST CASE WIND ANGLE) (CONT.)

RECEPTOR	CONC/LINK (PPM) I	J	K	L	M	N	O	P	Q	R	S	T
1. NE3	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
2. SE3	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
3. SW3	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
4. NW3	.0	.2	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
5. NE7	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
6. SE7	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
7. SW7	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
8. NW7	.0	.1	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 1

JOB: RIVERSIDE AVENUE AND SIERRA AVENUE AM WP
RUN: (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

I. SITE VARIABLES

U=	.5 M/S	Z0=	100. CM	ALT=	0. (FT)
BRG=	WORST CASE	VD=	.0 CM/S		
CLAS=	7 (G)	VS=	.0 CM/S		
MIXH=	1000. M	AMB=	.0 PPM		
SIGTH=	5. DEGREES	TEMP=	15.6 DEGREE (C)		

II. LINK VARIABLES

LINK DESCRIPTION	LINK COORDINATES (FT) X1	Y1	X2	Y2	TYPE	VPH	EF (G/MI)	H (FT)	W (FT)
A. NF	15	-1500	15	-500	AG	399	.9	.0	35.0
B. NA	15	-500	15	0	AG	399	1.4	.0	33.0
C. ND	15	0	15	500	AG	1615	1.3	.0	33.0
D. NE	15	500	15	1500	AG	1615	.9	.0	35.0
E. SF	-15	1500	-15	500	AG	1662	.9	.0	35.0
F. SA	-15	500	-15	0	AG	462	1.3	.0	33.0
G. SD	-15	0	-15	-500	AG	527	1.0	.0	33.0
H. SE	-15	-500	-15	-1500	AG	527	.9	.0	35.0
I. WF	1500	8	500	8	AG	1348	.9	.0	35.0
J. WA	500	8	0	8	AG	1283	1.8	.0	33.0
K. WD	0	1800	0	1900	AG	0	1.1	.0	33.0
L. WE	0	1800	0	1900	AG	0	.9	.0	35.0
M. EF	0	1800	0	1900	AG	0	.9	.0	35.0
N. EA	0	1800	0	1900	AG	0	1.5	.0	33.0
O. ED	0	1800	0	1900	AG	1267	1.8	.0	33.0
P. EE	0	1800	0	1900	AG	1267	.9	.0	35.0
Q. NL	0	-1900	0	-1800	AG	0	1.3	.0	33.0
R. SL	0	0	-15	500	AG	1200	1.8	.0	33.0
S. WL	0	0	500	8	AG	65	1.5	.0	33.0
T. EL	0	-1900	0	-1800	AG	0	1.5	.0	33.0

III. RECEPTOR LOCATIONS

RECEPTOR	COORDINATES (FT) X	Y	Z
1. NE3	33	25	6.0
2. SE3	33	-25	6.0
3. SW3	-33	-25	6.0
4. NW3	-33	25	6.0
5. NE7	46	38	6.0
6. SE7	46	-38	6.0
7. SW7	-46	-38	6.0
8. NW7	-46	38	6.0

IV. MODEL RESULTS (WORST CASE WIND ANGLE)

RECEPTOR	BRG (DEG)	PRED CONC (PPM)	CONC/LINK (PPM) A	B	C	D	E	F	G	H
1. NE3	353.	.7	.0	.0	.4	.0	.0	.0	.0	.0
2. SE3	354.	.8	.0	.0	.4	.0	.0	.0	.0	.0
3. SW3	5.	.5	.0	.0	.0	.0	.0	.1	.0	.0
4. NW3	94.	.7	.0	.0	.0	.0	.0	.0	.0	.0
5. NE7	350.	.4	.0	.0	.2	.0	.0	.0	.0	.0
6. SE7	351.	.6	.0	.0	.2	.0	.0	.0	.0	.0
7. SW7	7.	.4	.0	.0	.0	.0	.0	.0	.0	.0
8. NW7	96.	.5	.0	.0	.0	.0	.0	.0	.0	.0

IV. MODEL RESULTS (WORST CASE WIND ANGLE) (CONT.)

RECEPTOR	CONC/LINK (PPM) I	J	K	L	M	N	O	P	Q	R	S	T
1. NE3	.0	.0	.0	.0	.0	.0	.0	.0	.0	.2	.0	.0
2. SE3	.0	.1	.0	.0	.0	.0	.0	.0	.0	.2	.0	.0
3. SW3	.0	.0	.0	.0	.0	.0	.0	.0	.0	.2	.0	.0
4. NW3	.0	.4	.0	.0	.0	.0	.0	.0	.0	.1	.0	.0
5. NE7	.0	.0	.0	.0	.0	.0	.0	.0	.0	.1	.0	.0
6. SE7	.0	.1	.0	.0	.0	.0	.0	.0	.0	.2	.0	.0
7. SW7	.0	.0	.0	.0	.0	.0	.0	.0	.0	.2	.0	.0
8. NW7	.0	.2	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 1

JOB: RIVERSIDE AVENUE AND SIERRA AVENUE PM NP
RUN: (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

I. SITE VARIABLES

U= .5 M/S Z0= 100. CM ALT= 0. (FT)
BRG= WORST CASE VD= .0 CM/S
CLAS= 7 (G) VS= .0 CM/S
MIXH= 1000. M AMB= .0 PPM
SIGTH= 5. DEGREES TEMP= 15.6 DEGREE (C)

II. LINK VARIABLES

LINK DESCRIPTION	LINK COORDINATES (FT) X1	Y1	X2	Y2	TYPE	VPH	EF (G/MI)	H (FT)	W (FT)
A. NF	15	-1500	15	-500	AG	596	.9	.0	35.0
B. NA	15	-500	15	0	AG	596	1.3	.0	33.0
C. ND	15	0	15	500	AG	1146	1.1	.0	33.0
D. NE	15	500	15	1500	AG	1146	.9	.0	35.0
E. SF	-15	1500	-15	500	AG	1160	.9	.0	35.0
F. SA	-15	500	-15	0	AG	431	1.2	.0	33.0
G. SD	-15	0	-15	-500	AG	549	1.0	.0	33.0
H. SE	-15	-500	-15	-1500	AG	549	.9	.0	35.0
I. WF	1500	8	500	8	AG	770	.9	.0	35.0
J. WA	500	8	0	8	AG	652	1.8	.0	33.0
K. WD	0	1800	0	1900	AG	0	1.1	.0	33.0
L. WE	0	1800	0	1900	AG	0	.9	.0	35.0
M. EF	0	1800	0	1900	AG	0	.9	.0	35.0
N. EA	0	1800	0	1900	AG	0	1.6	.0	33.0
O. ED	0	1800	0	1900	AG	831	1.8	.0	33.0
P. EE	0	1800	0	1900	AG	831	.9	.0	35.0
Q. NL	0	-1900	0	-1800	AG	0	1.2	.0	33.0
R. SL	0	0	-15	500	AG	729	1.4	.0	33.0
S. WL	0	0	500	8	AG	118	1.6	.0	33.0
T. EL	0	-1900	0	-1800	AG	0	1.6	.0	33.0

III. RECEPTOR LOCATIONS

RECEPTOR	COORDINATES (FT) X	Y	Z
1. NE3	33	25	6.0
2. SE3	33	-25	6.0
3. SW3	-33	-25	6.0
4. NW3	-33	25	6.0
5. NE7	46	38	6.0
6. SE7	46	-38	6.0
7. SW7	-46	-38	6.0
8. NW7	-46	38	6.0

IV. MODEL RESULTS (WORST CASE WIND ANGLE)

RECEPTOR	BRG (DEG)	PRED CONC (PPM)	CONC/LINK (PPM) A	B	C	D	E	F	G	H
1. NE3	355.	.4	.0	.0	.3	.0	.0	.0	.0	.0
2. SE3	355.	.5	.0	.0	.2	.0	.0	.0	.0	.0
3. SW3	5.	.4	.0	.0	.0	.0	.0	.1	.0	.0
4. NW3	94.	.4	.0	.0	.0	.0	.0	.0	.0	.0
5. NE7	353.	.3	.0	.0	.1	.0	.0	.0	.0	.0
6. SE7	353.	.3	.0	.0	.1	.0	.0	.0	.0	.0
7. SW7	6.	.3	.0	.0	.0	.0	.0	.0	.0	.0
8. NW7	96.	.3	.0	.0	.0	.0	.0	.0	.0	.0

IV. MODEL RESULTS (WORST CASE WIND ANGLE) (CONT.)

RECEPTOR	CONC/LINK (PPM) I	J	K	L	M	N	O	P	Q	R	S	T
1. NE3	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
2. SE3	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
3. SW3	.0	.0	.0	.0	.0	.0	.0	.0	.0	.1	.0	.0
4. NW3	.0	.2	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
5. NE7	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
6. SE7	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
7. SW7	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
8. NW7	.0	.1	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 1

JOB: RIVERSIDE AVENUE AND SIERRA AVENUE PM WP
RUN: (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

I. SITE VARIABLES

U=	.5 M/S	Z0=	100. CM	ALT=	0. (FT)
BRG=	WORST CASE	VD=	.0 CM/S		
CLAS=	7 (G)	VS=	.0 CM/S		
MIXH=	1000. M	AMB=	.0 PPM		
SIGTH=	5. DEGREES	TEMP=	15.6 DEGREE (C)		

II. LINK VARIABLES

LINK DESCRIPTION	LINK COORDINATES (FT) X1	Y1	X2	Y2	TYPE	VPH	EF (G/MI)	H (FT)	W (FT)
A. NF	15	-1500	15	-500	AG	653	.9	.0	35.0
B. NA	15	-500	15	0	AG	653	1.5	.0	33.0
C. ND	15	0	15	500	AG	2088	1.3	.0	33.0
D. NE	15	500	15	1500	AG	2088	.9	.0	35.0
E. SF	-15	1500	-15	500	AG	2200	.9	.0	35.0
F. SA	-15	500	-15	0	AG	485	1.3	.0	33.0
G. SD	-15	0	-15	-500	AG	610	1.0	.0	33.0
H. SE	-15	-500	-15	-1500	AG	610	.9	.0	35.0
I. WF	1500	8	500	8	AG	1663	.9	.0	35.0
J. WA	500	8	0	8	AG	1538	1.8	.0	33.0
K. WD	0	1800	0	1900	AG	0	1.1	.0	33.0
L. WE	0	1800	0	1900	AG	0	.9	.0	35.0
M. EF	0	1800	0	1900	AG	0	.9	.0	35.0
N. EA	0	1800	0	1900	AG	0	1.5	.0	33.0
O. ED	0	1800	0	1900	AG	1818	1.8	.0	33.0
P. EE	0	1800	0	1900	AG	1818	.9	.0	35.0
Q. NL	0	-1900	0	-1800	AG	0	1.3	.0	33.0
R. SL	0	0	-15	500	AG	1715	1.8	.0	33.0
S. WL	0	0	500	8	AG	125	1.5	.0	33.0
T. EL	0	-1900	0	-1800	AG	0	1.5	.0	33.0

III. RECEPTOR LOCATIONS

RECEPTOR	COORDINATES (FT) X	Y	Z
1. NE3	33	25	6.0
2. SE3	33	-25	6.0
3. SW3	-33	-25	6.0
4. NW3	-33	25	6.0
5. NE7	46	38	6.0
6. SE7	46	-38	6.0
7. SW7	-46	-38	6.0
8. NW7	-46	38	6.0

IV. MODEL RESULTS (WORST CASE WIND ANGLE)

RECEPTOR	BRG (DEG)	PRED CONC (PPM)	CONC/LINK (PPM) A	B	C	D	E	F	G	H
1. NE3	353.	.8	.0	.0	.5	.0	.0	.0	.0	.0
2. SE3	354.	1.0	.0	.0	.4	.0	.0	.0	.0	.0
3. SW3	5.	.6	.0	.0	.1	.0	.0	.1	.0	.0
4. NW3	94.	.8	.0	.0	.1	.0	.0	.0	.0	.0
5. NE7	350.	.5	.0	.0	.3	.0	.0	.0	.0	.0
6. SE7	350.	.7	.0	.0	.3	.0	.0	.0	.0	.0
7. SW7	7.	.5	.0	.0	.0	.0	.0	.0	.0	.0
8. NW7	96.	.6	.0	.0	.0	.0	.0	.0	.0	.0

IV. MODEL RESULTS (WORST CASE WIND ANGLE) (CONT.)

RECEPTOR	CONC/LINK (PPM) I	J	K	L	M	N	O	P	Q	R	S	T
1. NE3	.0	.0	.0	.0	.0	.0	.0	.0	.0	.2	.0	.0
2. SE3	.0	.1	.0	.0	.0	.0	.0	.0	.0	.2	.0	.0
3. SW3	.0	.0	.0	.0	.0	.0	.0	.0	.0	.3	.0	.0
4. NW3	.0	.5	.0	.0	.0	.0	.0	.0	.0	.2	.0	.0
5. NE7	.0	.0	.0	.0	.0	.0	.0	.0	.0	.2	.0	.0
6. SE7	.0	.1	.0	.0	.0	.0	.0	.0	.0	.2	.0	.0
7. SW7	.0	.0	.0	.0	.0	.0	.0	.0	.0	.2	.0	.0
8. NW7	.0	.3	.0	.0	.0	.0	.0	.0	.0	.1	.0	.0

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 1

JOB: SR-210 FREEWAY EB ON/OFF RAMPS AND STATE STREET AM NP
RUN: (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

I. SITE VARIABLES

U= .5 M/S Z0= 100. CM ALT= 0. (FT)
BRG= WORST CASE VD= .0 CM/S
CLAS= 7 (G) VS= .0 CM/S
MIXH= 1000. M AMB= .0 PPM
SIGTH= 5. DEGREES TEMP= 15.6 DEGREE (C)

II. LINK VARIABLES

LINK DESCRIPTION	LINK COORDINATES (FT) X1	Y1	X2	Y2	TYPE	VPH	EF (G/MI)	H (FT)	W (FT)
A. NF	23	-1500	23	-500	AG	1596	.9	.0	50.0
B. NA	23	-500	23	0	AG	1268	1.3	.0	45.0
C. ND	23	0	23	500	AG	2092	1.3	.0	33.0
D. NE	23	500	23	1500	AG	2092	.9	.0	50.0
E. SF	-23	1500	-23	500	AG	1158	.9	.0	50.0
F. SA	-23	500	-23	0	AG	1158	1.3	.0	45.0
G. SD	-23	0	-23	-500	AG	1507	1.1	.0	33.0
H. SE	-23	-500	-23	-1500	AG	1507	.9	.0	50.0
I. WF	1500	15	500	15	AG	20	.9	.0	35.0
J. WA	500	15	0	15	AG	16	1.5	.0	33.0
K. WD	0	15	-500	15	AG	776	1.8	.0	33.0
L. WE	-500	15	-1500	15	AG	776	.9	.0	35.0
M. EF	-1500	-15	-500	-15	AG	1601	.9	.0	35.0
N. EA	-500	-15	0	-15	AG	786	1.6	.0	33.0
O. ED	0	-15	500	-15	AG	0	1.1	.0	33.0
P. EE	500	-15	1500	-15	AG	0	.9	.0	35.0
Q. NL	0	0	15	-500	AG	328	1.3	.0	33.0
R. SL	0	0	-15	500	AG	0	1.3	.0	33.0
S. WL	0	0	500	15	AG	4	1.5	.0	33.0
T. EL	0	0	-500	-15	AG	815	1.8	.0	33.0

III. RECEPTOR LOCATIONS

RECEPTOR	COORDINATES (FT) X	Y	Z
1. NE3	48	33	6.0
2. SE3	48	-33	6.0
3. SW3	-48	-33	6.0
4. NW3	-48	33	6.0
5. NE7	61	46	6.0
6. SE7	61	-46	6.0
7. SW7	-61	-46	6.0
8. NW7	-61	46	6.0

IV. MODEL RESULTS (WORST CASE WIND ANGLE)

RECEPTOR	BRG (DEG)	PRED CONC (PPM)	CONC/LINK (PPM) A	B	C	D	E	F	G	H
1. NE3	264.	.7	.0	.0	.2	.0	.0	.0	.0	.0
2. SE3	275.	.7	.0	.1	.0	.0	.0	.0	.0	.0
3. SW3	5.	.6	.0	.0	.0	.0	.0	.2	.0	.0
4. NW3	172.	.6	.0	.0	.0	.0	.0	.0	.2	.0
5. NE7	261.	.6	.0	.0	.1	.0	.0	.0	.0	.0
6. SE7	277.	.5	.0	.0	.0	.0	.0	.0	.0	.0
7. SW7	8.	.5	.0	.0	.0	.0	.0	.2	.0	.0
8. NW7	172.	.5	.0	.0	.0	.0	.0	.0	.1	.0

IV. MODEL RESULTS (WORST CASE WIND ANGLE) (CONT.)

RECEPTOR	CONC/LINK (PPM) I	J	K	L	M	N	O	P	Q	R	S	T
1. NE3	.0	.0	.2	.0	.0	.0	.0	.0	.0	.0	.0	.1
2. SE3	.0	.0	.0	.0	.0	.2	.0	.0	.0	.0	.0	.2
3. SW3	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
4. NW3	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
5. NE7	.0	.0	.2	.0	.0	.0	.0	.0	.0	.0	.0	.1
6. SE7	.0	.0	.0	.0	.0	.2	.0	.0	.0	.0	.0	.1
7. SW7	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
8. NW7	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 1

JOB: SR-210 FREEWAY EB ON/OFF RAMPS AND STATE STREET AW WP
RUN: (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

I. SITE VARIABLES

U= .5 M/S Z0= 100. CM ALT= 0. (FT)
BRG= WORST CASE VD= .0 CM/S
CLAS= 7 (G) VS= .0 CM/S
MIXH= 1000. M AMB= .0 PPM
SIGTH= 5. DEGREES TEMP= 15.6 DEGREE (C)

II. LINK VARIABLES

LINK DESCRIPTION	LINK COORDINATES (FT) X1	Y1	X2	Y2	TYPE	VPH	EF (G/MI)	H (FT)	W (FT)
A. NF	23	-1500	23	-500	AG	1624	.9	.0	50.0
B. NA	23	-500	23	0	AG	1296	1.3	.0	45.0
C. ND	23	0	23	500	AG	2182	1.3	.0	33.0
D. NE	23	500	23	1500	AG	2182	.9	.0	50.0
E. SF	-23	1500	-23	500	AG	1158	.9	.0	50.0
F. SA	-23	500	-23	0	AG	1158	1.3	.0	45.0
G. SD	-23	0	-23	-500	AG	1573	1.1	.0	33.0
H. SE	-23	-500	-23	-1500	AG	1573	.9	.0	50.0
I. WF	1500	15	500	15	AG	20	.9	.0	35.0
J. WA	500	15	0	15	AG	16	1.5	.0	33.0
K. WD	0	15	-500	15	AG	776	1.7	.0	33.0
L. WE	-500	15	-1500	15	AG	776	.9	.0	35.0
M. EF	-1500	-15	-500	-15	AG	1730	.9	.0	35.0
N. EA	-500	-15	0	-15	AG	852	1.6	.0	33.0
O. ED	0	-15	500	-15	AG	1	1.1	.0	33.0
P. EE	500	-15	1500	-15	AG	1	.9	.0	35.0
Q. NL	0	0	15	-500	AG	328	1.3	.0	33.0
R. SL	0	0	-15	500	AG	0	1.3	.0	33.0
S. WL	0	0	500	15	AG	4	1.5	.0	33.0
T. EL	0	0	-500	-15	AG	878	1.8	.0	33.0

III. RECEPTOR LOCATIONS

RECEPTOR	COORDINATES (FT) X	Y	Z
1. NE3	48	33	6.0
2. SE3	48	-33	6.0
3. SW3	-48	-33	6.0
4. NW3	-48	33	6.0
5. NE7	61	46	6.0
6. SE7	61	-46	6.0
7. SW7	-61	-46	6.0
8. NW7	-61	46	6.0

IV. MODEL RESULTS (WORST CASE WIND ANGLE)

RECEPTOR	BRG (DEG)	PRED CONC (PPM)	CONC/LINK (PPM) A	B	C	D	E	F	G	H
1. NE3	264.	.7	.0	.0	.2	.0	.0	.0	.0	.0
2. SE3	275.	.7	.0	.1	.0	.0	.0	.0	.0	.0
3. SW3	6.	.6	.0	.0	.0	.0	.0	.2	.0	.0
4. NW3	172.	.6	.0	.0	.0	.0	.0	.0	.2	.0
5. NE7	261.	.6	.0	.0	.1	.0	.0	.0	.0	.0
6. SE7	277.	.6	.0	.0	.0	.0	.0	.0	.0	.0
7. SW7	8.	.5	.0	.0	.0	.0	.0	.2	.0	.0
8. NW7	172.	.5	.0	.0	.0	.0	.0	.0	.1	.0

IV. MODEL RESULTS (WORST CASE WIND ANGLE) (CONT.)

RECEPTOR	CONC/LINK (PPM) I	J	K	L	M	N	O	P	Q	R	S	T
1. NE3	.0	.0	.2	.0	.0	.0	.0	.0	.0	.0	.0	.1
2. SE3	.0	.0	.0	.0	.0	.2	.0	.0	.0	.0	.0	.2
3. SW3	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
4. NW3	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
5. NE7	.0	.0	.2	.0	.0	.0	.0	.0	.0	.0	.0	.1
6. SE7	.0	.0	.0	.0	.0	.2	.0	.0	.0	.0	.0	.1
7. SW7	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
8. NW7	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 1

JOB: SR-210 FREEWAY EB ON/OFF RAMPS AND STATE STREET PM NP
RUN: (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

I. SITE VARIABLES

U= .5 M/S Z0= 100. CM ALT= 0. (FT)
BRG= WORST CASE VD= .0 CM/S
CLAS= 7 (G) VS= .0 CM/S
MIXH= 1000. M AMB= .0 PPM
SIGTH= 5. DEGREES TEMP= 15.6 DEGREE (C)

II. LINK VARIABLES

LINK DESCRIPTION	LINK COORDINATES (FT) X1	Y1	X2	Y2	TYPE	VPH	EF (G/MI)	H (FT)	W (FT)
A. NF	23	-1500	23	-500	AG	1697	.9	.0	50.0
B. NA	23	-500	23	0	AG	1341	1.3	.0	45.0
C. ND	23	0	23	500	AG	1933	1.3	.0	33.0
D. NE	23	500	23	1500	AG	1933	.9	.0	50.0
E. SF	-23	1500	-23	500	AG	1322	.9	.0	50.0
F. SA	-23	500	-23	0	AG	1199	1.3	.0	45.0
G. SD	-23	0	-23	-500	AG	1901	1.3	.0	33.0
H. SE	-23	-500	-23	-1500	AG	1901	.9	.0	50.0
I. WF	1500	15	500	15	AG	183	.9	.0	35.0
J. WA	500	15	0	15	AG	134	1.5	.0	33.0
K. WD	0	15	-500	15	AG	787	1.7	.0	33.0
L. WE	-500	15	-1500	15	AG	787	.9	.0	35.0
M. EF	-1500	-15	-500	-15	AG	1771	.9	.0	35.0
N. EA	-500	-15	0	-15	AG	1108	1.8	.0	33.0
O. ED	0	-15	500	-15	AG	352	1.1	.0	33.0
P. EE	500	-15	1500	-15	AG	352	.9	.0	35.0
Q. NL	0	0	15	-500	AG	356	1.3	.0	33.0
R. SL	0	0	-15	500	AG	123	1.3	.0	33.0
S. WL	0	0	500	15	AG	49	1.5	.0	33.0
T. EL	0	0	-500	-15	AG	663	1.8	.0	33.0

III. RECEPTOR LOCATIONS

RECEPTOR	COORDINATES (FT) X	Y	Z
1. NE3	48	33	6.0
2. SE3	48	-33	6.0
3. SW3	-48	-33	6.0
4. NW3	-48	33	6.0
5. NE7	61	46	6.0
6. SE7	61	-46	6.0
7. SW7	-61	-46	6.0
8. NW7	-61	46	6.0

IV. MODEL RESULTS (WORST CASE WIND ANGLE)

RECEPTOR	BRG (DEG)	PRED CONC (PPM)	CONC/LINK (PPM) A	B	C	D	E	F	G	H
1. NE3	264.	.7	.0	.0	.1	.0	.0	.0	.0	.0
2. SE3	275.	.8	.0	.1	.0	.0	.0	.0	.0	.0
3. SW3	5.	.7	.0	.0	.0	.0	.0	.2	.0	.0
4. NW3	172.	.7	.0	.0	.0	.0	.0	.0	.3	.0
5. NE7	261.	.6	.0	.0	.1	.0	.0	.0	.0	.0
6. SE7	277.	.6	.0	.0	.0	.0	.0	.0	.0	.0
7. SW7	8.	.5	.0	.0	.0	.0	.0	.2	.0	.0
8. NW7	171.	.6	.0	.0	.0	.0	.0	.0	.2	.0

IV. MODEL RESULTS (WORST CASE WIND ANGLE) (CONT.)

RECEPTOR	CONC/LINK (PPM) I	J	K	L	M	N	O	P	Q	R	S	T
1. NE3	.0	.0	.2	.0	.0	.1	.0	.0	.0	.0	.0	.1
2. SE3	.0	.0	.0	.0	.0	.3	.0	.0	.0	.0	.0	.1
3. SW3	.0	.0	.0	.0	.0	.1	.0	.0	.0	.0	.0	.0
4. NW3	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
5. NE7	.0	.0	.2	.0	.0	.1	.0	.0	.0	.0	.0	.1
6. SE7	.0	.0	.0	.0	.0	.2	.0	.0	.0	.0	.0	.1
7. SW7	.0	.0	.0	.0	.0	.1	.0	.0	.0	.0	.0	.0
8. NW7	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 1

JOB: SR-210 FREEWAY EB ON/OFF RAMPS AND STATE STREET PM WP
RUN: (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

I. SITE VARIABLES

U= .5 M/S Z0= 100. CM ALT= 0. (FT)
BRG= WORST CASE VD= .0 CM/S
CLAS= 7 (G) VS= .0 CM/S
MIXH= 1000. M AMB= .0 PPM
SIGTH= 5. DEGREES TEMP= 15.6 DEGREE (C)

II. LINK VARIABLES

LINK DESCRIPTION	LINK COORDINATES (FT) X1	Y1	X2	Y2	TYPE	VPH	EF (G/MI)	H (FT)	W (FT)
A. NF	23	-1500	23	-500	AG	1776	.9	.0	50.0
B. NA	23	-500	23	0	AG	1419	1.4	.0	45.0
C. ND	23	0	23	500	AG	2072	1.3	.0	33.0
D. NE	23	500	23	1500	AG	2072	.9	.0	50.0
E. SF	-23	1500	-23	500	AG	1323	.9	.0	50.0
F. SA	-23	500	-23	0	AG	1200	1.4	.0	45.0
G. SD	-23	0	-23	-500	AG	1962	1.3	.0	33.0
H. SE	-23	-500	-23	-1500	AG	1962	.9	.0	50.0
I. WF	1500	15	500	15	AG	200	.9	.0	35.0
J. WA	500	15	0	15	AG	151	1.5	.0	33.0
K. WD	0	15	-500	15	AG	788	1.7	.0	33.0
L. WE	-500	15	-1500	15	AG	788	.9	.0	35.0
M. EF	-1500	-15	-500	-15	AG	1893	.9	.0	35.0
N. EA	-500	-15	0	-15	AG	1186	1.8	.0	33.0
O. ED	0	-15	500	-15	AG	370	1.1	.0	33.0
P. EE	500	-15	1500	-15	AG	370	.9	.0	35.0
Q. NL	0	0	15	-500	AG	357	1.4	.0	33.0
R. SL	0	0	-15	500	AG	123	1.3	.0	33.0
S. WL	0	0	500	15	AG	49	1.5	.0	33.0
T. EL	0	0	-500	-15	AG	707	1.8	.0	33.0

III. RECEPTOR LOCATIONS

RECEPTOR	COORDINATES (FT) X	Y	Z
1. NE3	48	33	6.0
2. SE3	48	-33	6.0
3. SW3	-48	-33	6.0
4. NW3	-48	33	6.0
5. NE7	61	46	6.0
6. SE7	61	-46	6.0
7. SW7	-61	-46	6.0
8. NW7	-61	46	6.0

IV. MODEL RESULTS (WORST CASE WIND ANGLE)

RECEPTOR	BRG (DEG)	PRED CONC (PPM)	CONC/LINK (PPM) A	B	C	D	E	F	G	H
1. NE3	263.	.8	.0	.0	.2	.0	.0	.0	.0	.0
2. SE3	275.	.9	.0	.1	.0	.0	.0	.0	.0	.0
3. SW3	6.	.7	.0	.0	.0	.0	.0	.3	.0	.0
4. NW3	172.	.8	.0	.0	.0	.0	.0	.0	.3	.0
5. NE7	261.	.6	.0	.0	.1	.0	.0	.0	.0	.0
6. SE7	277.	.6	.0	.1	.0	.0	.0	.0	.0	.0
7. SW7	8.	.5	.0	.0	.0	.0	.0	.2	.0	.0
8. NW7	171.	.6	.0	.0	.0	.0	.0	.0	.2	.0

IV. MODEL RESULTS (WORST CASE WIND ANGLE) (CONT.)

RECEPTOR	CONC/LINK (PPM) I	J	K	L	M	N	O	P	Q	R	S	T
1. NE3	.0	.0	.2	.0	.0	.1	.0	.0	.0	.0	.0	.1
2. SE3	.0	.0	.0	.0	.0	.3	.0	.0	.0	.0	.0	.1
3. SW3	.0	.0	.0	.0	.0	.1	.0	.0	.0	.0	.0	.0
4. NW3	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
5. NE7	.0	.0	.2	.0	.0	.1	.0	.0	.0	.0	.0	.1
6. SE7	.0	.0	.0	.0	.0	.2	.0	.0	.0	.0	.0	.1
7. SW7	.0	.0	.0	.0	.0	.1	.0	.0	.0	.0	.0	.0
8. NW7	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 1

JOB: HIGHLAND AVENUE/EASTON STREET AND ALDER AVENUE AM NP
RUN: (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

I. SITE VARIABLES

U= .5 M/S Z0= 100. CM ALT= 0. (FT)
BRG= WORST CASE VD= .0 CM/S
CLAS= 7 (G) VS= .0 CM/S
MIXH= 1000. M AMB= .0 PPM
SIGTH= 5. DEGREES TEMP= 15.6 DEGREE (C)

II. LINK VARIABLES

LINK DESCRIPTION	LINK COORDINATES (FT) X1	Y1	X2	Y2	TYPE	VPH	EF (G/MI)	H (FT)	W (FT)
A. NF	15	-1500	15	-500	AG	671	.9	.0	35.0
B. NA	15	-500	15	0	AG	591	1.4	.0	33.0
C. ND	15	0	15	500	AG	773	1.2	.0	33.0
D. NE	15	500	15	1500	AG	773	.9	.0	35.0
E. SF	-15	1500	-15	500	AG	486	.9	.0	35.0
F. SA	-15	500	-15	0	AG	300	1.4	.0	33.0
G. SD	-15	0	-15	-500	AG	319	1.0	.0	33.0
H. SE	-15	-500	-15	-1500	AG	319	.9	.0	35.0
I. WF	1500	23	500	23	AG	665	.9	.0	50.0
J. WA	500	23	0	23	AG	551	1.5	.0	45.0
K. WD	0	23	-500	23	AG	584	1.1	.0	33.0
L. WE	-500	23	-1500	23	AG	584	.9	.0	50.0
M. EF	-1500	-23	-500	-23	AG	306	.9	.0	50.0
N. EA	-500	-23	0	-23	AG	291	1.5	.0	45.0
O. ED	0	-23	500	-23	AG	452	1.0	.0	33.0
P. EE	500	-23	1500	-23	AG	452	.9	.0	50.0
Q. NL	0	0	15	-500	AG	80	1.4	.0	33.0
R. SL	0	0	-15	500	AG	186	1.4	.0	33.0
S. WL	0	0	500	15	AG	114	1.5	.0	33.0
T. EL	0	0	-500	-15	AG	15	1.5	.0	33.0

III. RECEPTOR LOCATIONS

RECEPTOR	COORDINATES (FT) X	Y	Z
1. NE3	33	48	6.0
2. SE3	33	-48	6.0
3. SW3	-33	-48	6.0
4. NW3	-33	48	6.0
5. NE7	46	61	6.0
6. SE7	46	-61	6.0
7. SW7	-46	-61	6.0
8. NW7	-46	61	6.0

IV. MODEL RESULTS (WORST CASE WIND ANGLE)

RECEPTOR	BRG (DEG)	PRED CONC (PPM)	CONC/LINK (PPM) A	B	C	D	E	F	G	H
1. NE3	184.	.3	.0	.1	.0	.0	.0	.0	.0	.0
2. SE3	355.	.4	.0	.0	.2	.0	.0	.0	.0	.0
3. SW3	5.	.3	.0	.0	.0	.0	.0	.0	.0	.0
4. NW3	95.	.3	.0	.0	.0	.0	.0	.0	.0	.0
5. NE7	186.	.2	.0	.0	.0	.0	.0	.0	.0	.0
6. SE7	354.	.2	.0	.0	.1	.0	.0	.0	.0	.0
7. SW7	6.	.2	.0	.0	.0	.0	.0	.0	.0	.0
8. NW7	96.	.2	.0	.0	.0	.0	.0	.0	.0	.0

IV. MODEL RESULTS (WORST CASE WIND ANGLE) (CONT.)

RECEPTOR	CONC/LINK (PPM) I	J	K	L	M	N	O	P	Q	R	S	T
1. NE3	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
2. SE3	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
3. SW3	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
4. NW3	.0	.1	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
5. NE7	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
6. SE7	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
7. SW7	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
8. NW7	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 1

JOB: HIGHLAND AVENUE/EASTON STREET AND ALDER AVENUE AM WP
RUN: (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

I. SITE VARIABLES

U= .5 M/S Z0= 100. CM ALT= 0. (FT)
BRG= WORST CASE VD= .0 CM/S
CLAS= 7 (G) VS= .0 CM/S
MIXH= 1000. M AMB= .0 PPM
SIGTH= 5. DEGREES TEMP= 15.6 DEGREE (C)

II. LINK VARIABLES

LINK DESCRIPTION	LINK COORDINATES (FT) X1	Y1	X2	Y2	TYPE	VPH	EF (G/MI)	H (FT)	W (FT)
A. NF	15	-1500	15	-500	AG	736	.9	.0	35.0
B. NA	15	-500	15	0	AG	656	1.3	.0	33.0
C. ND	15	0	15	500	AG	860	1.1	.0	33.0
D. NE	15	500	15	1500	AG	860	.9	.0	35.0
E. SF	-15	1500	-15	500	AG	862	.9	.0	35.0
F. SA	-15	500	-15	0	AG	676	1.3	.0	33.0
G. SD	-15	0	-15	-500	AG	694	1.0	.0	33.0
H. SE	-15	-500	-15	-1500	AG	694	.9	.0	35.0
I. WF	1500	23	500	23	AG	665	.9	.0	50.0
J. WA	500	23	0	23	AG	551	1.5	.0	45.0
K. WD	0	23	-500	23	AG	585	1.1	.0	33.0
L. WE	-500	23	-1500	23	AG	585	.9	.0	50.0
M. EF	-1500	-23	-500	-23	AG	328	.9	.0	50.0
N. EA	-500	-23	0	-23	AG	291	1.5	.0	45.0
O. ED	0	-23	500	-23	AG	452	1.1	.0	33.0
P. EE	500	-23	1500	-23	AG	452	.9	.0	50.0
Q. NL	0	0	15	-500	AG	80	1.3	.0	33.0
R. SL	0	0	-15	500	AG	186	1.3	.0	33.0
S. WL	0	0	500	15	AG	114	1.5	.0	33.0
T. EL	0	0	-500	-15	AG	37	1.5	.0	33.0

III. RECEPTOR LOCATIONS

RECEPTOR	COORDINATES (FT) X	Y	Z
1. NE3	33	48	6.0
2. SE3	33	-48	6.0
3. SW3	-33	-48	6.0
4. NW3	-33	48	6.0
5. NE7	46	61	6.0
6. SE7	46	-61	6.0
7. SW7	-46	-61	6.0
8. NW7	-46	61	6.0

IV. MODEL RESULTS (WORST CASE WIND ANGLE)

RECEPTOR	BRG (DEG)	PRED CONC (PPM)	CONC/LINK (PPM) A	B	C	D	E	F	G	H
1. NE3	185.	.4	.0	.1	.0	.0	.0	.0	.0	.0
2. SE3	355.	.4	.0	.0	.2	.0	.0	.0	.0	.0
3. SW3	5.	.4	.0	.0	.0	.0	.0	.2	.0	.0
4. NW3	175.	.3	.0	.0	.0	.0	.0	.0	.1	.0
5. NE7	186.	.3	.0	.1	.0	.0	.0	.0	.0	.0
6. SE7	354.	.3	.0	.0	.1	.0	.0	.0	.0	.0
7. SW7	6.	.3	.0	.0	.0	.0	.0	.1	.0	.0
8. NW7	97.	.3	.0	.0	.0	.0	.0	.0	.0	.0

IV. MODEL RESULTS (WORST CASE WIND ANGLE) (CONT.)

RECEPTOR	CONC/LINK (PPM) I	J	K	L	M	N	O	P	Q	R	S	T
1. NE3	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
2. SE3	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
3. SW3	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
4. NW3	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
5. NE7	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
6. SE7	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
7. SW7	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
8. NW7	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 1

JOB: HIGHLAND AVENUE/EASTON STREET AND ALDER AVENUE PM NP
RUN: (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

I. SITE VARIABLES

U= .5 M/S Z0= 100. CM ALT= 0. (FT)
BRG= WORST CASE VD= .0 CM/S
CLAS= 7 (G) VS= .0 CM/S
MIXH= 1000. M AMB= .0 PPM
SIGTH= 5. DEGREES TEMP= 15.6 DEGREE (C)

II. LINK VARIABLES

LINK DESCRIPTION	LINK COORDINATES (FT) X1	Y1	X2	Y2	TYPE	VPH	EF (G/MI)	H (FT)	W (FT)
A. NF	15	-1500	15	-500	AG	725	.9	.0	35.0
B. NA	15	-500	15	0	AG	701	1.5	.0	33.0
C. ND	15	0	15	500	AG	994	1.7	.0	33.0
D. NE	15	500	15	1500	AG	994	.9	.0	35.0
E. SF	-15	1500	-15	500	AG	844	.9	.0	35.0
F. SA	-15	500	-15	0	AG	723	1.5	.0	33.0
G. SD	-15	0	-15	-500	AG	909	1.6	.0	33.0
H. SE	-15	-500	-15	-1500	AG	909	.9	.0	35.0
I. WF	1500	23	500	23	AG	572	.9	.0	50.0
J. WA	500	23	0	23	AG	466	1.4	.0	45.0
K. WD	0	23	-500	23	AG	362	1.0	.0	33.0
L. WE	-500	23	-1500	23	AG	362	.9	.0	50.0
M. EF	-1500	-23	-500	-23	AG	1163	.9	.0	50.0
N. EA	-500	-23	0	-23	AG	1093	1.4	.0	45.0
O. ED	0	-23	500	-23	AG	1039	1.0	.0	33.0
P. EE	500	-23	1500	-23	AG	1039	.9	.0	50.0
Q. NL	0	0	15	-500	AG	24	1.4	.0	33.0
R. SL	0	0	-15	500	AG	121	1.4	.0	33.0
S. WL	0	0	500	15	AG	106	1.4	.0	33.0
T. EL	0	0	-500	-15	AG	70	1.4	.0	33.0

III. RECEPTOR LOCATIONS

RECEPTOR	COORDINATES (FT) X	Y	Z
1. NE3	33	48	6.0
2. SE3	33	-48	6.0
3. SW3	-33	-48	6.0
4. NW3	-33	48	6.0
5. NE7	46	61	6.0
6. SE7	46	-61	6.0
7. SW7	-46	-61	6.0
8. NW7	-46	61	6.0

IV. MODEL RESULTS (WORST CASE WIND ANGLE)

RECEPTOR	BRG (DEG)	PRED CONC (PPM)	CONC/LINK (PPM) A	B	C	D	E	F	G	H
1. NE3	185.	.5	.0	.2	.0	.0	.0	.0	.0	.0
2. SE3	355.	.6	.0	.0	.3	.0	.0	.0	.0	.0
3. SW3	5.	.6	.0	.0	.0	.0	.0	.2	.0	.0
4. NW3	175.	.5	.0	.0	.0	.0	.0	.0	.2	.0
5. NE7	187.	.3	.0	.1	.0	.0	.0	.0	.0	.0
6. SE7	353.	.4	.0	.0	.2	.0	.0	.0	.0	.0
7. SW7	7.	.4	.0	.0	.0	.0	.0	.1	.0	.0
8. NW7	173.	.3	.0	.0	.0	.0	.0	.0	.2	.0

IV. MODEL RESULTS (WORST CASE WIND ANGLE) (CONT.)

RECEPTOR	CONC/LINK (PPM) I	J	K	L	M	N	O	P	Q	R	S	T
1. NE3	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
2. SE3	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
3. SW3	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
4. NW3	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
5. NE7	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
6. SE7	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
7. SW7	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
8. NW7	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 1

JOB: HIGHLAND AVENUE/EASTON STREET AND ALDER AVENUE PM WP
RUN: (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

I. SITE VARIABLES

U= .5 M/S Z0= 100. CM ALT= 0. (FT)
BRG= WORST CASE VD= .0 CM/S
CLAS= 7 (G) VS= .0 CM/S
MIXH= 1000. M AMB= .0 PPM
SIGTH= 5. DEGREES TEMP= 15.6 DEGREE (C)

II. LINK VARIABLES

LINK DESCRIPTION	LINK COORDINATES (FT) X1	Y1	X2	Y2	TYPE	VPH	EF (G/MI)	H (FT)	W (FT)
A. NF	15	-1500	15	-500	AG	839	.9	.0	35.0
B. NA	15	-500	15	0	AG	815	1.5	.0	33.0
C. ND	15	0	15	500	AG	1128	1.6	.0	33.0
D. NE	15	500	15	1500	AG	1128	.9	.0	35.0
E. SF	-15	1500	-15	500	AG	988	.9	.0	35.0
F. SA	-15	500	-15	0	AG	867	1.5	.0	33.0
G. SD	-15	0	-15	-500	AG	1017	1.6	.0	33.0
H. SE	-15	-500	-15	-1500	AG	1017	.9	.0	35.0
I. WF	1500	23	500	23	AG	574	.9	.0	50.0
J. WA	500	23	0	23	AG	466	1.4	.0	45.0
K. WD	0	23	-500	23	AG	400	1.0	.0	33.0
L. WE	-500	23	-1500	23	AG	400	.9	.0	50.0
M. EF	-1500	-23	-500	-23	AG	1184	.9	.0	50.0
N. EA	-500	-23	0	-23	AG	1094	1.5	.0	45.0
O. ED	0	-23	500	-23	AG	1040	1.1	.0	33.0
P. EE	500	-23	1500	-23	AG	1040	.9	.0	50.0
Q. NL	0	0	15	-500	AG	24	1.4	.0	33.0
R. SL	0	0	-15	500	AG	121	1.4	.0	33.0
S. WL	0	0	500	15	AG	108	1.4	.0	33.0
T. EL	0	0	-500	-15	AG	90	1.4	.0	33.0

III. RECEPTOR LOCATIONS

RECEPTOR	COORDINATES (FT) X	Y	Z
1. NE3	33	48	6.0
2. SE3	33	-48	6.0
3. SW3	-33	-48	6.0
4. NW3	-33	48	6.0
5. NE7	46	61	6.0
6. SE7	46	-61	6.0
7. SW7	-46	-61	6.0
8. NW7	-46	61	6.0

IV. MODEL RESULTS (WORST CASE WIND ANGLE)

RECEPTOR	BRG (DEG)	PRED CONC (PPM)	CONC/LINK (PPM) A	B	C	D	E	F	G	H
1. NE3	185.	.5	.0	.2	.1	.0	.0	.0	.0	.0
2. SE3	355.	.6	.0	.0	.3	.0	.0	.0	.0	.0
3. SW3	5.	.6	.0	.0	.0	.0	.0	.2	.0	.0
4. NW3	175.	.6	.0	.0	.0	.0	.0	.0	.3	.0
5. NE7	187.	.3	.0	.1	.0	.0	.0	.0	.0	.0
6. SE7	353.	.4	.0	.0	.2	.0	.0	.0	.0	.0
7. SW7	7.	.4	.0	.0	.0	.0	.0	.1	.0	.0
8. NW7	173.	.4	.0	.0	.0	.0	.0	.0	.2	.0

IV. MODEL RESULTS (WORST CASE WIND ANGLE) (CONT.)

RECEPTOR	CONC/LINK (PPM) I	J	K	L	M	N	O	P	Q	R	S	T
1. NE3	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
2. SE3	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
3. SW3	.0	.0	.0	.0	.0	.1	.0	.0	.0	.0	.0	.0
4. NW3	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
5. NE7	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
6. SE7	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
7. SW7	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
8. NW7	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 1

JOB: HIGHLAND AVENUE AND STATE STREET AM NP
RUN: (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

I. SITE VARIABLES

U=	.5 M/S	Z0=	100. CM	ALT=	0. (FT)
BRG=	WORST CASE	VD=	.0 CM/S		
CLAS=	7 (G)	VS=	.0 CM/S		
MIXH=	1000. M	AMB=	.0 PPM		
SIGTH=	5. DEGREES	TEMP=	15.6 DEGREE (C)		

II. LINK VARIABLES

LINK DESCRIPTION	LINK COORDINATES (FT) X1	Y1	X2	Y2	TYPE	VPH	EF (G/MI)	H (FT)	W (FT)
A. NF	30	-1500	30	-500	AG	960	.9	.0	50.0
B. NA	30	-500	30	0	AG	832	1.4	.0	60.0
C. ND	30	0	30	500	AG	585	1.0	.0	33.0
D. NE	30	500	30	1500	AG	585	.9	.0	50.0
E. SF	-30	1500	-30	500	AG	754	.9	.0	50.0
F. SA	-30	500	-30	0	AG	753	1.4	.0	45.0
G. SD	-30	0	-30	-500	AG	2206	1.5	.0	33.0
H. SE	-30	-500	-30	-1500	AG	2206	.9	.0	50.0
I. WF	1500	23	500	23	AG	1026	.9	.0	50.0
J. WA	500	23	0	23	AG	35	1.4	.0	45.0
K. WD	0	23	-500	23	AG	163	1.0	.0	33.0
L. WE	-500	23	-1500	23	AG	163	.9	.0	50.0
M. EF	-1500	-23	-500	-23	AG	482	.9	.0	50.0
N. EA	-500	-23	0	-23	AG	479	1.4	.0	45.0
O. ED	0	-23	500	-23	AG	268	1.0	.0	33.0
P. EE	500	-23	1500	-23	AG	268	.9	.0	50.0
Q. NL	0	0	23	-500	AG	128	1.4	.0	33.0
R. SL	0	0	-23	500	AG	1	1.4	.0	33.0
S. WL	0	0	500	15	AG	991	1.8	.0	33.0
T. EL	0	0	-500	-15	AG	3	1.4	.0	33.0

III. RECEPTOR LOCATIONS

RECEPTOR	COORDINATES (FT) X	Y	Z
1. NE3	55	48	6.0
2. SE3	55	-48	6.0
3. SW3	-55	-48	6.0
4. NW3	-55	48	6.0
5. NE7	68	61	6.0
6. SE7	68	-61	6.0
7. SW7	-68	-61	6.0
8. NW7	-68	61	6.0

IV. MODEL RESULTS (WORST CASE WIND ANGLE)

RECEPTOR	BRG (DEG)	PRED CONC (PPM)	CONC/LINK (PPM) A	B	C	D	E	F	G	H
1. NE3	186.	.4	.0	.2	.0	.0	.0	.0	.0	.0
2. SE3	186.	.3	.0	.2	.0	.0	.0	.0	.0	.1
3. SW3	81.	.5	.0	.0	.0	.0	.0	.0	.2	.0
4. NW3	174.	.6	.0	.0	.0	.0	.0	.0	.4	.0
5. NE7	188.	.4	.0	.1	.0	.0	.0	.0	.0	.0
6. SE7	188.	.3	.0	.1	.0	.0	.0	.0	.0	.0
7. SW7	79.	.4	.0	.0	.0	.0	.0	.0	.2	.0
8. NW7	171.	.4	.0	.0	.0	.0	.0	.0	.3	.0

IV. MODEL RESULTS (WORST CASE WIND ANGLE) (CONT.)

RECEPTOR	CONC/LINK (PPM) I	J	K	L	M	N	O	P	Q	R	S	T
1. NE3	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
2. SE3	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
3. SW3	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.1	.0
4. NW3	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
5. NE7	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
6. SE7	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
7. SW7	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.1	.0
8. NW7	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 1

JOB: HIGHLAND AVENUE AND STATE STREET AM WP
RUN: (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

I. SITE VARIABLES

U= .5 M/S Z0= 100. CM ALT= 0. (FT)
BRG= WORST CASE VD= .0 CM/S
CLAS= 7 (G) VS= .0 CM/S
MIXH= 1000. M AMB= .0 PPM
SIGTH= 5. DEGREES TEMP= 15.6 DEGREE (C)

II. LINK VARIABLES

LINK DESCRIPTION	LINK COORDINATES (FT) X1	Y1	X2	Y2	TYPE	VPH	EF (G/MI)	H (FT)	W (FT)
A. NF	30	-1500	30	-500	AG	1020	.9	.0	50.0
B. NA	30	-500	30	0	AG	892	1.4	.0	60.0
C. ND	30	0	30	500	AG	607	1.0	.0	33.0
D. NE	30	500	30	1500	AG	607	.9	.0	50.0
E. SF	-30	1500	-30	500	AG	764	.9	.0	50.0
F. SA	-30	500	-30	0	AG	763	1.4	.0	45.0
G. SD	-30	0	-30	-500	AG	2288	1.5	.0	33.0
H. SE	-30	-500	-30	-1500	AG	2288	.9	.0	50.0
I. WF	1500	23	500	23	AG	1098	.9	.0	50.0
J. WA	500	23	0	23	AG	35	1.4	.0	45.0
K. WD	0	23	-500	23	AG	163	1.0	.0	33.0
L. WE	-500	23	-1500	23	AG	163	.9	.0	50.0
M. EF	-1500	-23	-500	-23	AG	482	.9	.0	50.0
N. EA	-500	-23	0	-23	AG	479	1.4	.0	45.0
O. ED	0	-23	500	-23	AG	306	1.0	.0	33.0
P. EE	500	-23	1500	-23	AG	306	.9	.0	50.0
Q. NL	0	0	23	-500	AG	128	1.4	.0	33.0
R. SL	0	0	-23	500	AG	1	1.4	.0	33.0
S. WL	0	0	500	15	AG	1063	1.8	.0	33.0
T. EL	0	0	-500	-15	AG	3	1.4	.0	33.0

III. RECEPTOR LOCATIONS

RECEPTOR	COORDINATES (FT) X	Y	Z
1. NE3	55	48	6.0
2. SE3	55	-48	6.0
3. SW3	-55	-48	6.0
4. NW3	-55	48	6.0
5. NE7	68	61	6.0
6. SE7	68	-61	6.0
7. SW7	-68	-61	6.0
8. NW7	-68	61	6.0

IV. MODEL RESULTS (WORST CASE WIND ANGLE)

RECEPTOR	BRG (DEG)	PRED CONC (PPM)	CONC/LINK (PPM) A	B	C	D	E	F	G	H
1. NE3	186.	.4	.0	.2	.0	.0	.0	.0	.0	.0
2. SE3	186.	.4	.0	.2	.0	.0	.0	.0	.0	.1
3. SW3	81.	.5	.0	.0	.0	.0	.0	.0	.2	.0
4. NW3	173.	.6	.0	.0	.0	.0	.0	.0	.4	.0
5. NE7	188.	.4	.0	.1	.0	.0	.0	.0	.0	.0
6. SE7	188.	.3	.0	.1	.0	.0	.0	.0	.0	.1
7. SW7	79.	.4	.0	.0	.0	.0	.0	.0	.2	.0
8. NW7	171.	.4	.0	.0	.0	.0	.0	.0	.3	.0

IV. MODEL RESULTS (WORST CASE WIND ANGLE) (CONT.)

RECEPTOR	CONC/LINK (PPM) I	J	K	L	M	N	O	P	Q	R	S	T
1. NE3	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
2. SE3	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
3. SW3	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.1	.0
4. NW3	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
5. NE7	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
6. SE7	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
7. SW7	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.1	.0
8. NW7	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 1

JOB: HIGHLAND AVENUE AND STATE STREET PM NP
RUN: (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

I. SITE VARIABLES

U= .5 M/S Z0= 100. CM ALT= 0. (FT)
BRG= WORST CASE VD= .0 CM/S
CLAS= 7 (G) VS= .0 CM/S
MIXH= 1000. M AMB= .0 PPM
SIGTH= 5. DEGREES TEMP= 15.6 DEGREE (C)

II. LINK VARIABLES

LINK DESCRIPTION	LINK COORDINATES (FT) X1	Y1	X2	Y2	TYPE	VPH	EF (G/MI)	H (FT)	W (FT)
A. NF	30	-1500	30	-500	AG	843	.9	.0	50.0
B. NA	30	-500	30	0	AG	824	1.5	.0	60.0
C. ND	30	0	30	500	AG	803	1.1	.0	33.0
D. NE	30	500	30	1500	AG	803	.9	.0	50.0
E. SF	-30	1500	-30	500	AG	782	.9	.0	50.0
F. SA	-30	500	-30	0	AG	771	1.5	.0	45.0
G. SD	-30	0	-30	-500	AG	2627	1.8	.0	33.0
H. SE	-30	-500	-30	-1500	AG	2627	.9	.0	50.0
I. WF	1500	23	500	23	AG	1445	.9	.0	50.0
J. WA	500	23	0	23	AG	219	1.3	.0	45.0
K. WD	0	23	-500	23	AG	96	1.0	.0	33.0
L. WE	-500	23	-1500	23	AG	96	.9	.0	50.0
M. EF	-1500	-23	-500	-23	AG	868	.9	.0	50.0
N. EA	-500	-23	0	-23	AG	793	1.3	.0	45.0
O. ED	0	-23	500	-23	AG	412	1.0	.0	33.0
P. EE	500	-23	1500	-23	AG	412	.9	.0	50.0
Q. NL	0	0	23	-500	AG	19	1.5	.0	33.0
R. SL	0	0	-23	500	AG	11	1.5	.0	33.0
S. WL	0	0	500	15	AG	1226	1.8	.0	33.0
T. EL	0	0	-500	-15	AG	75	1.3	.0	33.0

III. RECEPTOR LOCATIONS

RECEPTOR	COORDINATES (FT) X	Y	Z
1. NE3	55	48	6.0
2. SE3	55	-48	6.0
3. SW3	-55	-48	6.0
4. NW3	-55	48	6.0
5. NE7	68	61	6.0
6. SE7	68	-61	6.0
7. SW7	-68	-61	6.0
8. NW7	-68	61	6.0

IV. MODEL RESULTS (WORST CASE WIND ANGLE)

RECEPTOR	BRG (DEG)	PRED CONC (PPM)	CONC/LINK (PPM) A	B	C	D	E	F	G	H
1. NE3	188.	.5	.0	.2	.0	.0	.0	.0	.0	.0
2. SE3	354.	.4	.0	.0	.1	.0	.0	.0	.0	.0
3. SW3	80.	.6	.0	.0	.0	.0	.0	.0	.3	.0
4. NW3	174.	.7	.0	.0	.0	.0	.0	.0	.5	.0
5. NE7	189.	.4	.0	.1	.0	.0	.0	.0	.0	.0
6. SE7	276.	.3	.0	.0	.0	.0	.0	.0	.1	.0
7. SW7	79.	.5	.0	.0	.0	.0	.0	.0	.2	.0
8. NW7	171.	.5	.0	.0	.0	.0	.0	.0	.4	.0

IV. MODEL RESULTS (WORST CASE WIND ANGLE) (CONT.)

RECEPTOR	CONC/LINK (PPM) I	J	K	L	M	N	O	P	Q	R	S	T
1. NE3	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
2. SE3	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
3. SW3	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.2	.0
4. NW3	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
5. NE7	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
6. SE7	.0	.0	.0	.0	.0	.1	.0	.0	.0	.0	.0	.0
7. SW7	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.1	.0
8. NW7	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 1

JOB: HIGHLAND AVENUE AND STATE STREET PM WP
RUN: (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

I. SITE VARIABLES

U= .5 M/S Z0= 100. CM ALT= 0. (FT)
BRG= WORST CASE VD= .0 CM/S
CLAS= 7 (G) VS= .0 CM/S
MIXH= 1000. M AMB= .0 PPM
SIGTH= 5. DEGREES TEMP= 15.6 DEGREE (C)

II. LINK VARIABLES

LINK DESCRIPTION	LINK COORDINATES (FT) X1	Y1	X2	Y2	TYPE	VPH	EF (G/MI)	H (FT)	W (FT)
A. NF	30	-1500	30	-500	AG	886	.9	.0	50.0
B. NA	30	-500	30	0	AG	867	1.5	.0	60.0
C. ND	30	0	30	500	AG	833	1.1	.0	33.0
D. NE	30	500	30	1500	AG	833	.9	.0	50.0
E. SF	-30	1500	-30	500	AG	821	.9	.0	50.0
F. SA	-30	500	-30	0	AG	810	1.5	.0	45.0
G. SD	-30	0	-30	-500	AG	2822	1.8	.0	33.0
H. SE	-30	-500	-30	-1500	AG	2822	.9	.0	50.0
I. WF	1500	23	500	23	AG	1608	.9	.0	50.0
J. WA	500	23	0	23	AG	224	1.3	.0	45.0
K. WD	0	23	-500	23	AG	103	1.0	.0	33.0
L. WE	-500	23	-1500	23	AG	103	.9	.0	50.0
M. EF	-1500	-23	-500	-23	AG	889	.9	.0	50.0
N. EA	-500	-23	0	-23	AG	804	1.3	.0	45.0
O. ED	0	-23	500	-23	AG	446	1.0	.0	33.0
P. EE	500	-23	1500	-23	AG	446	.9	.0	50.0
Q. NL	0	0	23	-500	AG	19	1.5	.0	33.0
R. SL	0	0	-23	500	AG	11	1.5	.0	33.0
S. WL	0	0	500	15	AG	1384	1.8	.0	33.0
T. EL	0	0	-500	-15	AG	85	1.3	.0	33.0

III. RECEPTOR LOCATIONS

RECEPTOR	COORDINATES (FT) X	Y	Z
1. NE3	55	48	6.0
2. SE3	55	-48	6.0
3. SW3	-55	-48	6.0
4. NW3	-55	48	6.0
5. NE7	68	61	6.0
6. SE7	68	-61	6.0
7. SW7	-68	-61	6.0
8. NW7	-68	61	6.0

IV. MODEL RESULTS (WORST CASE WIND ANGLE)

RECEPTOR	BRG (DEG)	PRED CONC (PPM)	CONC/LINK (PPM) A	B	C	D	E	F	G	H
1. NE3	191.	.5	.0	.1	.0	.0	.0	.0	.2	.0
2. SE3	354.	.4	.0	.0	.1	.0	.0	.0	.0	.0
3. SW3	80.	.7	.0	.0	.0	.0	.0	.0	.3	.0
4. NW3	173.	.7	.0	.0	.0	.0	.0	.0	.5	.0
5. NE7	191.	.4	.0	.1	.0	.0	.0	.0	.1	.0
6. SE7	276.	.3	.0	.0	.0	.0	.0	.0	.1	.0
7. SW7	79.	.5	.0	.0	.0	.0	.0	.0	.2	.0
8. NW7	171.	.5	.0	.0	.0	.0	.0	.0	.4	.0

IV. MODEL RESULTS (WORST CASE WIND ANGLE) (CONT.)

RECEPTOR	CONC/LINK (PPM) I	J	K	L	M	N	O	P	Q	R	S	T
1. NE3	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.1	.0
2. SE3	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.1	.0
3. SW3	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.2	.0
4. NW3	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
5. NE7	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
6. SE7	.0	.0	.0	.0	.0	.1	.0	.0	.0	.0	.0	.0
7. SW7	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.2	.0
8. NW7	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 1

JOB: SR-210 FREEWAY EB ON/OFF RAMPS AND RIVERSIDE AVENUE AM NP
RUN: (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

I. SITE VARIABLES

U= .5 M/S Z0= 100. CM ALT= 0. (FT)
BRG= WORST CASE VD= .0 CM/S
CLAS= 7 (G) VS= .0 CM/S
MIXH= 1000. M AMB= .0 PPM
SIGTH= 5. DEGREES TEMP= 15.6 DEGREE (C)

II. LINK VARIABLES

LINK DESCRIPTION	LINK COORDINATES (FT) X1	Y1	X2	Y2	TYPE	VPH	EF (G/MI)	H (FT)	W (FT)
A. NF	23	-1500	23	-500	AG	1607	.9	.0	50.0
B. NA	23	-500	23	0	AG	1607	1.4	.0	33.0
C. ND	23	0	23	500	AG	549	1.0	.0	33.0
D. NE	23	500	23	1500	AG	549	.9	.0	50.0
E. SF	-23	1500	-23	500	AG	1423	.9	.0	50.0
F. SA	-23	500	-23	0	AG	519	1.2	.0	45.0
G. SD	-23	0	-23	-500	AG	803	1.0	.0	33.0
H. SE	-23	-500	-23	-1500	AG	803	.9	.0	50.0
I. WF	1500	8	500	8	AG	0	.9	.0	35.0
J. WA	500	8	0	8	AG	0	1.8	.0	33.0
K. WD	0	8	-500	8	AG	0	1.8	.0	33.0
L. WE	-500	8	-1500	8	AG	0	.9	.0	35.0
M. EF	-1500	-8	-500	-8	AG	374	.9	.0	35.0
N. EA	-500	-8	0	-8	AG	284	1.8	.0	33.0
O. ED	0	-8	500	-8	AG	2052	1.8	.0	33.0
P. EE	500	-8	1500	-8	AG	2052	.9	.0	35.0
Q. NL	0	-1900	0	-1800	AG	0	1.2	.0	33.0
R. SL	0	0	-15	500	AG	904	1.5	.0	33.0
S. WL	0	-1900	0	-1800	AG	0	1.8	.0	33.0
T. EL	0	0	-500	-8	AG	90	1.8	.0	33.0

III. RECEPTOR LOCATIONS

RECEPTOR	COORDINATES (FT) X	Y	Z
1. NE3	48	25	6.0
2. SE3	48	-25	6.0
3. SW3	-48	-25	6.0
4. NW3	-48	25	6.0
5. NE7	61	38	6.0
6. SE7	61	-38	6.0
7. SW7	-61	-38	6.0
8. NW7	-61	38	6.0

IV. MODEL RESULTS (WORST CASE WIND ANGLE)

RECEPTOR	BRG (DEG)	PRED CONC (PPM)	CONC/LINK (PPM) A	B	C	D	E	F	G	H
1. NE3	186.	.6	.0	.3	.0	.0	.0	.0	.0	.0
2. SE3	85.	.7	.0	.0	.0	.0	.0	.0	.0	.0
3. SW3	86.	.7	.0	.0	.0	.0	.0	.0	.0	.0
4. NW3	97.	.5	.0	.0	.0	.0	.0	.0	.0	.0
5. NE7	187.	.4	.0	.2	.0	.0	.0	.0	.0	.0
6. SE7	309.	.4	.0	.0	.0	.0	.0	.0	.0	.0
7. SW7	84.	.5	.0	.0	.0	.0	.0	.0	.0	.0
8. NW7	99.	.4	.0	.0	.0	.0	.0	.0	.0	.0

IV. MODEL RESULTS (WORST CASE WIND ANGLE) (CONT.)

RECEPTOR	CONC/LINK (PPM) I	J	K	L	M	N	O	P	Q	R	S	T
1. NE3	.0	.0	.0	.0	.0	.0	.2	.0	.0	.0	.0	.0
2. SE3	.0	.0	.0	.0	.0	.0	.7	.0	.0	.0	.0	.0
3. SW3	.0	.0	.0	.0	.0	.0	.5	.0	.0	.0	.0	.0
4. NW3	.0	.0	.0	.0	.0	.0	.3	.0	.0	.0	.0	.0
5. NE7	.0	.0	.0	.0	.0	.0	.2	.0	.0	.0	.0	.0
6. SE7	.0	.0	.0	.0	.0	.0	.2	.0	.0	.0	.0	.0
7. SW7	.0	.0	.0	.0	.0	.0	.3	.0	.0	.0	.0	.0
8. NW7	.0	.0	.0	.0	.0	.0	.3	.0	.0	.0	.0	.0

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 1

JOB: SR-210 FREEWAY EB ON/OFF RAMPS AND RIVERSIDE AVENUE AM WP
RUN: (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

I. SITE VARIABLES

U= .5 M/S Z0= 100. CM ALT= 0. (FT)
BRG= WORST CASE VD= .0 CM/S
CLAS= 7 (G) VS= .0 CM/S
MIXH= 1000. M AMB= .0 PPM
SIGTH= 5. DEGREES TEMP= 15.6 DEGREE (C)

II. LINK VARIABLES

LINK DESCRIPTION	LINK COORDINATES (FT) X1	Y1	X2	Y2	TYPE	VPH	EF (G/MI)	H (FT)	W (FT)
A. NF	23	-1500	23	-500	AG	1694	.9	.0	50.0
B. NA	23	-500	23	0	AG	1694	1.4	.0	33.0
C. ND	23	0	23	500	AG	636	1.0	.0	33.0
D. NE	23	500	23	1500	AG	636	.9	.0	50.0
E. SF	-23	1500	-23	500	AG	1958	.9	.0	50.0
F. SA	-23	500	-23	0	AG	560	1.2	.0	45.0
G. SD	-23	0	-23	-500	AG	856	1.0	.0	33.0
H. SE	-23	-500	-23	-1500	AG	856	.9	.0	50.0
I. WF	1500	8	500	8	AG	0	.9	.0	35.0
J. WA	500	8	0	8	AG	0	1.8	.0	33.0
K. WD	0	8	-500	8	AG	0	1.8	.0	33.0
L. WE	-500	8	-1500	8	AG	0	.9	.0	35.0
M. EF	-1500	-8	-500	-8	AG	386	.9	.0	35.0
N. EA	-500	-8	0	-8	AG	296	1.8	.0	33.0
O. ED	0	-8	500	-8	AG	2546	1.8	.0	33.0
P. EE	500	-8	1500	-8	AG	2546	.9	.0	35.0
Q. NL	0	-1900	0	-1800	AG	0	1.2	.0	33.0
R. SL	0	0	-15	500	AG	1398	1.6	.0	33.0
S. WL	0	-1900	0	-1800	AG	0	1.8	.0	33.0
T. EL	0	0	-500	-8	AG	90	1.8	.0	33.0

III. RECEPTOR LOCATIONS

RECEPTOR	COORDINATES (FT) X	Y	Z
1. NE3	48	25	6.0
2. SE3	48	-25	6.0
3. SW3	-48	-25	6.0
4. NW3	-48	25	6.0
5. NE7	61	38	6.0
6. SE7	61	-38	6.0
7. SW7	-61	-38	6.0
8. NW7	-61	38	6.0

IV. MODEL RESULTS (WORST CASE WIND ANGLE)

RECEPTOR	BRG (DEG)	PRED CONC (PPM)	CONC/LINK (PPM) A	B	C	D	E	F	G	H
1. NE3	186.	.6	.0	.3	.0	.0	.0	.0	.0	.0
2. SE3	85.	.9	.0	.0	.0	.0	.0	.0	.0	.0
3. SW3	86.	.8	.0	.0	.0	.0	.0	.0	.0	.0
4. NW3	98.	.6	.0	.0	.0	.0	.0	.0	.0	.0
5. NE7	187.	.5	.0	.2	.0	.0	.0	.0	.0	.0
6. SE7	310.	.5	.0	.0	.0	.0	.0	.0	.0	.0
7. SW7	84.	.5	.0	.0	.0	.0	.0	.0	.0	.0
8. NW7	99.	.4	.0	.0	.0	.0	.0	.0	.0	.0

IV. MODEL RESULTS (WORST CASE WIND ANGLE) (CONT.)

RECEPTOR	CONC/LINK (PPM) I	J	K	L	M	N	O	P	Q	R	S	T
1. NE3	.0	.0	.0	.0	.0	.0	.2	.0	.0	.0	.0	.0
2. SE3	.0	.0	.0	.0	.0	.0	.8	.0	.0	.0	.0	.0
3. SW3	.0	.0	.0	.0	.0	.0	.6	.0	.0	.0	.0	.0
4. NW3	.0	.0	.0	.0	.0	.0	.4	.0	.0	.0	.0	.0
5. NE7	.0	.0	.0	.0	.0	.0	.2	.0	.0	.0	.0	.0
6. SE7	.0	.0	.0	.0	.0	.0	.3	.0	.0	.0	.0	.0
7. SW7	.0	.0	.0	.0	.0	.0	.4	.0	.0	.0	.0	.0
8. NW7	.0	.0	.0	.0	.0	.0	.3	.0	.0	.0	.0	.0

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 1

JOB: SR-210 FREEWAY EB ON/OFF RAMPS AND RIVERSIDE AVENUE PM NP
RUN: (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

I. SITE VARIABLES

U= .5 M/S Z0= 100. CM ALT= 0. (FT)
BRG= WORST CASE VD= .0 CM/S
CLAS= 7 (G) VS= .0 CM/S
MIXH= 1000. M AMB= .0 PPM
SIGTH= 5. DEGREES TEMP= 15.6 DEGREE (C)

II. LINK VARIABLES

LINK DESCRIPTION	LINK COORDINATES (FT) X1	Y1	X2	Y2	TYPE	VPH	EF (G/MI)	H (FT)	W (FT)
A. NF	23	-1500	23	-500	AG	1342	.9	.0	50.0
B. NA	23	-500	23	0	AG	1342	1.4	.0	33.0
C. ND	23	0	23	500	AG	524	1.0	.0	33.0
D. NE	23	500	23	1500	AG	524	.9	.0	50.0
E. SF	-23	1500	-23	500	AG	1618	.9	.0	50.0
F. SA	-23	500	-23	0	AG	843	1.2	.0	45.0
G. SD	-23	0	-23	-500	AG	1384	1.0	.0	33.0
H. SE	-23	-500	-23	-1500	AG	1384	.9	.0	50.0
I. WF	1500	8	500	8	AG	0	.9	.0	35.0
J. WA	500	8	0	8	AG	0	1.8	.0	33.0
K. WD	0	8	-500	8	AG	0	1.3	.0	33.0
L. WE	-500	8	-1500	8	AG	0	.9	.0	35.0
M. EF	-1500	-8	-500	-8	AG	644	.9	.0	35.0
N. EA	-500	-8	0	-8	AG	541	1.8	.0	33.0
O. ED	0	-8	500	-8	AG	1696	1.8	.0	33.0
P. EE	500	-8	1500	-8	AG	1696	.9	.0	35.0
Q. NL	0	-1900	0	-1800	AG	0	1.2	.0	33.0
R. SL	0	0	-15	500	AG	775	1.4	.0	33.0
S. WL	0	-1900	0	-1800	AG	0	1.8	.0	33.0
T. EL	0	0	-500	-8	AG	103	1.8	.0	33.0

III. RECEPTOR LOCATIONS

RECEPTOR	COORDINATES (FT) X	Y	Z
1. NE3	48	25	6.0
2. SE3	48	-25	6.0
3. SW3	-48	-25	6.0
4. NW3	-48	25	6.0
5. NE7	61	38	6.0
6. SE7	61	-38	6.0
7. SW7	-61	-38	6.0
8. NW7	-61	38	6.0

IV. MODEL RESULTS (WORST CASE WIND ANGLE)

RECEPTOR	BRG (DEG)	PRED CONC (PPM)	CONC/LINK (PPM) A	B	C	D	E	F	G	H
1. NE3	186.	.5	.0	.2	.0	.0	.0	.0	.0	.0
2. SE3	85.	.6	.0	.0	.0	.0	.0	.0	.0	.0
3. SW3	86.	.7	.0	.0	.0	.0	.0	.0	.0	.0
4. NW3	97.	.4	.0	.0	.0	.0	.0	.0	.0	.0
5. NE7	187.	.4	.0	.2	.0	.0	.0	.0	.0	.0
6. SE7	350.	.4	.0	.0	.0	.0	.0	.0	.0	.0
7. SW7	84.	.5	.0	.0	.0	.0	.0	.0	.0	.0
8. NW7	99.	.3	.0	.0	.0	.0	.0	.0	.0	.0

IV. MODEL RESULTS (WORST CASE WIND ANGLE) (CONT.)

RECEPTOR	CONC/LINK (PPM) I	J	K	L	M	N	O	P	Q	R	S	T
1. NE3	.0	.0	.0	.0	.0	.0	.2	.0	.0	.0	.0	.0
2. SE3	.0	.0	.0	.0	.0	.0	.6	.0	.0	.0	.0	.0
3. SW3	.0	.0	.0	.0	.0	.0	.5	.0	.0	.0	.0	.0
4. NW3	.0	.0	.0	.0	.0	.0	.3	.0	.0	.0	.0	.0
5. NE7	.0	.0	.0	.0	.0	.0	.1	.0	.0	.0	.0	.0
6. SE7	.0	.0	.0	.0	.0	.0	.2	.0	.0	.0	.0	.0
7. SW7	.0	.0	.0	.0	.0	.0	.3	.0	.0	.0	.0	.0
8. NW7	.0	.0	.0	.0	.0	.0	.2	.0	.0	.0	.0	.0

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 1

JOB: SR-210 FREEWAY EB ON/OFF RAMPS AND RIVERSIDE AVENUE PM WP
RUN: (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

I. SITE VARIABLES

U= .5 M/S Z0= 100. CM ALT= 0. (FT)
BRG= WORST CASE VD= .0 CM/S
CLAS= 7 (G) VS= .0 CM/S
MIXH= 1000. M AMB= .0 PPM
SIGTH= 5. DEGREES TEMP= 15.6 DEGREE (C)

II. LINK VARIABLES

LINK DESCRIPTION	LINK COORDINATES (FT) X1	Y1	X2	Y2	TYPE	VPH	EF (G/MI)	H (FT)	W (FT)
A. NF	23	-1500	23	-500	AG	1487	.9	.0	50.0
B. NA	23	-500	23	0	AG	1487	1.4	.0	33.0
C. ND	23	0	23	500	AG	668	1.0	.0	33.0
D. NE	23	500	23	1500	AG	668	.9	.0	50.0
E. SF	-23	1500	-23	500	AG	2195	.9	.0	50.0
F. SA	-23	500	-23	0	AG	984	1.2	.0	45.0
G. SD	-23	0	-23	-500	AG	1525	1.0	.0	33.0
H. SE	-23	-500	-23	-1500	AG	1525	.9	.0	50.0
I. WF	1500	8	500	8	AG	0	.9	.0	35.0
J. WA	500	8	0	8	AG	0	1.8	.0	33.0
K. WD	0	8	-500	8	AG	0	1.5	.0	33.0
L. WE	-500	8	-1500	8	AG	0	.9	.0	35.0
M. EF	-1500	-8	-500	-8	AG	644	.9	.0	35.0
N. EA	-500	-8	0	-8	AG	541	1.8	.0	33.0
O. ED	0	-8	500	-8	AG	2133	1.8	.0	33.0
P. EE	500	-8	1500	-8	AG	2133	.9	.0	35.0
Q. NL	0	-1900	0	-1800	AG	0	1.2	.0	33.0
R. SL	0	0	-15	500	AG	1211	1.6	.0	33.0
S. WL	0	-1900	0	-1800	AG	0	1.8	.0	33.0
T. EL	0	0	-500	-8	AG	103	1.8	.0	33.0

III. RECEPTOR LOCATIONS

RECEPTOR	COORDINATES (FT) X	Y	Z
1. NE3	48	25	6.0
2. SE3	48	-25	6.0
3. SW3	-48	-25	6.0
4. NW3	-48	25	6.0
5. NE7	61	38	6.0
6. SE7	61	-38	6.0
7. SW7	-61	-38	6.0
8. NW7	-61	38	6.0

IV. MODEL RESULTS (WORST CASE WIND ANGLE)

RECEPTOR	BRG (DEG)	PRED CONC (PPM)	CONC/LINK (PPM) A	B	C	D	E	F	G	H
1. NE3	186.	.6	.0	.3	.0	.0	.0	.0	.0	.0
2. SE3	85.	.8	.0	.0	.0	.0	.0	.0	.0	.0
3. SW3	86.	.8	.0	.0	.0	.0	.0	.0	.0	.0
4. NW3	98.	.5	.0	.0	.0	.0	.0	.0	.0	.0
5. NE7	187.	.4	.0	.2	.0	.0	.0	.0	.0	.0
6. SE7	349.	.5	.0	.0	.0	.0	.0	.0	.0	.0
7. SW7	84.	.5	.0	.0	.0	.0	.0	.0	.0	.0
8. NW7	99.	.4	.0	.0	.0	.0	.0	.0	.0	.0

IV. MODEL RESULTS (WORST CASE WIND ANGLE) (CONT.)

RECEPTOR	CONC/LINK (PPM) I	J	K	L	M	N	O	P	Q	R	S	T
1. NE3	.0	.0	.0	.0	.0	.0	.2	.0	.0	.0	.0	.0
2. SE3	.0	.0	.0	.0	.0	.0	.7	.0	.0	.0	.0	.0
3. SW3	.0	.0	.0	.0	.0	.0	.5	.0	.0	.0	.0	.0
4. NW3	.0	.0	.0	.0	.0	.0	.4	.0	.0	.0	.0	.0
5. NE7	.0	.0	.0	.0	.0	.0	.2	.0	.0	.0	.0	.0
6. SE7	.0	.0	.0	.0	.0	.0	.2	.0	.0	.1	.0	.0
7. SW7	.0	.0	.0	.0	.0	.0	.4	.0	.0	.0	.0	.0
8. NW7	.0	.0	.0	.0	.0	.0	.3	.0	.0	.0	.0	.0

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 1

JOB: SR-210 FREEWAY WB ON/OFF RAMPS AND RIVERSIDE AVENUE AM NP
RUN: (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

I. SITE VARIABLES

U= .5 M/S Z0= 100. CM ALT= 0. (FT)
BRG= WORST CASE VD= .0 CM/S
CLAS= 7 (G) VS= .0 CM/S
MIXH= 1000. M AMB= .0 PPM
SIGTH= 5. DEGREES TEMP= 15.6 DEGREE (C)

II. LINK VARIABLES

LINK DESCRIPTION	LINK COORDINATES (FT) X1	Y1	X2	Y2	TYPE	VPH	EF (G/MI)	H (FT)	W (FT)
A. NF	23	-1500	23	-500	AG	592	.9	.0	50.0
B. NA	23	-500	23	0	AG	544	1.2	.0	45.0
C. ND	23	0	23	500	AG	570	1.0	.0	33.0
D. NE	23	500	23	1500	AG	570	.9	.0	50.0
E. SF	-23	1500	-23	500	AG	1032	.9	.0	50.0
F. SA	-23	500	-23	0	AG	1032	1.3	.0	33.0
G. SD	-23	0	-23	-500	AG	1062	1.0	.0	33.0
H. SE	-23	-500	-23	-1500	AG	1062	.9	.0	50.0
I. WF	1500	8	500	8	AG	0	.9	.0	35.0
J. WA	500	8	0	8	AG	0	1.8	.0	33.0
K. WD	0	8	-500	8	AG	50	1.8	.0	33.0
L. WE	-500	8	-1500	8	AG	50	.9	.0	35.0
M. EF	-1500	-8	-500	-8	AG	58	.9	.0	35.0
N. EA	-500	-8	0	-8	AG	32	1.8	.0	33.0
O. ED	0	-8	500	-8	AG	0	1.8	.0	33.0
P. EE	500	-8	1500	-8	AG	0	.9	.0	35.0
Q. NL	0	0	15	-500	AG	48	1.2	.0	33.0
R. SL	0	-1900	0	-1800	AG	0	1.2	.0	33.0
S. WL	0	0	500	8	AG	0	1.8	.0	33.0
T. EL	0	-1900	0	-1800	AG	26	1.8	.0	33.0

III. RECEPTOR LOCATIONS

RECEPTOR	COORDINATES (FT) X	Y	Z
1. NE3	48	25	6.0
2. SE3	48	-25	6.0
3. SW3	-48	-25	6.0
4. NW3	-48	25	6.0
5. NE7	61	38	6.0
6. SE7	61	-38	6.0
7. SW7	-61	-38	6.0
8. NW7	-61	38	6.0

IV. MODEL RESULTS (WORST CASE WIND ANGLE)

RECEPTOR	BRG (DEG)	PRED CONC (PPM)	CONC/LINK (PPM) A	B	C	D	E	F	G	H
1. NE3	185.	.2	.0	.1	.0	.0	.0	.0	.0	.0
2. SE3	186.	.2	.0	.1	.0	.0	.0	.0	.0	.0
3. SW3	5.	.3	.0	.0	.0	.0	.0	.2	.0	.0
4. NW3	175.	.2	.0	.0	.0	.0	.0	.0	.1	.0
5. NE7	186.	.2	.0	.0	.0	.0	.0	.0	.0	.0
6. SE7	187.	.2	.0	.0	.0	.0	.0	.0	.0	.0
7. SW7	6.	.2	.0	.0	.0	.0	.0	.1	.0	.0
8. NW7	174.	.2	.0	.0	.0	.0	.0	.0	.0	.0

IV. MODEL RESULTS (WORST CASE WIND ANGLE) (CONT.)

RECEPTOR	CONC/LINK (PPM) I	J	K	L	M	N	O	P	Q	R	S	T
1. NE3	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
2. SE3	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
3. SW3	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
4. NW3	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
5. NE7	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
6. SE7	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
7. SW7	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
8. NW7	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 1

JOB: SSR-210 FREEWAY WB ON/OFF RAMPS AND RIVERSIDE AVENUE AM WP
RUN: (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

I. SITE VARIABLES

U= .5 M/S Z0= 100. CM ALT= 0. (FT)
BRG= WORST CASE VD= .0 CM/S
CLAS= 7 (G) VS= .0 CM/S
MIXH= 1000. M AMB= .0 PPM
SIGTH= 5. DEGREES TEMP= 15.6 DEGREE (C)

II. LINK VARIABLES

LINK DESCRIPTION	LINK COORDINATES (FT) X1	Y1	X2	Y2	TYPE	VPH	EF (G/MI)	H (FT)	W (FT)
A. NF	23	-1500	23	-500	AG	891	.9	.0	50.0
B. NA	23	-500	23	0	AG	843	1.2	.0	45.0
C. ND	23	0	23	500	AG	869	1.0	.0	33.0
D. NE	23	500	23	1500	AG	869	.9	.0	50.0
E. SF	-23	1500	-23	500	AG	1567	.9	.0	50.0
F. SA	-23	500	-23	0	AG	1567	1.4	.0	33.0
G. SD	-23	0	-23	-500	AG	1597	1.0	.0	33.0
H. SE	-23	-500	-23	-1500	AG	1597	.9	.0	50.0
I. WF	1500	8	500	8	AG	0	.9	.0	35.0
J. WA	500	8	0	8	AG	0	1.8	.0	33.0
K. WD	0	8	-500	8	AG	50	1.8	.0	33.0
L. WE	-500	8	-1500	8	AG	50	.9	.0	35.0
M. EF	-1500	-8	-500	-8	AG	58	.9	.0	35.0
N. EA	-500	-8	0	-8	AG	32	1.8	.0	33.0
O. ED	0	-8	500	-8	AG	0	1.8	.0	33.0
P. EE	500	-8	1500	-8	AG	0	.9	.0	35.0
Q. NL	0	0	15	-500	AG	48	1.2	.0	33.0
R. SL	0	-1900	0	-1800	AG	0	1.2	.0	33.0
S. WL	0	0	500	8	AG	0	1.8	.0	33.0
T. EL	0	-1900	0	-1800	AG	26	1.8	.0	33.0

III. RECEPTOR LOCATIONS

RECEPTOR	COORDINATES (FT) X	Y	Z
1. NE3	48	25	6.0
2. SE3	48	-25	6.0
3. SW3	-48	-25	6.0
4. NW3	-48	25	6.0
5. NE7	61	38	6.0
6. SE7	61	-38	6.0
7. SW7	-61	-38	6.0
8. NW7	-61	38	6.0

IV. MODEL RESULTS (WORST CASE WIND ANGLE)

RECEPTOR	BRG (DEG)	PRED CONC (PPM)	CONC/LINK (PPM) A	B	C	D	E	F	G	H
1. NE3	185.	.3	.0	.2	.0	.0	.0	.0	.0	.0
2. SE3	186.	.3	.0	.2	.0	.0	.0	.0	.0	.0
3. SW3	6.	.4	.0	.0	.0	.0	.0	.3	.0	.0
4. NW3	6.	.4	.0	.0	.0	.0	.0	.3	.0	.0
5. NE7	186.	.2	.0	.1	.0	.0	.0	.0	.0	.0
6. SE7	352.	.2	.0	.0	.0	.0	.0	.0	.0	.0
7. SW7	6.	.3	.0	.0	.0	.0	.0	.2	.0	.0
8. NW7	7.	.3	.0	.0	.0	.0	.0	.2	.0	.0

IV. MODEL RESULTS (WORST CASE WIND ANGLE) (CONT.)

RECEPTOR	CONC/LINK (PPM) I	J	K	L	M	N	O	P	Q	R	S	T
1. NE3	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
2. SE3	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
3. SW3	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
4. NW3	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
5. NE7	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
6. SE7	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
7. SW7	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
8. NW7	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 1

JOB: SSR-210 FREEWAY WB ON/OFF RAMPS AND RIVERSIDE AVENUE PM NP
RUN: (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

I. SITE VARIABLES

U=	.5 M/S	Z0=	100. CM	ALT=	0. (FT)
BRG=	WORST CASE	VD=	.0 CM/S		
CLAS=	7 (G)	VS=	.0 CM/S		
MIXH=	1000. M	AMB=	.0 PPM		
SIGTH=	5. DEGREES	TEMP=	15.6 DEGREE (C)		

II. LINK VARIABLES

LINK DESCRIPTION	LINK COORDINATES (FT) X1	Y1	X2	Y2	TYPE	VPH	EF (G/MI)	H (FT)	W (FT)
A. NF	23	-1500	23	-500	AG	1249	.9	.0	50.0
B. NA	23	-500	23	0	AG	1162	1.2	.0	45.0
C. ND	23	0	23	500	AG	1243	1.0	.0	33.0
D. NE	23	500	23	1500	AG	1243	.9	.0	50.0
E. SF	-23	1500	-23	500	AG	1020	.9	.0	50.0
F. SA	-23	500	-23	0	AG	1020	1.3	.0	33.0
G. SD	-23	0	-23	-500	AG	1128	1.0	.0	33.0
H. SE	-23	-500	-23	-1500	AG	1128	.9	.0	50.0
I. WF	1500	8	500	8	AG	0	.9	.0	35.0
J. WA	500	8	0	8	AG	0	1.8	.0	33.0
K. WD	0	8	-500	8	AG	97	1.8	.0	33.0
L. WE	-500	8	-1500	8	AG	97	.9	.0	35.0
M. EF	-1500	-8	-500	-8	AG	199	.9	.0	35.0
N. EA	-500	-8	0	-8	AG	118	1.8	.0	33.0
O. ED	0	-8	500	-8	AG	0	1.8	.0	33.0
P. EE	500	-8	1500	-8	AG	0	.9	.0	35.0
Q. NL	0	0	15	-500	AG	87	1.2	.0	33.0
R. SL	0	-1900	0	-1800	AG	0	1.2	.0	33.0
S. WL	0	0	500	8	AG	0	1.8	.0	33.0
T. EL	0	-1900	0	-1800	AG	81	1.8	.0	33.0

III. RECEPTOR LOCATIONS

RECEPTOR	COORDINATES (FT) X	Y	Z
1. NE3	48	25	6.0
2. SE3	48	-25	6.0
3. SW3	-48	-25	6.0
4. NW3	-48	25	6.0
5. NE7	61	38	6.0
6. SE7	61	-38	6.0
7. SW7	-61	-38	6.0
8. NW7	-61	38	6.0

IV. MODEL RESULTS (WORST CASE WIND ANGLE)

RECEPTOR	BRG (DEG)	PRED CONC (PPM)	CONC/LINK (PPM) A	B	C	D	E	F	G	H
1. NE3	185.	.3	.0	.2	.0	.0	.0	.0	.0	.0
2. SE3	185.	.4	.0	.2	.0	.0	.0	.0	.0	.0
3. SW3	6.	.3	.0	.0	.0	.0	.0	.2	.0	.0
4. NW3	174.	.3	.0	.0	.0	.0	.0	.0	.2	.0
5. NE7	186.	.2	.0	.1	.0	.0	.0	.0	.0	.0
6. SE7	187.	.2	.0	.1	.0	.0	.0	.0	.0	.0
7. SW7	6.	.2	.0	.0	.0	.0	.0	.1	.0	.0
8. NW7	173.	.2	.0	.0	.0	.0	.0	.0	.1	.0

IV. MODEL RESULTS (WORST CASE WIND ANGLE) (CONT.)

RECEPTOR	CONC/LINK (PPM) I	J	K	L	M	N	O	P	Q	R	S	T
1. NE3	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
2. SE3	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
3. SW3	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
4. NW3	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
5. NE7	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
6. SE7	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
7. SW7	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
8. NW7	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 1

JOB: SSR-210 FREEWAY WB ON/OFF RAMPS AND RIVERSIDE AVENUE PM WP
RUN: (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

I. SITE VARIABLES

U= .5 M/S Z0= 100. CM ALT= 0. (FT)
BRG= WORST CASE VD= .0 CM/S
CLAS= 7 (G) VS= .0 CM/S
MIXH= 1000. M AMB= .0 PPM
SIGTH= 5. DEGREES TEMP= 15.6 DEGREE (C)

II. LINK VARIABLES

LINK DESCRIPTION	LINK COORDINATES (FT) X1	Y1	X2	Y2	TYPE	VPH	EF (G/MI)	H (FT)	W (FT)
A. NF	23	-1500	23	-500	AG	1934	.9	.0	50.0
B. NA	23	-500	23	0	AG	1847	1.3	.0	45.0
C. ND	23	0	23	500	AG	1928	1.1	.0	33.0
D. NE	23	500	23	1500	AG	1928	.9	.0	50.0
E. SF	-23	1500	-23	500	AG	1598	.9	.0	50.0
F. SA	-23	500	-23	0	AG	1598	1.4	.0	33.0
G. SD	-23	0	-23	-500	AG	1706	1.1	.0	33.0
H. SE	-23	-500	-23	-1500	AG	1706	.9	.0	50.0
I. WF	1500	8	500	8	AG	0	.9	.0	35.0
J. WA	500	8	0	8	AG	0	1.8	.0	33.0
K. WD	0	8	-500	8	AG	97	1.8	.0	33.0
L. WE	-500	8	-1500	8	AG	97	.9	.0	35.0
M. EF	-1500	-8	-500	-8	AG	199	.9	.0	35.0
N. EA	-500	-8	0	-8	AG	118	1.8	.0	33.0
O. ED	0	-8	500	-8	AG	0	1.8	.0	33.0
P. EE	500	-8	1500	-8	AG	0	.9	.0	35.0
Q. NL	0	0	15	-500	AG	87	1.2	.0	33.0
R. SL	0	-1900	0	-1800	AG	0	1.2	.0	33.0
S. WL	0	0	500	8	AG	0	1.8	.0	33.0
T. EL	0	-1900	0	-1800	AG	81	1.8	.0	33.0

III. RECEPTOR LOCATIONS

RECEPTOR	COORDINATES (FT) X	Y	Z
1. NE3	48	25	6.0
2. SE3	48	-25	6.0
3. SW3	-48	-25	6.0
4. NW3	-48	25	6.0
5. NE7	61	38	6.0
6. SE7	61	-38	6.0
7. SW7	-61	-38	6.0
8. NW7	-61	38	6.0

IV. MODEL RESULTS (WORST CASE WIND ANGLE)

RECEPTOR	BRG (DEG)	PRED CONC (PPM)	CONC/LINK (PPM) A	B	C	D	E	F	G	H
1. NE3	185.	.5	.0	.4	.0	.0	.0	.0	.0	.0
2. SE3	186.	.5	.0	.4	.0	.0	.0	.0	.0	.0
3. SW3	6.	.5	.0	.0	.0	.0	.0	.3	.0	.0
4. NW3	174.	.4	.0	.0	.0	.0	.0	.0	.2	.0
5. NE7	187.	.4	.0	.2	.0	.0	.0	.0	.0	.0
6. SE7	187.	.4	.0	.2	.0	.0	.0	.0	.0	.0
7. SW7	7.	.3	.0	.0	.0	.0	.0	.2	.0	.0
8. NW7	172.	.3	.0	.0	.0	.0	.0	.0	.2	.0

IV. MODEL RESULTS (WORST CASE WIND ANGLE) (CONT.)

RECEPTOR	CONC/LINK (PPM) I	J	K	L	M	N	O	P	Q	R	S	T
1. NE3	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
2. SE3	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
3. SW3	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
4. NW3	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
5. NE7	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
6. SE7	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
7. SW7	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
8. NW7	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 1

JOB: BASELINE ROAD AND ALDER AVENUE AM NP
RUN: (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

I. SITE VARIABLES

U= .5 M/S Z0= 100. CM ALT= 0. (FT)
BRG= WORST CASE VD= .0 CM/S
CLAS= 7 (G) VS= .0 CM/S
MIXH= 1000. M AMB= .0 PPM
SIGTH= 5. DEGREES TEMP= 15.6 DEGREE (C)

II. LINK VARIABLES

LINK DESCRIPTION	LINK COORDINATES (FT) X1	Y1	X2	Y2	TYPE	VPH	EF (G/MI)	H (FT)	W (FT)
A. NF	15	-1500	15	-500	AG	619	.9	.0	35.0
B. NA	15	-500	15	0	AG	463	1.3	.0	33.0
C. ND	15	0	15	500	AG	543	1.0	.0	33.0
D. NE	15	500	15	1500	AG	543	.9	.0	35.0
E. SF	-15	1500	-15	500	AG	576	.9	.0	35.0
F. SA	-15	500	-15	0	AG	443	1.3	.0	33.0
G. SD	-15	0	-15	-500	AG	483	1.0	.0	33.0
H. SE	-15	-500	-15	-1500	AG	483	.9	.0	35.0
I. WF	1500	15	500	15	AG	165	.9	.0	35.0
J. WA	500	15	0	15	AG	161	1.5	.0	33.0
K. WD	0	15	-500	15	AG	382	1.1	.0	33.0
L. WE	-500	15	-1500	15	AG	382	.9	.0	35.0
M. EF	-1500	-15	-500	-15	AG	645	.9	.0	35.0
N. EA	-500	-15	0	-15	AG	589	1.5	.0	33.0
O. ED	0	-15	500	-15	AG	597	1.3	.0	33.0
P. EE	500	-15	1500	-15	AG	597	.9	.0	35.0
Q. NL	0	0	15	-500	AG	156	1.3	.0	33.0
R. SL	0	0	-15	500	AG	133	1.3	.0	33.0
S. WL	0	0	500	15	AG	4	1.5	.0	33.0
T. EL	0	0	-500	-15	AG	56	1.5	.0	33.0

III. RECEPTOR LOCATIONS

RECEPTOR	COORDINATES (FT) X	Y	Z
1. NE3	33	33	6.0
2. SE3	33	-33	6.0
3. SW3	-33	-33	6.0
4. NW3	-33	33	6.0
5. NE7	46	46	6.0
6. SE7	46	-46	6.0
7. SW7	-46	-46	6.0
8. NW7	-46	46	6.0

IV. MODEL RESULTS (WORST CASE WIND ANGLE)

RECEPTOR	BRG (DEG)	PRED CONC (PPM)	CONC/LINK (PPM) A	B	C	D	E	F	G	H
1. NE3	265.	.3	.0	.0	.0	.0	.0	.0	.0	.0
2. SE3	274.	.4	.0	.0	.0	.0	.0	.0	.0	.0
3. SW3	4.	.3	.0	.0	.0	.0	.0	.1	.0	.0
4. NW3	175.	.3	.0	.0	.0	.0	.0	.0	.0	.0
5. NE7	263.	.2	.0	.0	.0	.0	.0	.0	.0	.0
6. SE7	276.	.2	.0	.0	.0	.0	.0	.0	.0	.0
7. SW7	6.	.2	.0	.0	.0	.0	.0	.0	.0	.0
8. NW7	173.	.2	.0	.0	.0	.0	.0	.0	.0	.0

IV. MODEL RESULTS (WORST CASE WIND ANGLE) (CONT.)

RECEPTOR	CONC/LINK (PPM) I	J	K	L	M	N	O	P	Q	R	S	T
1. NE3	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
2. SE3	.0	.0	.0	.0	.0	.2	.0	.0	.0	.0	.0	.0
3. SW3	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
4. NW3	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
5. NE7	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
6. SE7	.0	.0	.0	.0	.0	.1	.0	.0	.0	.0	.0	.0
7. SW7	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
8. NW7	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 1

JOB: BASELINE ROAD AND ALDER AVENUE AM WP
RUN: (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

I. SITE VARIABLES

U= .5 M/S Z0= 100. CM ALT= 0. (FT)
BRG= WORST CASE VD= .0 CM/S
CLAS= 7 (G) VS= .0 CM/S
MIXH= 1000. M AMB= .0 PPM
SIGTH= 5. DEGREES TEMP= 15.6 DEGREE (C)

II. LINK VARIABLES

LINK DESCRIPTION	LINK COORDINATES (FT) X1	Y1	X2	Y2	TYPE	VPH	EF (G/MI)	H (FT)	W (FT)
A. NF	15	-1500	15	-500	AG	665	.9	.0	35.0
B. NA	15	-500	15	0	AG	509	1.3	.0	33.0
C. ND	15	0	15	500	AG	604	1.0	.0	33.0
D. NE	15	500	15	1500	AG	604	.9	.0	35.0
E. SF	-15	1500	-15	500	AG	634	.9	.0	35.0
F. SA	-15	500	-15	0	AG	492	1.3	.0	33.0
G. SD	-15	0	-15	-500	AG	528	1.0	.0	33.0
H. SE	-15	-500	-15	-1500	AG	528	.9	.0	35.0
I. WF	1500	15	500	15	AG	176	.9	.0	35.0
J. WA	500	15	0	15	AG	170	1.5	.0	33.0
K. WD	0	15	-500	15	AG	391	1.1	.0	33.0
L. WE	-500	15	-1500	15	AG	391	.9	.0	35.0
M. EF	-1500	-15	-500	-15	AG	658	.9	.0	35.0
N. EA	-500	-15	0	-15	AG	591	1.6	.0	33.0
O. ED	0	-15	500	-15	AG	610	1.3	.0	33.0
P. EE	500	-15	1500	-15	AG	610	.9	.0	35.0
Q. NL	0	0	15	-500	AG	156	1.3	.0	33.0
R. SL	0	0	-15	500	AG	142	1.3	.0	33.0
S. WL	0	0	500	15	AG	6	1.5	.0	33.0
T. EL	0	0	-500	-15	AG	67	1.5	.0	33.0

III. RECEPTOR LOCATIONS

RECEPTOR	COORDINATES (FT) X	Y	Z
1. NE3	33	33	6.0
2. SE3	33	-33	6.0
3. SW3	-33	-33	6.0
4. NW3	-33	33	6.0
5. NE7	46	46	6.0
6. SE7	46	-46	6.0
7. SW7	-46	-46	6.0
8. NW7	-46	46	6.0

IV. MODEL RESULTS (WORST CASE WIND ANGLE)

RECEPTOR	BRG (DEG)	PRED CONC (PPM)	CONC/LINK (PPM) A	B	C	D	E	F	G	H
1. NE3	265.	.3	.0	.0	.0	.0	.0	.0	.0	.0
2. SE3	274.	.4	.0	.0	.0	.0	.0	.0	.0	.0
3. SW3	4.	.3	.0	.0	.0	.0	.0	.1	.0	.0
4. NW3	175.	.3	.0	.0	.0	.0	.0	.0	.1	.0
5. NE7	263.	.2	.0	.0	.0	.0	.0	.0	.0	.0
6. SE7	276.	.2	.0	.0	.0	.0	.0	.0	.0	.0
7. SW7	6.	.2	.0	.0	.0	.0	.0	.0	.0	.0
8. NW7	173.	.2	.0	.0	.0	.0	.0	.0	.0	.0

IV. MODEL RESULTS (WORST CASE WIND ANGLE) (CONT.)

RECEPTOR	CONC/LINK (PPM) I	J	K	L	M	N	O	P	Q	R	S	T
1. NE3	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
2. SE3	.0	.0	.0	.0	.0	.2	.0	.0	.0	.0	.0	.0
3. SW3	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
4. NW3	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
5. NE7	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
6. SE7	.0	.0	.0	.0	.0	.1	.0	.0	.0	.0	.0	.0
7. SW7	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
8. NW7	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 1

JOB: BASELINE ROAD AND ALDER AVENUE PM NP
RUN: (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

I. SITE VARIABLES

U= .5 M/S Z0= 100. CM ALT= 0. (FT)
BRG= WORST CASE VD= .0 CM/S
CLAS= 7 (G) VS= .0 CM/S
MIXH= 1000. M AMB= .0 PPM
SIGTH= 5. DEGREES TEMP= 15.6 DEGREE (C)

II. LINK VARIABLES

LINK DESCRIPTION	LINK COORDINATES (FT) X1	Y1	X2	Y2	TYPE	VPH	EF (G/MI)	H (FT)	W (FT)
A. NF	15	-1500	15	-500	AG	698	.9	.0	35.0
B. NA	15	-500	15	0	AG	525	1.4	.0	33.0
C. ND	15	0	15	500	AG	693	1.1	.0	33.0
D. NE	15	500	15	1500	AG	693	.9	.0	35.0
E. SF	-15	1500	-15	500	AG	1045	.9	.0	35.0
F. SA	-15	500	-15	0	AG	860	1.4	.0	33.0
G. SD	-15	0	-15	-500	AG	990	1.5	.0	33.0
H. SE	-15	-500	-15	-1500	AG	990	.9	.0	35.0
I. WF	1500	15	500	15	AG	698	.9	.0	35.0
J. WA	500	15	0	15	AG	648	1.5	.0	33.0
K. WD	0	15	-500	15	AG	834	1.5	.0	33.0
L. WE	-500	15	-1500	15	AG	834	.9	.0	35.0
M. EF	-1500	-15	-500	-15	AG	723	.9	.0	35.0
N. EA	-500	-15	0	-15	AG	600	1.5	.0	33.0
O. ED	0	-15	500	-15	AG	647	1.1	.0	33.0
P. EE	500	-15	1500	-15	AG	647	.9	.0	35.0
Q. NL	0	0	15	-500	AG	173	1.4	.0	33.0
R. SL	0	0	-15	500	AG	185	1.4	.0	33.0
S. WL	0	0	500	15	AG	50	1.5	.0	33.0
T. EL	0	0	-500	-15	AG	123	1.5	.0	33.0

III. RECEPTOR LOCATIONS

RECEPTOR	COORDINATES (FT) X	Y	Z
1. NE3	33	33	6.0
2. SE3	33	-33	6.0
3. SW3	-33	-33	6.0
4. NW3	-33	33	6.0
5. NE7	46	46	6.0
6. SE7	46	-46	6.0
7. SW7	-46	-46	6.0
8. NW7	-46	46	6.0

IV. MODEL RESULTS (WORST CASE WIND ANGLE)

RECEPTOR	BRG (DEG)	PRED CONC (PPM)	CONC/LINK (PPM) A	B	C	D	E	F	G	H
1. NE3	265.	.5	.0	.0	.0	.0	.0	.0	.0	.0
2. SE3	275.	.5	.0	.0	.0	.0	.0	.0	.0	.0
3. SW3	5.	.5	.0	.0	.0	.0	.0	.2	.0	.0
4. NW3	175.	.6	.0	.0	.0	.0	.0	.0	.3	.0
5. NE7	263.	.3	.0	.0	.0	.0	.0	.0	.0	.0
6. SE7	277.	.3	.0	.0	.0	.0	.0	.0	.0	.0
7. SW7	6.	.4	.0	.0	.0	.0	.0	.1	.0	.0
8. NW7	173.	.4	.0	.0	.0	.0	.0	.0	.2	.0

IV. MODEL RESULTS (WORST CASE WIND ANGLE) (CONT.)

RECEPTOR	CONC/LINK (PPM) I	J	K	L	M	N	O	P	Q	R	S	T
1. NE3	.0	.0	.2	.0	.0	.0	.0	.0	.0	.0	.0	.0
2. SE3	.0	.0	.0	.0	.0	.2	.0	.0	.0	.0	.0	.0
3. SW3	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
4. NW3	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
5. NE7	.0	.0	.1	.0	.0	.0	.0	.0	.0	.0	.0	.0
6. SE7	.0	.0	.0	.0	.0	.1	.0	.0	.0	.0	.0	.0
7. SW7	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
8. NW7	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 1

JOB: BASELINE ROAD AND ALDER AVENUE PM WP
RUN: (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

I. SITE VARIABLES

U= .5 M/S Z0= 100. CM ALT= 0. (FT)
BRG= WORST CASE VD= .0 CM/S
CLAS= 7 (G) VS= .0 CM/S
MIXH= 1000. M AMB= .0 PPM
SIGTH= 5. DEGREES TEMP= 15.6 DEGREE (C)

II. LINK VARIABLES

LINK DESCRIPTION	LINK COORDINATES (FT) X1	Y1	X2	Y2	TYPE	VPH	EF (G/MI)	H (FT)	W (FT)
A. NF	15	-1500	15	-500	AG	790	.9	.0	35.0
B. NA	15	-500	15	0	AG	617	1.4	.0	33.0
C. ND	15	0	15	500	AG	816	1.1	.0	33.0
D. NE	15	500	15	1500	AG	816	.9	.0	35.0
E. SF	-15	1500	-15	500	AG	1140	.9	.0	35.0
F. SA	-15	500	-15	0	AG	941	1.4	.0	33.0
G. SD	-15	0	-15	-500	AG	1061	1.4	.0	33.0
H. SE	-15	-500	-15	-1500	AG	1061	.9	.0	35.0
I. WF	1500	15	500	15	AG	724	.9	.0	35.0
J. WA	500	15	0	15	AG	671	1.5	.0	33.0
K. WD	0	15	-500	15	AG	852	1.7	.0	33.0
L. WE	-500	15	-1500	15	AG	852	.9	.0	35.0
M. EF	-1500	-15	-500	-15	AG	742	.9	.0	35.0
N. EA	-500	-15	0	-15	AG	606	1.5	.0	33.0
O. ED	0	-15	500	-15	AG	667	1.4	.0	33.0
P. EE	500	-15	1500	-15	AG	667	.9	.0	35.0
Q. NL	0	0	15	-500	AG	173	1.3	.0	33.0
R. SL	0	0	-15	500	AG	199	1.3	.0	33.0
S. WL	0	0	500	15	AG	53	1.5	.0	33.0
T. EL	0	0	-500	-15	AG	136	1.5	.0	33.0

III. RECEPTOR LOCATIONS

RECEPTOR	COORDINATES (FT) X	Y	Z
1. NE3	33	33	6.0
2. SE3	33	-33	6.0
3. SW3	-33	-33	6.0
4. NW3	-33	33	6.0
5. NE7	46	46	6.0
6. SE7	46	-46	6.0
7. SW7	-46	-46	6.0
8. NW7	-46	46	6.0

IV. MODEL RESULTS (WORST CASE WIND ANGLE)

RECEPTOR	BRG (DEG)	PRED CONC (PPM)	CONC/LINK (PPM) A	B	C	D	E	F	G	H
1. NE3	265.	.6	.0	.0	.0	.0	.0	.0	.0	.0
2. SE3	275.	.5	.0	.0	.0	.0	.0	.0	.0	.0
3. SW3	5.	.6	.0	.0	.0	.0	.0	.2	.0	.0
4. NW3	175.	.6	.0	.0	.0	.0	.0	.0	.3	.0
5. NE7	263.	.4	.0	.0	.0	.0	.0	.0	.0	.0
6. SE7	277.	.4	.0	.0	.0	.0	.0	.0	.0	.0
7. SW7	6.	.4	.0	.0	.0	.0	.0	.2	.0	.0
8. NW7	173.	.4	.0	.0	.0	.0	.0	.0	.2	.0

IV. MODEL RESULTS (WORST CASE WIND ANGLE) (CONT.)

RECEPTOR	CONC/LINK (PPM) I	J	K	L	M	N	O	P	Q	R	S	T
1. NE3	.0	.0	.3	.0	.0	.0	.0	.0	.0	.0	.0	.0
2. SE3	.0	.0	.0	.0	.0	.2	.0	.0	.0	.0	.0	.0
3. SW3	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
4. NW3	.0	.0	.1	.0	.0	.0	.0	.0	.0	.0	.0	.0
5. NE7	.0	.0	.2	.0	.0	.0	.0	.0	.0	.0	.0	.0
6. SE7	.0	.0	.0	.0	.0	.1	.0	.0	.0	.0	.0	.0
7. SW7	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
8. NW7	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 1

JOB: EASTON STREET AND AYALA DRIVE AM NP
RUN: (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

I. SITE VARIABLES

U=	.5 M/S	Z0= 100. CM	ALT= 0. (FT)
BRG=	WORST CASE	VD= .0 CM/S	
CLAS=	7 (G)	VS= .0 CM/S	
MIXH=	1000. M	AMB= .0 PPM	
SIGTH=	5. DEGREES	TEMP= 15.6 DEGREE (C)	

II. LINK VARIABLES

LINK DESCRIPTION	LINK COORDINATES (FT) X1	Y1	X2	Y2	TYPE	VPH	EF (G/MI)	H (FT)	W (FT)
A. NF	23	-1500	23	-500	AG	1236	.9	.0	50.0
B. NA	23	-500	23	0	AG	934	1.3	.0	45.0
C. ND	23	0	23	500	AG	1170	1.0	.0	33.0
D. NE	23	500	23	1500	AG	1170	.9	.0	50.0
E. SF	-23	1500	-23	500	AG	1050	.9	.0	50.0
F. SA	-23	500	-23	0	AG	1033	1.3	.0	45.0
G. SD	-23	0	-23	-500	AG	1514	1.1	.0	33.0
H. SE	-23	-500	-23	-1500	AG	1514	.9	.0	50.0
I. WF	1500	23	500	23	AG	251	.9	.0	50.0
J. WA	500	23	0	23	AG	167	1.6	.0	45.0
K. WD	0	23	-500	23	AG	573	1.1	.0	33.0
L. WE	-500	23	-1500	23	AG	573	.9	.0	50.0
M. EF	-1500	-23	-500	-23	AG	872	.9	.0	50.0
N. EA	-500	-23	0	-23	AG	637	1.6	.0	45.0
O. ED	0	-23	500	-23	AG	152	1.1	.0	33.0
P. EE	500	-23	1500	-23	AG	152	.9	.0	50.0
Q. NL	0	0	15	-500	AG	302	1.3	.0	33.0
R. SL	0	0	-15	500	AG	17	1.2	.0	33.0
S. WL	0	0	500	15	AG	84	1.6	.0	33.0
T. EL	0	0	-500	-15	AG	235	1.6	.0	33.0

III. RECEPTOR LOCATIONS

RECEPTOR	COORDINATES (FT) X	Y	Z
1. NE3	48	48	6.0
2. SE3	48	-48	6.0
3. SW3	-48	-48	6.0
4. NW3	-48	48	6.0
5. NE7	61	61	6.0
6. SE7	61	-61	6.0
7. SW7	-61	-61	6.0
8. NW7	-61	61	6.0

IV. MODEL RESULTS (WORST CASE WIND ANGLE)

RECEPTOR	BRG (DEG)	PRED CONC (PPM)	CONC/LINK (PPM) A	B	C	D	E	F	G	H
1. NE3	262.	.3	.0	.0	.0	.0	.0	.0	.0	.0
2. SE3	275.	.4	.0	.0	.0	.0	.0	.0	.0	.0
3. SW3	5.	.4	.0	.0	.0	.0	.0	.2	.0	.0
4. NW3	173.	.5	.0	.0	.0	.0	.0	.0	.2	.0
5. NE7	187.	.3	.0	.1	.0	.0	.0	.0	.0	.0
6. SE7	277.	.3	.0	.0	.0	.0	.0	.0	.0	.0
7. SW7	6.	.3	.0	.0	.0	.0	.0	.1	.0	.0
8. NW7	173.	.3	.0	.0	.0	.0	.0	.0	.1	.0

IV. MODEL RESULTS (WORST CASE WIND ANGLE) (CONT.)

RECEPTOR	CONC/LINK (PPM) I	J	K	L	M	N	O	P	Q	R	S	T
1. NE3	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
2. SE3	.0	.0	.0	.0	.0	.2	.0	.0	.0	.0	.0	.0
3. SW3	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
4. NW3	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
5. NE7	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
6. SE7	.0	.0	.0	.0	.0	.1	.0	.0	.0	.0	.0	.0
7. SW7	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
8. NW7	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 1

JOB: EASTON STREET AND AYALA DRIVE AM WP
RUN: (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

I. SITE VARIABLES

U= .5 M/S Z0= 100. CM ALT= 0. (FT)
BRG= WORST CASE VD= .0 CM/S
CLAS= 7 (G) VS= .0 CM/S
MIXH= 1000. M AMB= .0 PPM
SIGTH= 5. DEGREES TEMP= 15.6 DEGREE (C)

II. LINK VARIABLES

LINK DESCRIPTION	LINK COORDINATES (FT) X1	Y1	X2	Y2	TYPE	VPH	EF (G/MI)	H (FT)	W (FT)
A. NF	23	-1500	23	-500	AG	1307	.9	.0	50.0
B. NA	23	-500	23	0	AG	992	1.3	.0	45.0
C. ND	23	0	23	500	AG	1198	1.0	.0	33.0
D. NE	23	500	23	1500	AG	1198	.9	.0	50.0
E. SF	-23	1500	-23	500	AG	1082	.9	.0	50.0
F. SA	-23	500	-23	0	AG	1065	1.3	.0	45.0
G. SD	-23	0	-23	-500	AG	1598	1.1	.0	33.0
H. SE	-23	-500	-23	-1500	AG	1598	.9	.0	50.0
I. WF	1500	23	500	23	AG	275	.9	.0	50.0
J. WA	500	23	0	23	AG	167	1.6	.0	45.0
K. WD	0	23	-500	23	AG	586	1.1	.0	33.0
L. WE	-500	23	-1500	23	AG	586	.9	.0	50.0
M. EF	-1500	-23	-500	-23	AG	900	.9	.0	50.0
N. EA	-500	-23	0	-23	AG	665	1.6	.0	45.0
O. ED	0	-23	500	-23	AG	182	1.1	.0	33.0
P. EE	500	-23	1500	-23	AG	182	.9	.0	50.0
Q. NL	0	0	15	-500	AG	315	1.3	.0	33.0
R. SL	0	0	-15	500	AG	17	1.2	.0	33.0
S. WL	0	0	500	15	AG	108	1.6	.0	33.0
T. EL	0	0	-500	-15	AG	235	1.6	.0	33.0

III. RECEPTOR LOCATIONS

RECEPTOR	COORDINATES (FT) X	Y	Z
1. NE3	48	48	6.0
2. SE3	48	-48	6.0
3. SW3	-48	-48	6.0
4. NW3	-48	48	6.0
5. NE7	61	61	6.0
6. SE7	61	-61	6.0
7. SW7	-61	-61	6.0
8. NW7	-61	61	6.0

IV. MODEL RESULTS (WORST CASE WIND ANGLE)

RECEPTOR	BRG (DEG)	PRED CONC (PPM)	CONC/LINK (PPM) A	B	C	D	E	F	G	H
1. NE3	262.	.3	.0	.0	.0	.0	.0	.0	.0	.0
2. SE3	275.	.4	.0	.0	.0	.0	.0	.0	.0	.0
3. SW3	5.	.4	.0	.0	.0	.0	.0	.2	.0	.0
4. NW3	173.	.5	.0	.0	.0	.0	.0	.0	.2	.0
5. NE7	187.	.3	.0	.1	.0	.0	.0	.0	.0	.0
6. SE7	277.	.3	.0	.0	.0	.0	.0	.0	.0	.0
7. SW7	6.	.3	.0	.0	.0	.0	.0	.1	.0	.0
8. NW7	173.	.3	.0	.0	.0	.0	.0	.0	.1	.0

IV. MODEL RESULTS (WORST CASE WIND ANGLE) (CONT.)

RECEPTOR	CONC/LINK (PPM) I	J	K	L	M	N	O	P	Q	R	S	T
1. NE3	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
2. SE3	.0	.0	.0	.0	.0	.2	.0	.0	.0	.0	.0	.0
3. SW3	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
4. NW3	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
5. NE7	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
6. SE7	.0	.0	.0	.0	.0	.1	.0	.0	.0	.0	.0	.0
7. SW7	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
8. NW7	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 1

JOB: EASTON STREET AND AYALA DRIVE PM NP
RUN: (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

I. SITE VARIABLES

U=	.5 M/S	Z0= 100. CM	ALT= 0. (FT)
BRG=	WORST CASE	VD= .0 CM/S	
CLAS=	7 (G)	VS= .0 CM/S	
MIXH=	1000. M	AMB= .0 PPM	
SIGTH=	5. DEGREES	TEMP= 15.6 DEGREE (C)	

II. LINK VARIABLES

LINK DESCRIPTION	LINK COORDINATES (FT) X1	Y1	X2	Y2	TYPE	VPH	EF (G/MI)	H (FT)	W (FT)
A. NF	23	-1500	23	-500	AG	1367	.9	.0	50.0
B. NA	23	-500	23	0	AG	1044	1.3	.0	45.0
C. ND	23	0	23	500	AG	1467	1.1	.0	33.0
D. NE	23	500	23	1500	AG	1467	.9	.0	50.0
E. SF	-23	1500	-23	500	AG	1395	.9	.0	50.0
F. SA	-23	500	-23	0	AG	1353	1.4	.0	45.0
G. SD	-23	0	-23	-500	AG	2190	1.4	.0	33.0
H. SE	-23	-500	-23	-1500	AG	2190	.9	.0	50.0
I. WF	1500	23	500	23	AG	346	.9	.0	50.0
J. WA	500	23	0	23	AG	236	1.5	.0	45.0
K. WD	0	23	-500	23	AG	703	1.1	.0	33.0
L. WE	-500	23	-1500	23	AG	703	.9	.0	50.0
M. EF	-1500	-23	-500	-23	AG	1678	.9	.0	50.0
N. EA	-500	-23	0	-23	AG	1239	1.6	.0	45.0
O. ED	0	-23	500	-23	AG	426	1.1	.0	33.0
P. EE	500	-23	1500	-23	AG	426	.9	.0	50.0
Q. NL	0	0	15	-500	AG	323	1.3	.0	33.0
R. SL	0	0	-15	500	AG	42	1.3	.0	33.0
S. WL	0	0	500	15	AG	110	1.5	.0	33.0
T. EL	0	0	-500	-15	AG	439	1.6	.0	33.0

III. RECEPTOR LOCATIONS

RECEPTOR	COORDINATES (FT) X	Y	Z
1. NE3	48	48	6.0
2. SE3	48	-48	6.0
3. SW3	-48	-48	6.0
4. NW3	-48	48	6.0
5. NE7	61	61	6.0
6. SE7	61	-61	6.0
7. SW7	-61	-61	6.0
8. NW7	-61	61	6.0

IV. MODEL RESULTS (WORST CASE WIND ANGLE)

RECEPTOR	BRG (DEG)	PRED CONC (PPM)	CONC/LINK (PPM) A	B	C	D	E	F	G	H
1. NE3	262.	.5	.0	.0	.0	.0	.0	.0	.0	.0
2. SE3	275.	.6	.0	.0	.0	.0	.0	.0	.0	.0
3. SW3	5.	.6	.0	.0	.0	.0	.0	.3	.0	.0
4. NW3	173.	.7	.0	.0	.0	.0	.0	.0	.4	.0
5. NE7	260.	.4	.0	.0	.0	.0	.0	.0	.0	.0
6. SE7	277.	.5	.0	.0	.0	.0	.0	.0	.0	.0
7. SW7	7.	.5	.0	.0	.0	.0	.0	.2	.0	.0
8. NW7	172.	.5	.0	.0	.0	.0	.0	.0	.2	.0

IV. MODEL RESULTS (WORST CASE WIND ANGLE) (CONT.)

RECEPTOR	CONC/LINK (PPM) I	J	K	L	M	N	O	P	Q	R	S	T
1. NE3	.0	.0	.1	.0	.0	.0	.0	.0	.0	.0	.0	.0
2. SE3	.0	.0	.0	.0	.0	.3	.0	.0	.0	.0	.0	.0
3. SW3	.0	.0	.0	.0	.0	.1	.0	.0	.0	.0	.0	.0
4. NW3	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
5. NE7	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
6. SE7	.0	.0	.0	.0	.0	.2	.0	.0	.0	.0	.0	.0
7. SW7	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
8. NW7	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 1

JOB: EASTON STREET AND AYALA DRIVE PM WP
RUN: (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

I. SITE VARIABLES

U=	.5 M/S	Z0= 100. CM	ALT= 0. (FT)
BRG=	WORST CASE	VD= .0 CM/S	
CLAS=	7 (G)	VS= .0 CM/S	
MIXH=	1000. M	AMB= .0 PPM	
SIGTH=	5. DEGREES	TEMP= 15.6 DEGREE (C)	

II. LINK VARIABLES

LINK DESCRIPTION	LINK COORDINATES (FT) X1	Y1	X2	Y2	TYPE	VPH	EF (G/MI)	H (FT)	W (FT)
A. NF	23	-1500	23	-500	AG	1422	.9	.0	50.0
B. NA	23	-500	23	0	AG	1082	1.4	.0	45.0
C. ND	23	0	23	500	AG	1512	1.1	.0	33.0
D. NE	23	500	23	1500	AG	1512	.9	.0	50.0
E. SF	-23	1500	-23	500	AG	1434	.9	.0	50.0
F. SA	-23	500	-23	0	AG	1392	1.4	.0	45.0
G. SD	-23	0	-23	-500	AG	2304	1.4	.0	33.0
H. SE	-23	-500	-23	-1500	AG	2304	.9	.0	50.0
I. WF	1500	23	500	23	AG	409	.9	.0	50.0
J. WA	500	23	0	23	AG	250	1.5	.0	45.0
K. WD	0	23	-500	23	AG	727	1.1	.0	33.0
L. WE	-500	23	-1500	23	AG	727	.9	.0	50.0
M. EF	-1500	-23	-500	-23	AG	1704	.9	.0	50.0
N. EA	-500	-23	0	-23	AG	1265	1.6	.0	45.0
O. ED	0	-23	500	-23	AG	426	1.1	.0	33.0
P. EE	500	-23	1500	-23	AG	426	.9	.0	50.0
Q. NL	0	0	15	-500	AG	340	1.4	.0	33.0
R. SL	0	0	-15	500	AG	42	1.3	.0	33.0
S. WL	0	0	500	15	AG	159	1.5	.0	33.0
T. EL	0	0	-500	-15	AG	439	1.6	.0	33.0

III. RECEPTOR LOCATIONS

RECEPTOR	COORDINATES (FT) X	Y	Z
1. NE3	48	48	6.0
2. SE3	48	-48	6.0
3. SW3	-48	-48	6.0
4. NW3	-48	48	6.0
5. NE7	61	61	6.0
6. SE7	61	-61	6.0
7. SW7	-61	-61	6.0
8. NW7	-61	61	6.0

IV. MODEL RESULTS (WORST CASE WIND ANGLE)

RECEPTOR	BRG (DEG)	PRED CONC (PPM)	CONC/LINK (PPM) A	B	C	D	E	F	G	H
1. NE3	262.	.5	.0	.0	.1	.0	.0	.0	.0	.0
2. SE3	275.	.6	.0	.0	.0	.0	.0	.0	.1	.0
3. SW3	5.	.6	.0	.0	.0	.0	.0	.3	.0	.0
4. NW3	173.	.7	.0	.0	.0	.0	.0	.0	.4	.0
5. NE7	260.	.4	.0	.0	.0	.0	.0	.0	.0	.0
6. SE7	277.	.5	.0	.0	.0	.0	.0	.0	.0	.0
7. SW7	7.	.5	.0	.0	.0	.0	.0	.2	.0	.0
8. NW7	171.	.5	.0	.0	.0	.0	.0	.0	.3	.0

IV. MODEL RESULTS (WORST CASE WIND ANGLE) (CONT.)

RECEPTOR	CONC/LINK (PPM) I	J	K	L	M	N	O	P	Q	R	S	T
1. NE3	.0	.0	.1	.0	.0	.0	.0	.0	.0	.0	.0	.0
2. SE3	.0	.0	.0	.0	.0	.3	.0	.0	.0	.0	.0	.0
3. SW3	.0	.0	.0	.0	.0	.1	.0	.0	.0	.0	.0	.0
4. NW3	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
5. NE7	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
6. SE7	.0	.0	.0	.0	.0	.2	.0	.0	.0	.0	.0	.0
7. SW7	.0	.0	.0	.0	.0	.1	.0	.0	.0	.0	.0	.0
8. NW7	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 1

JOB: EASTON STREET AND RIVERSIDE AVENUE AM NP
RUN: (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

I. SITE VARIABLES

U=	.5 M/S	Z0=	100. CM	ALT=	0. (FT)
BRG=	WORST CASE	VD=	.0 CM/S		
CLAS=	7 (G)	VS=	.0 CM/S		
MIXH=	1000. M	AMB=	.0 PPM		
SIGTH=	5. DEGREES	TEMP=	15.6 DEGREE (C)		

II. LINK VARIABLES

LINK DESCRIPTION	LINK COORDINATES (FT) X1	Y1	X2	Y2	TYPE	VPH	EF (G/MI)	H (FT)	W (FT)
A. NF	23	-1500	23	-500	AG	1072	.9	.0	50.0
B. NA	23	-500	23	0	AG	997	1.3	.0	45.0
C. ND	23	0	23	500	AG	1642	1.1	.0	33.0
D. NE	23	500	23	1500	AG	1642	.9	.0	50.0
E. SF	-23	1500	-23	500	AG	837	.9	.0	50.0
F. SA	-23	500	-23	0	AG	784	1.3	.0	45.0
G. SD	-23	0	-23	-500	AG	883	1.0	.0	33.0
H. SE	-23	-500	-23	-1500	AG	883	.9	.0	50.0
I. WF	1500	30	500	30	AG	676	.9	.0	50.0
J. WA	500	30	0	30	AG	562	1.5	.0	60.0
K. WD	0	30	-500	30	AG	431	1.1	.0	33.0
L. WE	-500	30	-1500	30	AG	431	.9	.0	50.0
M. EF	-1500	-30	-500	-30	AG	693	.9	.0	50.0
N. EA	-500	-30	0	-30	AG	336	1.5	.0	45.0
O. ED	0	-30	500	-30	AG	322	1.1	.0	33.0
P. EE	500	-30	1500	-30	AG	322	.9	.0	50.0
Q. NL	0	0	15	-500	AG	75	1.3	.0	33.0
R. SL	0	0	-15	500	AG	53	1.3	.0	33.0
S. WL	0	0	500	23	AG	114	1.5	.0	33.0
T. EL	0	0	-500	-23	AG	357	1.6	.0	33.0

III. RECEPTOR LOCATIONS

RECEPTOR	COORDINATES (FT) X	Y	Z
1. NE3	48	55	6.0
2. SE3	48	-55	6.0
3. SW3	-48	-55	6.0
4. NW3	-48	55	6.0
5. NE7	61	68	6.0
6. SE7	61	-68	6.0
7. SW7	-61	-68	6.0
8. NW7	-61	68	6.0

IV. MODEL RESULTS (WORST CASE WIND ANGLE)

RECEPTOR	BRG (DEG)	PRED CONC (PPM)	CONC/LINK (PPM) A	B	C	D	E	F	G	H
1. NE3	261.	.3	.0	.0	.1	.0	.0	.0	.0	.0
2. SE3	354.	.4	.0	.0	.2	.0	.0	.0	.0	.0
3. SW3	5.	.4	.0	.0	.0	.0	.0	.2	.0	.0
4. NW3	173.	.3	.0	.0	.0	.0	.0	.0	.1	.0
5. NE7	186.	.3	.0	.1	.0	.0	.0	.0	.0	.0
6. SE7	354.	.3	.0	.0	.1	.0	.0	.0	.0	.0
7. SW7	7.	.3	.0	.0	.0	.0	.0	.1	.0	.0
8. NW7	172.	.2	.0	.0	.0	.0	.0	.0	.0	.0

IV. MODEL RESULTS (WORST CASE WIND ANGLE) (CONT.)

RECEPTOR	CONC/LINK (PPM) I	J	K	L	M	N	O	P	Q	R	S	T
1. NE3	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
2. SE3	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
3. SW3	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
4. NW3	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
5. NE7	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
6. SE7	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
7. SW7	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
8. NW7	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 1

JOB: EASTON STREET AND RIVERSIDE AVENUE AM WP
RUN: (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

I. SITE VARIABLES

U=	.5 M/S	Z0=	100. CM	ALT=	0. (FT)
BRG=	WORST CASE	VD=	.0 CM/S		
CLAS=	7 (G)	VS=	.0 CM/S		
MIXH=	1000. M	AMB=	.0 PPM		
SIGTH=	5. DEGREES	TEMP=	15.6 DEGREE (C)		

II. LINK VARIABLES

LINK DESCRIPTION	LINK COORDINATES (FT) X1	Y1	X2	Y2	TYPE	VPH	EF (G/MI)	H (FT)	W (FT)
A. NF	23	-1500	23	-500	AG	1148	.9	.0	50.0
B. NA	23	-500	23	0	AG	1073	1.4	.0	45.0
C. ND	23	0	23	500	AG	1739	1.2	.0	33.0
D. NE	23	500	23	1500	AG	1739	.9	.0	50.0
E. SF	-23	1500	-23	500	AG	890	.9	.0	50.0
F. SA	-23	500	-23	0	AG	831	1.3	.0	45.0
G. SD	-23	0	-23	-500	AG	983	1.0	.0	33.0
H. SE	-23	-500	-23	-1500	AG	983	.9	.0	50.0
I. WF	1500	30	500	30	AG	687	.9	.0	50.0
J. WA	500	30	0	30	AG	573	1.5	.0	60.0
K. WD	0	30	-500	30	AG	431	1.1	.0	33.0
L. WE	-500	30	-1500	30	AG	431	.9	.0	50.0
M. EF	-1500	-30	-500	-30	AG	760	.9	.0	50.0
N. EA	-500	-30	0	-30	AG	393	1.5	.0	45.0
O. ED	0	-30	500	-30	AG	332	1.1	.0	33.0
P. EE	500	-30	1500	-30	AG	332	.9	.0	50.0
Q. NL	0	0	15	-500	AG	75	1.3	.0	33.0
R. SL	0	0	-15	500	AG	59	1.3	.0	33.0
S. WL	0	0	500	23	AG	114	1.5	.0	33.0
T. EL	0	0	-500	-23	AG	367	1.6	.0	33.0

III. RECEPTOR LOCATIONS

RECEPTOR	COORDINATES (FT) X	Y	Z
1. NE3	48	55	6.0
2. SE3	48	-55	6.0
3. SW3	-48	-55	6.0
4. NW3	-48	55	6.0
5. NE7	61	68	6.0
6. SE7	61	-68	6.0
7. SW7	-61	-68	6.0
8. NW7	-61	68	6.0

IV. MODEL RESULTS (WORST CASE WIND ANGLE)

RECEPTOR	BRG (DEG)	PRED CONC (PPM)	CONC/LINK (PPM) A	B	C	D	E	F	G	H
1. NE3	260.	.4	.0	.0	.1	.0	.0	.0	.0	.0
2. SE3	354.	.5	.0	.0	.3	.0	.0	.0	.0	.0
3. SW3	5.	.4	.0	.0	.0	.0	.0	.2	.0	.0
4. NW3	173.	.4	.0	.0	.0	.0	.0	.0	.1	.0
5. NE7	186.	.3	.0	.1	.0	.0	.0	.0	.0	.0
6. SE7	353.	.3	.0	.0	.2	.0	.0	.0	.0	.0
7. SW7	7.	.3	.0	.0	.0	.0	.0	.1	.0	.0
8. NW7	172.	.3	.0	.0	.0	.0	.0	.0	.0	.0

IV. MODEL RESULTS (WORST CASE WIND ANGLE) (CONT.)

RECEPTOR	CONC/LINK (PPM) I	J	K	L	M	N	O	P	Q	R	S	T
1. NE3	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
2. SE3	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
3. SW3	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
4. NW3	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
5. NE7	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
6. SE7	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
7. SW7	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
8. NW7	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 1

JOB: EASTON STREET AND RIVERSIDE AVENUE PM NP
RUN: (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

I. SITE VARIABLES

U=	.5 M/S	Z0=	100. CM	ALT=	0. (FT)
BRG=	WORST CASE	VD=	.0 CM/S		
CLAS=	7 (G)	VS=	.0 CM/S		
MIXH=	1000. M	AMB=	.0 PPM		
SIGTH=	5. DEGREES	TEMP=	15.6 DEGREE (C)		

II. LINK VARIABLES

LINK DESCRIPTION	LINK COORDINATES (FT) X1	Y1	X2	Y2	TYPE	VPH	EF (G/MI)	H (FT)	W (FT)
A. NF	23	-1500	23	-500	AG	1282	.9	.0	50.0
B. NA	23	-500	23	0	AG	1135	1.4	.0	45.0
C. ND	23	0	23	500	AG	1394	1.1	.0	33.0
D. NE	23	500	23	1500	AG	1394	.9	.0	50.0
E. SF	-23	1500	-23	500	AG	1454	.9	.0	50.0
F. SA	-23	500	-23	0	AG	1121	1.4	.0	45.0
G. SD	-23	0	-23	-500	AG	1121	1.0	.0	33.0
H. SE	-23	-500	-23	-1500	AG	1121	.9	.0	50.0
I. WF	1500	30	500	30	AG	948	.9	.0	50.0
J. WA	500	30	0	30	AG	779	1.5	.0	60.0
K. WD	0	30	-500	30	AG	772	1.1	.0	33.0
L. WE	-500	30	-1500	30	AG	772	.9	.0	50.0
M. EF	-1500	-30	-500	-30	AG	901	.9	.0	50.0
N. EA	-500	-30	0	-30	AG	791	1.5	.0	45.0
O. ED	0	-30	500	-30	AG	1298	1.3	.0	33.0
P. EE	500	-30	1500	-30	AG	1298	.9	.0	50.0
Q. NL	0	0	15	-500	AG	147	1.3	.0	33.0
R. SL	0	0	-15	500	AG	333	1.3	.0	33.0
S. WL	0	0	500	23	AG	169	1.5	.0	33.0
T. EL	0	0	-500	-23	AG	110	1.5	.0	33.0

III. RECEPTOR LOCATIONS

RECEPTOR	COORDINATES (FT) X	Y	Z
1. NE3	48	55	6.0
2. SE3	48	-55	6.0
3. SW3	-48	-55	6.0
4. NW3	-48	55	6.0
5. NE7	61	68	6.0
6. SE7	61	-68	6.0
7. SW7	-61	-68	6.0
8. NW7	-61	68	6.0

IV. MODEL RESULTS (WORST CASE WIND ANGLE)

RECEPTOR	BRG (DEG)	PRED CONC (PPM)	CONC/LINK (PPM) A	B	C	D	E	F	G	H
1. NE3	185.	.5	.0	.2	.0	.0	.0	.0	.0	.0
2. SE3	352.	.6	.0	.0	.2	.0	.0	.0	.0	.0
3. SW3	82.	.5	.0	.0	.0	.0	.0	.0	.0	.0
4. NW3	172.	.4	.0	.0	.0	.0	.0	.0	.2	.0
5. NE7	186.	.4	.0	.2	.0	.0	.0	.0	.0	.0
6. SE7	351.	.4	.0	.0	.1	.0	.0	.0	.0	.0
7. SW7	7.	.4	.0	.0	.0	.0	.0	.2	.0	.0
8. NW7	97.	.4	.0	.0	.0	.0	.0	.0	.0	.0

IV. MODEL RESULTS (WORST CASE WIND ANGLE) (CONT.)

RECEPTOR	CONC/LINK (PPM) I	J	K	L	M	N	O	P	Q	R	S	T
1. NE3	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
2. SE3	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
3. SW3	.0	.0	.0	.0	.0	.0	.2	.0	.0	.0	.0	.0
4. NW3	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
5. NE7	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
6. SE7	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
7. SW7	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
8. NW7	.0	.1	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0

CALINE4: CALIFORNIA LINE SOURCE DISPERSION MODEL
JUNE 1989 VERSION
PAGE 1

JOB: EASTON STREET AND RIVERSIDE AVENUE PM WP
RUN: (WORST CASE ANGLE)
POLLUTANT: Carbon Monoxide

I. SITE VARIABLES

U= .5 M/S Z0= 100. CM ALT= 0. (FT)
BRG= WORST CASE VD= .0 CM/S
CLAS= 7 (G) VS= .0 CM/S
MIXH= 1000. M AMB= .0 PPM
SIGTH= 5. DEGREES TEMP= 15.6 DEGREE (C)

II. LINK VARIABLES

LINK DESCRIPTION	LINK COORDINATES (FT) X1	Y1	X2	Y2	TYPE	VPH	EF (G/MI)	H (FT)	W (FT)
A. NF	23	-1500	23	-500	AG	1387	.9	.0	50.0
B. NA	23	-500	23	0	AG	1240	1.3	.0	45.0
C. ND	23	0	23	500	AG	1537	1.1	.0	33.0
D. NE	23	500	23	1500	AG	1537	.9	.0	50.0
E. SF	-23	1500	-23	500	AG	1595	.9	.0	50.0
F. SA	-23	500	-23	0	AG	1220	1.3	.0	45.0
G. SD	-23	0	-23	-500	AG	1233	1.0	.0	33.0
H. SE	-23	-500	-23	-1500	AG	1233	.9	.0	50.0
I. WF	1500	30	500	30	AG	994	.9	.0	50.0
J. WA	500	30	0	30	AG	825	1.5	.0	60.0
K. WD	0	30	-500	30	AG	780	1.1	.0	33.0
L. WE	-500	30	-1500	30	AG	780	.9	.0	50.0
M. EF	-1500	-30	-500	-30	AG	920	.9	.0	50.0
N. EA	-500	-30	0	-30	AG	810	1.6	.0	45.0
O. ED	0	-30	500	-30	AG	1346	1.5	.0	33.0
P. EE	500	-30	1500	-30	AG	1346	.9	.0	50.0
Q. NL	0	0	15	-500	AG	147	1.3	.0	33.0
R. SL	0	0	-15	500	AG	375	1.3	.0	33.0
S. WL	0	0	500	23	AG	169	1.5	.0	33.0
T. EL	0	0	-500	-23	AG	110	1.5	.0	33.0

III. RECEPTOR LOCATIONS

RECEPTOR	COORDINATES (FT) X	Y	Z
1. NE3	48	55	6.0
2. SE3	48	-55	6.0
3. SW3	-48	-55	6.0
4. NW3	-48	55	6.0
5. NE7	61	68	6.0
6. SE7	61	-68	6.0
7. SW7	-61	-68	6.0
8. NW7	-61	68	6.0

IV. MODEL RESULTS (WORST CASE WIND ANGLE)

RECEPTOR	BRG (DEG)	PRED CONC (PPM)	CONC/LINK (PPM) A	B	C	D	E	F	G	H
1. NE3	185.	.5	.0	.2	.0	.0	.0	.0	.0	.0
2. SE3	352.	.6	.0	.0	.2	.0	.0	.0	.0	.0
3. SW3	83.	.6	.0	.0	.0	.0	.0	.0	.0	.0
4. NW3	172.	.5	.0	.0	.0	.0	.0	.0	.2	.0
5. NE7	186.	.4	.0	.2	.0	.0	.0	.0	.0	.0
6. SE7	351.	.4	.0	.0	.1	.0	.0	.0	.0	.0
7. SW7	81.	.4	.0	.0	.0	.0	.0	.0	.0	.0
8. NW7	97.	.4	.0	.0	.0	.0	.0	.0	.0	.0

IV. MODEL RESULTS (WORST CASE WIND ANGLE) (CONT.)

RECEPTOR	CONC/LINK (PPM) I	J	K	L	M	N	O	P	Q	R	S	T
1. NE3	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
2. SE3	.0	.0	.0	.0	.0	.0	.1	.0	.0	.0	.0	.0
3. SW3	.0	.0	.0	.0	.0	.0	.3	.0	.0	.0	.0	.0
4. NW3	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
5. NE7	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
6. SE7	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
7. SW7	.0	.0	.0	.0	.0	.0	.2	.0	.0	.0	.0	.0
8. NW7	.0	.1	.0	.0	.0	.0	.0	.0	.0	.0	.0	.0

Title : CO 2030
Version : Emfac2007 V2.3 Nov 1 2006
Run Date : 2008/04/03 10:22:28
Scen Year: 2030 -- All model years in the range 1986 to 2030 selected
Season : Annual
Area : Los Angeles
****
Year: 2030 -- Model Years 1986 to 2030 Inclusive -- Annual
Emfac2007 Emission Factors: V2.3 Nov 1 2006

County Average: Los Angeles County Average
Table 1: Running Exhaust Emissions (grams/mile)

Pollutant Name: Carbon Monoxide Temperature: 60F Relative Humidity: 50%

Speed MPH	LDA	LDT	MDT	HDT	UBUS	MCY	ALL
3	0.965	1.782	2.268	5.646	14.440	23.783	1.784
4	0.946	1.746	2.232	5.646	14.440	23.783	1.759
5	0.928	1.711	2.197	5.646	14.440	23.783	1.735
6	0.910	1.677	2.126	5.168	13.184	22.954	1.673
7	0.892	1.643	2.060	4.728	12.065	22.189	1.615
8	0.875	1.611	1.998	4.323	11.067	21.483	1.561
9	0.859	1.580	1.939	3.951	10.176	20.831	1.510
10	0.843	1.549	1.885	3.611	9.377	20.229	1.462
11	0.827	1.520	1.833	3.301	8.662	19.674	1.418
12	0.812	1.491	1.784	3.020	8.019	19.162	1.376
13	0.797	1.463	1.738	2.766	7.441	18.690	1.336
14	0.782	1.435	1.695	2.538	6.921	18.256	1.299
15	0.768	1.409	1.653	2.336	6.452	17.856	1.264
16	0.755	1.383	1.614	2.158	6.029	17.490	1.232
17	0.741	1.358	1.577	2.004	5.646	17.155	1.202
18	0.728	1.333	1.541	1.873	5.300	16.850	1.174
19	0.715	1.310	1.507	1.759	4.987	16.573	1.147
20	0.703	1.286	1.474	1.697	4.703	16.323	1.125
21	0.691	1.264	1.443	1.639	4.445	16.099	1.103
22	0.679	1.242	1.413	1.586	4.211	15.900	1.082
23	0.667	1.220	1.385	1.537	3.999	15.725	1.062
24	0.656	1.199	1.357	1.493	3.806	15.574	1.042
25	0.645	1.179	1.331	1.452	3.631	15.446	1.024
26	0.634	1.159	1.305	1.414	3.472	15.340	1.006
27	0.624	1.140	1.281	1.380	3.327	15.258	0.989
28	0.614	1.121	1.257	1.348	3.196	15.198	0.973
29	0.604	1.103	1.235	1.320	3.076	15.160	0.957
30	0.594	1.085	1.213	1.293	2.968	15.146	0.942
31	0.585	1.068	1.192	1.270	2.871	15.155	0.928
32	0.575	1.051	1.172	1.248	2.783	15.187	0.915
33	0.566	1.034	1.152	1.229	2.704	15.244	0.901
34	0.558	1.018	1.133	1.212	2.633	15.326	0.889
35	0.549	1.002	1.115	1.197	2.570	15.433	0.877
36	0.540	0.987	1.097	1.184	2.514	15.568	0.866
37	0.532	0.972	1.080	1.172	2.465	15.731	0.855
38	0.524	0.957	1.064	1.162	2.422	15.924	0.845
39	0.516	0.943	1.048	1.154	2.386	16.148	0.835
40	0.509	0.929	1.033	1.148	2.355	16.406	0.826

Appendix B-2

- Freeway Health Risk Assessment
  - Health Risk Assessment Calculations (Cancer, Chronic and Acute)
  - Emissions Rate Calculations (Diesel and TOG)
  - ISCST3 Input Values
  - Contour Plots (Industrial Source Complex)
- Surface Mining Health Risk Assessment
  - Health Risk Assessment Calculations
  - Emissions Rate Calculations (Diesel)
  - ISCST3 Input Values
  - Contour Plots (Industrial Source Complex)

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Lytle Creek Ranch
Freeway Health Risk Assesment
8. Risk Calculations (70 Yr)

Adult Risk (70 year Estimate)

Maximum Exposed Receptor

Source	Mass GLC		Weight Fraction	Contaminant	Carcinogenic Risk			
	(ug/m3)				URF (ug/m3)	CPF $(mg/kg/day)^{-1}$	Dose (mg/kg*day)	RISK
(a)	(b)		(d)	(e)	(f)	(g)		(h)
Freeway Segment	0.14162		6.84E-01	Benzene	2.9E-05	1.0E-01	2.5E-05	2.52E-06
			1.75E-01	Formaldehyde	6.0E-06	2.0E-02	6.4E-06	1.29E-07
			7.40E-02	1,3-Butadiene	1.7E-04	6.0E-01	2.7E-06	1.63E-06
			6.60E-02	Acetaldehyde	2.7E-06	0.0E+00	2.4E-06	0.00E+00
	0.76749		1.00E+00	Particulates	3.0E-04	1.1E+00	1.99E-04	2.19E-04

Total **2.24E-04**
224

Average Exposed Receptor

Source	Mass GLC		Weight Fraction	Contaminant	Carcinogenic Risk			
	(ug/m3)				URF (ug/m3)	CPF $(mg/kg/day)^{-1}$	Dose (mg/kg*day)	RISK
(a)	(b)		(d)	(e)	(f)	(g)		(h)
Freeway Segment	0.06000		6.84E-01	Benzene	2.9E-05	1.0E-01	1.1E-05	1.07E-06
			1.75E-01	Formaldehyde	6.0E-06	2.0E-02	2.7E-06	5.46E-08
			7.40E-02	1,3-Butadiene	1.7E-04	6.0E-01	1.2E-06	6.92E-07
			6.60E-02	Acetaldehyde	2.7E-06	0.0E+00	1.0E-06	0.00E+00
	0.35000		1.00E+00	Particulates	3.0E-04	1.1E+00	9.10E-05	1.00E-04

Total **1.02E-04**
102

* Key to Toxocological Endpoints

RESP	Respiratory System
CNS/PNS	Central/Peripheral Nervous System
CV/BL	Cardiovascular/Blood System
IMMUN	Immune System
KIDN	Kidney
GI/LV	Gastrointestinal System/Liver
REPRO	Reproductive System (e.g., teratogenic and developmental effects)
EYES	Eye irritation and/or other effects

Note: Exposure factors used to calculate contaminant intake

exposure frequency (days/year)	350
exposure duration (years)	70
inhalation rate (L/kg*day)	271
average body weight (kg)	70
averaging time$_{(cancer)}$ (days)	25550
averaging time$_{(noncancer)}$ (days)	25550

Lytle Creek Ranch
Freeway Health Risk Assesment
8. Risk Calculations (30 Yr)

Adult Risk (30 year Estimate)

Maximum Exposed Receptor

Source	Mass GLC		Weight Fraction	Contaminant	Carcinogenic Risk			
	(ug/m3)				URF (ug/m3)	CPF $(mg/kg/day)^{-1}$	Dose (mg/kg*day)	RISK
(a)	(b)		(d)	(e)	(f)	(g)		(h)
Freeway Segment	0.14162		6.84E-01	Benzene	2.9E-05	1.0E-01	1.1E-05	1.08E-06
			1.75E-01	Formaldehyde	6.0E-06	2.0E-02	2.8E-06	5.52E-08
			7.40E-02	1,3-Butadiene	1.7E-04	6.0E-01	1.2E-06	7.00E-07
			6.60E-02	Acetaldehyde	2.7E-06	0.0E+00	1.0E-06	0.00E+00
	0.76749		1.00E+00	Particulates	3.0E-04	1.1E+00	8.55E-05	9.40E-05

Total **9.59E-05**

96

Average Exposed Receptor

Source	Mass GLC		Weight Fraction	Contaminant	Carcinogenic Risk			
	(ug/m3)				URF (ug/m3)	CPF $(mg/kg/day)^{-1}$	Dose (mg/kg*day)	RISK
(a)	(b)		(d)	(e)	(f)	(g)		(h)
Freeway Segment	0.06000		6.84E-01	Benzene	2.9E-05	1.0E-01	4.6E-06	4.57E-07
			1.75E-01	Formaldehyde	6.0E-06	2.0E-02	1.2E-06	2.34E-08
			7.40E-02	1,3-Butadiene	1.7E-04	6.0E-01	4.9E-07	2.97E-07
			6.60E-02	Acetaldehyde	2.7E-06	0.0E+00	4.4E-07	0.00E+00
	0.35000		1.00E+00	Particulates	3.0E-04	1.1E+00	3.90E-05	4.29E-05

Total **4.37E-05**

44

* Key to Toxocological Endpoints

RESP	Respiratory System
CNS/PNS	Central/Peripheral Nervous System
CV/BL	Cardiovascular/Blood System
IMMUN	Immune System
KIDN	Kidney
GI/LV	Gastrointestinal System/Liver
REPRO	Reproductive System (e.g., teratogenic and developmental effects)
EYES	Eye irritation and/or other effects

Note: Exposure factors used to calculate contaminant intake

exposure frequency (days/year)	350
exposure duration (years)	30
inhalation rate (L/kg*day)	271
average body weight (kg)	70
averaging time$_{(cancer)}$ (days)	25550
averaging time$_{(noncancer)}$ (days)	10950

Lytle Creek Ranch
Freeway Health Risk Assesment
8. Risk Calculations (9 Yr)

Adult Risk (9 year Estimate)

Maximum Exposed Receptor

Source	Mass GLC		Weight Fraction	Contaminant	Carcinogenic Risk			
	(ug/m3)				URF (ug/m3)	CPF $(mg/kg/day)^{-1}$	Dose (mg/kg*day)	RISK
(a)	(b)		(d)	(e)	(f)	(g)		(h)
Freeway Segment	0.14162		6.84E-01	Benzene	2.9E-05	1.0E-01	3.2E-06	3.24E-07
			1.75E-01	Formaldehyde	6.0E-06	2.0E-02	8.3E-07	1.66E-08
			7.40E-02	1,3-Butadiene	1.7E-04	6.0E-01	3.5E-07	2.10E-07
			6.60E-02	Acetaldehyde	2.7E-06	0.0E+00	3.1E-07	0.00E+00
	0.76749		1.00E+00	Particulates	3.0E-04	1.1E+00	2.56E-05	2.82E-05

Total **2.88E-05**

29

Average Exposed Receptor

Source	Mass GLC		Weight Fraction	Contaminant	Carcinogenic Risk			
	(ug/m3)				URF (ug/m3)	CPF $(mg/kg/day)^{-1}$	Dose (mg/kg*day)	RISK
(a)	(b)		(d)	(e)	(f)	(g)		(h)
Freeway Segment	0.06000		6.84E-01	Benzene	2.9E-05	1.0E-01	1.4E-06	1.37E-07
			1.75E-01	Formaldehyde	6.0E-06	2.0E-02	3.5E-07	7.02E-09
			7.40E-02	1,3-Butadiene	1.7E-04	6.0E-01	1.5E-07	8.90E-08
			6.60E-02	Acetaldehyde	2.7E-06	0.0E+00	1.3E-07	0.00E+00
	0.35000		1.00E+00	Particulates	3.0E-04	1.1E+00	1.17E-05	1.29E-05

Total **1.31E-05**

13

* Key to Toxocological Endpoints

RESP	Respiratory System
CNS/PNS	Central/Peripheral Nervous System
CV/BL	Cardiovascular/Blood System
IMMUN	Immune System
KIDN	Kidney
GI/LV	Gastrointestinal System/Liver
REPRO	Reproductive System (e.g., teratogenic and developmental effects)
EYES	Eye irritation and/or other effects

Note: Exposure factors used to calculate contaminant intake

exposure frequency (days/year)	350
exposure duration (years)	9
inhalation rate (L/kg*day)	271
average body weight (kg)	70
averaging time$_{(cancer)}$ (days)	25550
averaging time$_{(noncancer)}$ (days)	3285

Lytle Creek Ranch
Freeway Health Risk Assesment
Chronic Risk Calculations

Pollutant	Annual Max Concentration (ug/m3)	Inhalation Chronic REL	Oral Chronic REL	Inhalation Chronic Risk	Oral Chronic Risk	Onsite Residential												
						Inhalation Risk												
						Cardiovascular	CNS	Immune System	Kidney	Alimentary System	Reproductive	Respiratory	Skin	Eye	Bone	Endocrine	Development	Hematopoietic
1,3-Butadiene	1.05E-02	20	-	5.24E-04	-	-	-	-	-	-	4.29E-03	-	-	-	-	-	-	-
Acetaldehyde	9.35E-03	9	-	1.04E-03	-	-	-	-	-	-	-	8.51E-03	-	-	-	-	-	-
Benzene	9.69E-02	60	-	1.61E-03	-	-	1.32E-02	-	-	-	-	-	-	-	-	-	1.32E-02	1.32E-02
Formaldehyde	2.48E-02	3	-	8.26E-03	-	-	-	-	-	-	-	6.77E-02	-	6.77E-02	-	-	-	-
DieselExhPM	7.67E-01	5	-	1.53E-01	-	-	-	-	-	-	-	1.44E-01	-	-	-	-	-	-
Hazard Index	**2.20E-01**					-	1.32E-02	-	-	-	4.29E-03	2.20E-01	-	6.77E-02	-	-	1.32E-02	1.32E-02

Lytle Creek Ranch
Freeway Health Risk Assesment
Acute Risk Calculation

Pollutant	1-hr Max Concentration (ug/m3)	Inhalation Acute REL	Acute Risk	Inhalation Acute REL												
				Acute Risk												
				Cardiovascular	CNS	Immune System	Kidney	Alimentary System	Reproductive	Respiratory	Skin	Eye	Bone	Endocrine	Development	Hematopoietic
1,3-Butadiene	1.05E-02	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Acetaldehyde	9.35E-03	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Benzene	9.69E-02	1300	7.45E-05	-	-	6.52E-04	-	-	6.52E-04	-	-	-	-	-	6.52E-04	6.52E-04
Formaldehyde	2.48E-02	94	2.64E-04	-	-	8.05E-03	-	-	-	8.05E-03	-	8.05E-03	-	-	-	-
DieselExhPM	7.67E-01	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hazard Index	**8.70E-03**			-	-	8.70E-03	-	-	6.52E-04	8.05E-03	-	8.05E-03	-	-	6.52E-04	6.52E-04

Lytle Creek Ranch
Freeway HRA
Diesel Particulate Matter EMFAC Calculations

1. Fleet Mix Percentage Determination (BURDEN Output)

						Percentage of Total		Percentage of Non-HDT		Percentage of HDT	
Weight Class	**Vehicle Class**	**CAT**	**DSL**	**NCAT**	**TOT**	**Gasoline**	**Diesel**	**Gasoline**	**Diesel**	**Gasoline**	**Diesel**
Non-HDT	LDA	34068	1	0	34069	41.6%	0.0%	49.1%	0.0%		
Non-HDT	LDT1	8281	30	0	8311	10.1%	0.0%	11.9%	0.0%		
Non-HDT	LDT2	17280	1	0	17281	21.1%	0.0%	24.9%	0.0%		
Non-HDT	MCY	521	0	257	779	0.9%	0.0%	1.1%	0.0%		
HDT	HHDT	102	8063	0	8164	0.1%	9.8%			0.8%	63.8%
HDT	LHDT1	1591	379	0	1970	1.9%	0.5%			12.6%	3.0%
HDT	LHDT2	354	263	0	617	0.4%	0.3%			2.8%	2.1%
Non-HDT	MDV	8893	3	0	8897	10.8%	0.0%	12.8%	0.0%		
HDT	MH	380	38	0	419	0.5%	0.0%			3.0%	0.3%
HDT	MHDT	217	1007	0	1225	0.3%	1.2%			1.7%	8.0%
HDT	OBUS	10	40	0	50	0.0%	0.0%			0.1%	0.3%
HDT	SBUS	10	108	0	118	0.0%	0.1%			0.1%	0.9%
HDT	UB	44	34	0	78	0.1%	0.0%			0.3%	0.3%
Grand Total		71751	9967	257	81978						

2. Obtain Actual Non-HDT (Auto) and HDT Split from PEMs Website

	Total	**Non-HDT (Autos)**	**HDT**
PEMs Measured ADT	126200	117822	8378
% of Total	100.0%	93.4%	6.6%
Average Hourly Trips	5258	4909	349

3. Obtain Average Daily Traffic From Traffic Study

	ADT			**Average Hourly**		
	Total	**Autos**	**HDT**	**Total**	**Autos**	**HDT**
Ontario Fwy (I-15) between Barstow Fwy (I-215) and Glen Helen Parkway	146,500	136,774	9,726	6,104	5,699	405
Ontario Fwy (I-15) between Glen Helen Parkway and Sierra Ave	159,500	148,911	10,589	6,646	6,205	441
Ontario Fwy (I-15) between Sierra Ave and Duncan Canyon Road	179,700	167,770	11,930	7,488	6,990	497
Ontario Fwy (I-15) between Duncan Canyon Road and Summit Ave	185,200	172,905	12,295	7,717	7,204	512

4. Calculate Population Fleet Mix

Between Glen Helen Pkwy and Sierra Ave		
Vehicle Class	**Gasoline**	**Diesel**
LDA	73,166	2
LDT1	17,785	64
LDT2	37,111	2
MDV	19,099	6
LHDT1	1,333	317
LHDT2	297	220
MHDT	182	844
HHDT	85	6,754
SBUS	8	90
UB	37	28
MH	318	32
OBUS	8	34
MCY	1,671	0
Total	151,100	8,395

Put these numbers into EMFAC2007 to Calculate Composite Emission Factor

5. Emission Rate Calculation (ISC Input Values)

Acceleration (45 mph)

Emfac (gr/mi) = (emfac at average link speed x 16/60) x (0.027) x (exp (.098 x acceleration speed product)) x (60 min/hr) / (average link speed)

emfac at link speed	**0.249**
speed (mph)	45.0
acceleration time (sec)	18.0
acceleration rate (mph/sec)	2.50
EMFAC (gr/mi)	**0.592**

Deceleration (5 mph)

*Emfac (gr/mi) = (emfac at idle speed * 1.5)*

emfac at idle speed (gr/mi)	**1.024**
EMFAC (gr/mi)	**1.536**

Freeway Cruise Speed (55 mph)

EMFAC (gr/mi)	**0.313**

1. Fleet Mix Percentage Determination (BURDEN Output)

						Percentage of Total		Percentage of Non-HDT		Percentage of HDT	
EMFAC 7G Weight Class	**Vehicle Class**	**CAT**	**DSL**	**NCAT**	**TOT**	**Gasoline**	**Diesel**	**Gasoline**	**Diesel**	**Gasoline**	**Diesel**
LDA	LDA	34068	1	0	34069	41.6%	0.0%	49.1%	0.0%		
LDA	LDT1	8281	30	0	8311	10.1%	0.0%	11.9%	0.0%		
LDA	LDT2	17280	1	0	17281	21.1%	0.0%	24.9%	0.0%		
MCY	MCY	521	0	257	779	0.9%	0.0%	1.1%	0.0%		
HDT	HHDT	102	8063	0	8164	0.1%	9.8%			0.9%	70.6%
HDT	LHDT1	1591	379	0	1970	1.9%	0.5%			13.9%	3.3%
HDT	LHDT2	354	263	0	617	0.4%	0.3%			3.1%	2.3%
MDT	MDV	8893	3	0	8897	10.8%	0.0%	12.8%	0.0%		
HDT	MH	380	38	0	419	0.5%	0.0%			3.3%	0.3%
MDT	MHDT	217	1007	0	1225	0.3%	1.2%			1.9%	8.8%
HDT	OBUS	10	40	0	50	0.0%	0.0%			0.1%	0.4%
HDT	SBUS	10	108	0	118	0.0%	0.1%			0.1%	0.9%
HDT	UB	44	34	0	78	0.1%	0.0%			0.4%	0.3%
Grand Total		71751	9967	257	81978						

2. Fleet Mix Percentage Adjustment for CAT and Non-CAT

Adjusted Fleet Mix	**Amount**	**% of Total**
LDA/LDT - CAT	59,629	0.83
LDA/LDT - NCAT	0	0.00
MDT - CAT	9,110	0.13
MDT - NCAT	0	0.00
HDT - CAT (Gas)	2,491	0.03
HDG - NCAT (Gas)	0	0.00
MCY - CAT	521	0.01
MCY - NCAT	257	0.00

3. Specific Toxic Compound Ratio and Percentage Adjustment for CAT and Non-CAT

Compound: Benzene

Vehicle Fleet	Benzene:TOG Ratio	Composite Ratio
LDA/LDT - CAT	0.04220	0.03495
LDA/LDT - NCAT	0.02740	0.00000
MDT - CAT	0.04220	0.00534
MDT - NCAT	0.02740	0.00000
HDG -CAT	0.04220	0.00146
HDG - NCAT	0.02740	0.00000
MCY - CAT	0.04220	0.00031
MCY - NCAT	0.02740	0.00010
	Total	0.04215

Compound: Formaldehyde

Vehicle Fleet	Formaldehyde:TOG Ratio	Composite Ratio
LDA/LDT - CAT	0.01300	0.01077
LDA/LDT - NCAT	0.03740	0.00000
MDT - CAT	0.01300	0.00164
MDT - NCAT	0.03740	0.00000
HDG -CAT	0.01500	0.00052
HDG - NCAT	0.04310	0.00000
MCY - CAT	0.01300	0.00009
MCY - NCAT	0.03740	0.00013
	Total	0.01316

3. Specific Toxic Compound Ratio and Percentage Adjustment for CAT and Non-CAT (continued)

Compound: 1,3-Butadiene

Vehicle Fleet	1,3-Butadiene:TOG Ratio	Composite Ratio
LDA/LDT - CAT	0.00560	0.00464
LDA/LDT - NCAT	0.01150	0.00000
MDT - CAT	0.00560	0.00071
MDT - NCAT	0.01150	0.00000
HDG -CAT	0.00560	0.00019
HDG - NCAT	0.01150	0.00000
MCY - CAT	0.00560	0.00004
MCY - NCAT	0.01150	0.00004
	Total	0.00562

Compound: Acetaldehyde

Vehicle Fleet	Acetaldehyde:TOG Ratio	Composite Ratio
LDA/LDT - CAT	0.00500	0.00414
LDA/LDT - NCAT	0.00820	0.00000
MDT - CAT	0.00500	0.00063
MDT - NCAT	0.00820	0.00000
HDG -CAT	0.00500	0.00017
HDG - NCAT	0.00830	0.00000
MCY - CAT	0.00500	0.00004
MCY - NCAT	0.00820	0.00003
	Total	0.00501

4. TOG Emission Rates from EMFAC2007 (Input EMFAC2007 Output Here)

Speed Parameter	TOG Emission Rate (g/mi)

Acceleration (45 mph)

Emfac (gr/mi) = (emfac at average link speed x 16/60) x (0.027) x (exp (.098 x acceleration speed product)) x (60 min/hr) / (average link speed)

emfac at link speed	**0.067**
speed (mph)	45.0
acceleration time (sec)	18.0
acceleration rate (mph/sec)	2.50
EMFAC (gr/mi)	**0.159**

Deceleration (5 mph)

*Emfac (gr/mi) = (emfac at idle speed * 1.5)*

emfac at idle speed (gr/mi)	**0.392**
EMFAC (gr/mi)	**0.588**

Freeway Cruise Speed (55 mph)

EMFAC (gr/mi)	**0.071**

5. TOG Speciation Breakdown - Emission Rates

Scenario/Pollutant	Emissions (g/mi)
Deceleration (5 mph)	
Benzene	0.0248
Formaldehyde	0.0077
1,3-Butadiene	0.0033
Acetaldehyde	0.0029
Acceleration (45 mph)	
Benzene	0.0067
Formaldehyde	0.0021
1,3-Butadiene	0.0009
Acetaldehyde	0.0008
Cruising (55 mph)	
Benzene	0.0030
Formaldehyde	0.0009
1,3-Butadiene	0.0004
Acetaldehyde	0.0004

6. TOG Emission Rates (ISC Input Values)

Scenario	TOG Emission Rate (g/mi)
Deceleration (5 mph)	**0.0388**
Acceleration (45 mph)	**0.0105**
Cruising (55 mph)	**0.0047**

Lytle Creek Ranch
Freeway HRA
Hour of Day Adjustment - Temporal Data

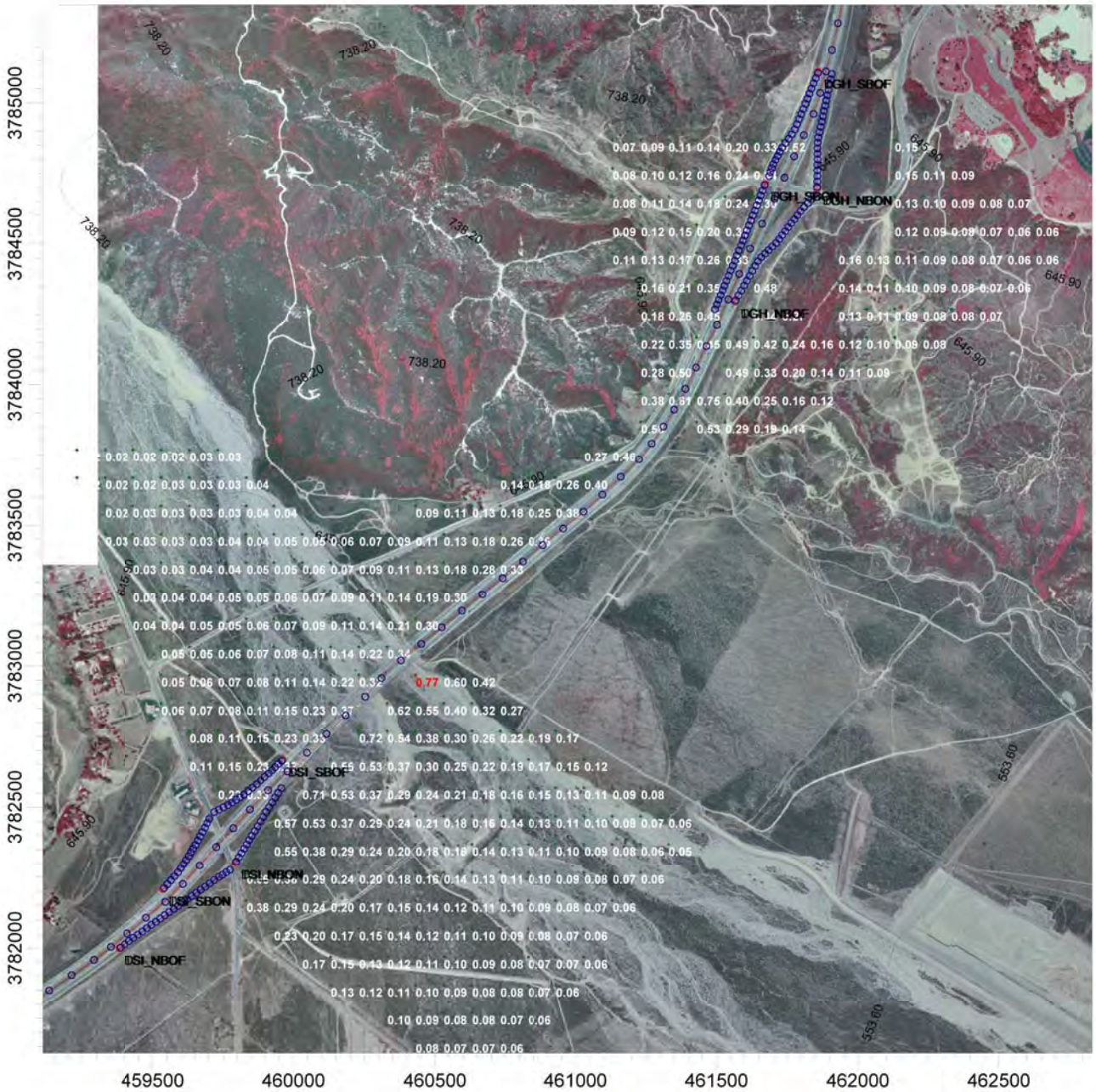
	NB		SB		Combined		Percent of Total		Non-HDT		
Hour	**Flow**	**Truck**	**Flow**	**Truck**	**Flow**	**Truck**	**Flow**	**Truck**	**Flow**	**Percentage**	**HROFDY (Hour of Day Adjustment)**
0:00	1313	157	983	59	2296	216	1.8%	2.6%	2080	1.8%	**0.44**
1:00	914	143	843	56	1757	199	1.4%	2.4%	1558	1.3%	**0.40**
2:00	740	138	834	57	1574	194	1.2%	2.3%	1380	1.2%	**0.39**
3:00	709	134	1002	68	1711	203	1.4%	2.4%	1508	1.3%	**0.41**
4:00	900	154	1682	95	2582	249	2.0%	3.0%	2333	2.0%	**0.50**
5:00	1717	222	2650	119	4367	341	3.5%	4.1%	4026	3.4%	**0.69**
6:00	2754	277	3011	114	5765	391	4.6%	4.7%	5374	4.6%	**0.79**
7:00	3136	291	3119	119	6255	410	5.0%	4.9%	5845	5.0%	**0.83**
8:00	3077	302	2754	133	5831	436	4.6%	5.2%	5395	4.6%	**0.88**
9:00	3193	329	2708	137	5901	466	4.7%	5.6%	5435	4.6%	**0.95**
10:00	3406	350	2766	140	6171	490	4.9%	5.9%	5681	4.8%	**1.00**
11:00	3643	353	2836	140	6480	493	5.1%	5.9%	5987	5.1%	**1.00**
12:00	3708	344	2973	142	6681	486	5.3%	5.8%	6196	5.3%	**0.99**
13:00	3913	342	3119	143	7033	485	5.6%	5.8%	6548	5.6%	**0.98**
14:00	4354	334	3246	140	7600	474	6.0%	5.7%	7125	6.0%	**0.96**
15:00	4734	251	3322	136	8056	387	6.4%	4.6%	7670	6.5%	**0.79**
16:00	4705	197	3316	129	8021	326	6.4%	3.9%	7695	6.5%	**0.66**
17:00	4615	191	3165	121	7780	312	6.2%	3.7%	7468	6.3%	**0.63**
18:00	4242	221	2746	104	6989	325	5.5%	3.9%	6664	5.7%	**0.66**
19:00	3724	255	2298	92	6021	346	4.8%	4.1%	5675	4.8%	**0.70**
20:00	3296	246	2057	83	5353	329	4.2%	3.9%	5024	4.3%	**0.67**
21:00	2935	218	1851	81	4787	299	3.8%	3.6%	4488	3.8%	**0.61**
22:00	2491	200	1563	73	4054	273	3.2%	3.3%	3780	3.2%	**0.56**
23:00	1882	184	1255	66	3137	250	2.5%	3.0%	2887	2.4%	**0.51**
Total	70101	5834	56099	2544	**126200**	**8378**			**117822**		
Max											

Calculate Freeway / Ramp Emission Factors for Input to ISCST3 Dispersion Model

	Link Measurements		Link Volumes				Emission Factors		Emission Rates	
Link / Segment	Link Length (m)	Lanes	ADT (2007)	Volume - Baseline (VPH)	Volume (VPH) - TOG	Volume (VPH) - Diesel	TOG (gr/mi)	DPM (g/mi)	TOG (g/sec)	DPM (g/sec)
15 Freeway NB + SB	6316	10	159,500	6,646	6,153	493	0.005	0.313	0.031	0.168
Sierra Avenue NB On Ramp	317	2	6,700	428	399	28	0.011	0.592	2.30E-04	9.20E-04
Sierra Avenue NB Off Ramp	489	2	6,500	415	387	28	0.039	1.024	1.27E-03	2.38E-03
Sierra Avenue SB On Ramp	307	2	6,200	396	370	26	0.011	0.592	2.06E-04	8.25E-04
Sierra Avenue SB Off Ramp	313	2	6,700	428	399	28	0.039	1.024	8.36E-04	1.57E-03
Glen Helen NB On Ramp	416	2	800	51	48	3	0.011	0.592	3.60E-05	1.44E-04
Glen Helen NB Off Ramp	473	2	2,600	166	155	11	0.039	1.024	4.91E-04	9.21E-04
Glen Helen SB On Ramp	481	2	950	61	57	4	0.011	0.592	4.94E-05	1.98E-04
Glen Helen SB Off Ramp	414	2	2,000	128	119	8	0.039	1.024	3.30E-04	6.20E-04

PROJECT TITLE:

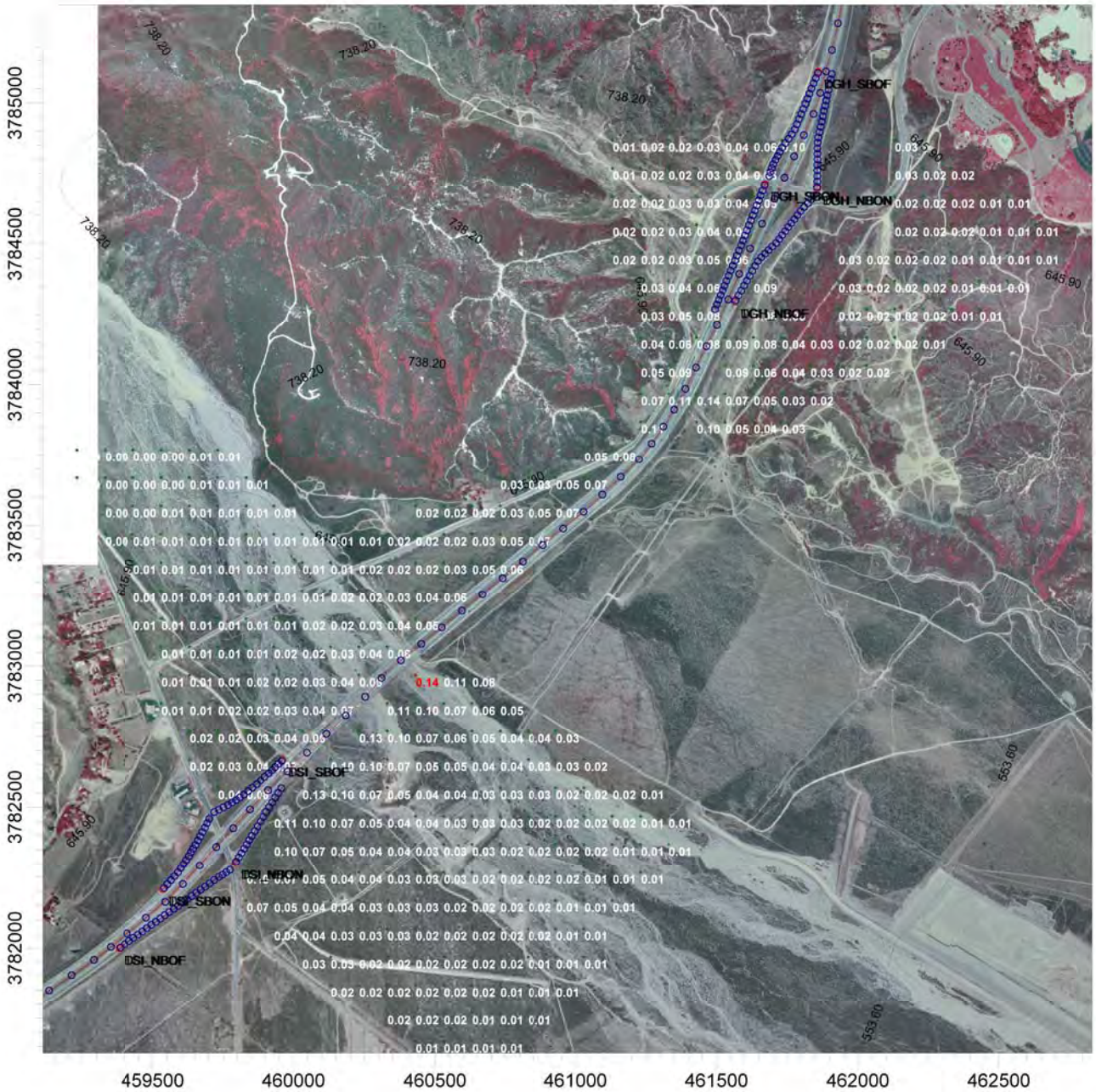
C:\ISC Models\Lytle Creek Freeway\HRA.isc



COMMENTS:	SOURCES:	COMPANY NAME:	
Lytle Creek Ranch Freeway Health Risk Assessment (HRA) Annual Diesel Particulate Matter (DPM)	**23**		
	RECEPTORS: **367**	MODELER:	
	OUTPUT TYPE: **Concentration**	SCALE: 1:22,721 0 — 0.5 km	
	MAX: **0.76749 ug/m^3**	DATE: **10/9/2007**	PROJECT NO.:

PROJECT TITLE:

C:\ISC Models\Lytle Creek Freeway\HRA.isc



COMMENTS:	SOURCES:	COMPANY NAME:	
Lytle Creek Ranch Freeway Health Risk Assessment Annual Total Organic Gases (TOG)	**23**		
	RECEPTORS:	MODELER:	
	367		
	OUTPUT TYPE:	SCALE: 1:22,721	
	Concentration	0 — 0.5 km	
	MAX:	DATE:	PROJECT NO.:
	0.14162 ug/m^3	**10/9/2007**	

Lytle Creek Ranch
Quarry HRA
Cancer Risk Calculations

Cancer Risk Calculation					Inhalation Cancer Risk (Exposure Duration)		
Pollutant		**Maximum Exposed Individual (MEI)**	**URF**	**Cancer Slope Factor**	**70 Year**	**30 Year**	**9 Year**
DieselExhPM		6.40E-02	3.0E-04	1.1E+00	1.83E-04	7.84E-05	2.35E-05
Total Risk in a Million					183	78	24
Cancer Risk Threshold					**10**		
Exceed Threshold?					**Yes**	**Yes**	**Yes**

Risk Calculation Assumptions (Residential - 70 years)	
Breathing Rate (L per Kg Body Weight per day)	271
Exposure Factor (days per year)	350
Exposure Duration (years)	70
Averaging Time (days) - 70 years x 365 days/year	25550

Risk Calculation Assumptions (Residential - 30 years)	
Breathing Rate (L per Kg Body Weight per day)[a]	271
Exposure Factor (days per year)	350
Exposure Duration (years)	30
Averaging Time (days) - 70 years x 365 days/year	25550

Risk Calculation Assumptions (Residential - 9 years)	
Breathing Rate (L per Kg Body Weight per day)	271
Exposure Factor (days per year)	350
Exposure Duration (years)	9
Averaging Time (days) - 70 years x 365 days/year	25550

Emission Factors

Operating Parameters	
Hours per Day	12
Idle time per Truck (min.)	10
Trucks per Day	
HDT	250
MDT	0
LDT	0

Travel Parameters	Distance (mi.)	Speed (mph)
On-Road Trucks	**0.76**	**10**
On-site Circulation (2nd Leg)	**2.00**	**10**
Idle Time (minutes)	**10**	

Emission Factors (g/mi)[a]

MPH	LDT	MDT	HDT
Idle (0 mph) - g/hr	0.000	0.045	0.316
10	0.083	0.081	0.154

Emission Rate per Truck (g/s)	LDT	MDT	HDT
On-Road Trucks	1.47E-06	1.43E-06	2.72E-06
On-Site Circulation	3.84E-06	3.75E-06	7.13E-06
Idling	0.00E+00	0.00E+00	8.78E-05

Idle Emissions Calculations	
Number of Trucks per Day	250
Idle Time per Truck (min)	10
Idle Time per Truck (sec)	600
Total Idle Time per Day (sec)	150000
EMFAC Idle Emission Rate (g/sec)	8.78E-05
Total Idle Emissions (g/day)	13.16666667
Total Operating Time per Day (sec)	43200
Average Idle Emission Rate (g/s)	3.05E-04

Total Emission Rate (g/s)	LDT	MDT	HDT
On-Road Trucks	0.00E+00	0.00E+00	**6.80E-04**
On-Site Circulation	0.00E+00	0.00E+00	**1.78E-03**
Idling	0.00E+00	0.00E+00	**3.05E-04**

Heavy Equipement Emission Rate Calculations

Equipment	No.	Hours per Day	Load	Emission (lbs/day)
Other Material Handling Equipment	8	8	59%	3

Heavy Equipment Emission Rate (ISC Input Value)	
Diesel Emissions (lbs/day)	3.00E+00
Diesel Emissions (g/day)	1.36E+03
Seconds per Day	43200
Diesel Emissions (g/s)	**3.15E-02**

a EMFAC2007, San Bernardino County, Year 2025, 60 F, 50% RH

Title : San Bernardino County Avg Annual CYr 2010 Default Title
Version : Emfac2007 V2.3 Nov 1 2006
Run Date : 2007/10/10 11:17:22
Scen Year: 2025 -- All model years in the range 1981 to 2025 selected
Season : Annual
Area : San Bernardino
****
Year: 2025 -- Model Years 1981 to 2025 Inclusive -- Annual
Emfac2007 Emission Factors: V2.3 Nov 1 2006

County Average San Bernardino County Average

Table 1: Running Exhaust Emissions (grams/mile; grams/idle-hour)

Pollutant Name: PM10 Temperature: 60F Relative Humidity: 50%

Speed MPH	LDA	LDT	MDT	HDT	UBUS	MCY	ALL
0	0.000	0.000	0.045	0.316	0.000	0.000	0.044
5	0.063	0.127	0.125	0.193	0.228	0.031	0.107
10	0.041	0.083	0.081	0.154	0.161	0.024	0.073
15	0.028	0.056	0.056	0.125	0.119	0.020	0.052
20	0.020	0.041	0.041	0.105	0.091	0.017	0.040
25	0.015	0.031	0.031	0.095	0.072	0.015	0.032
35	0.010	0.021	0.021	0.089	0.051	0.014	0.025
45	0.009	0.018	0.017	0.099	0.041	0.016	0.023

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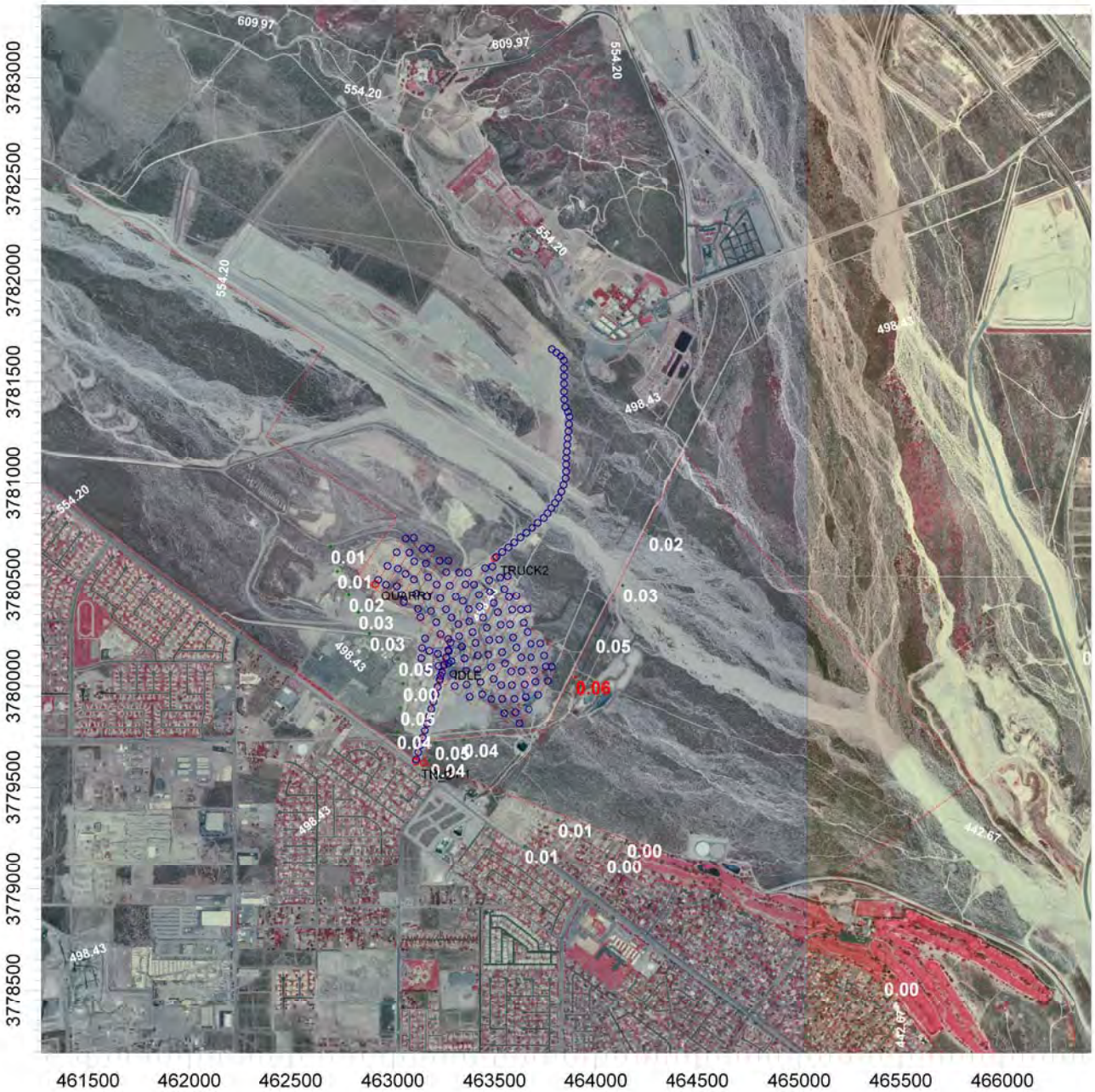
PROJECT TITLE:

C:\ISC Models\Lytle Creek Quarry\Quarry.isc



COMMENTS:	SOURCES:	COMPANY NAME:	
Lytle Creek Ranch Quarry HRA Annual Diesel Particulate Matter (DPM)	**9**		
	RECEPTORS: **30**	MODELER:	
	OUTPUT TYPE: **Concentration**	SCALE: 1:31,549 0 1 km	
	MAX: **0.06481 ug/m^3**	DATE: **10/10/2007**	PROJECT NO.:

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Appendix III-G

CLIMATE CHANGE TECHNICAL REPORT

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Climate Change Technical Report
Lytle Creek Ranch

Prepared for:
Lytle Development Company
Ontario, California

Prepared by:
ENVIRON International Corporation
Emeryville, California

Date:
November 19, 2009

Project Number:
0322796A

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Acronyms

AB 1493	Assembly Bill No. 1493
AB 32	California Global Warming Solutions Act of 2006
ACM	Alternative Compliance Method
AF	acre feet
ARB	California Air Resources Board
BAAQMD	Bay Area Air Quality Management District
C	carbon
CAFÉ	corporate average fuel economy
CAPCOA	California Air Pollution Control Officers Association
CAT	climate action team
CCAR	California Climate Action Registry
ccf/yr	hundred cubic feet per year
CEC	California Energy Commission
CEUS	California End Use Survey
CEQA	California Environmental Quality Act
CF_4	tetrafluoromethane
CFC	chlorinated fluorocarbons
CH_4	methane
CHP	combined heat and power
CO_2	carbon dioxide
CO_2e	CO_2 equivalents
CPUC	California Public Utilities Commission
DHW	domestic hot water
DOT	Department of Transportation
EIA	United States Energy Information Administration
EIR	Environmental Impact Report
EMFAC	emissions estimation software programs
ENVIRON	ENVIRON International Corporation
GDP	gross domestic product
GHGs	greenhouse gases
GRP	General Reporting Protocol
GWP	global warming potential
H_2O	water
HFC	hydrofluorocarbons
IPCC	Intergovernmental Panel on Climate Change
ISD	Climate Change Internal Services Department
ITE	Institute of Transportation Engineers
kW	kilowatt
kW-hr/yr	kilowatt hours/year
lbs	pounds
LCA	Life Cycle Assessment
LDA	light-duty auto
LDT	light-duty truck
LEED	Leadership in Energy and Environmental Design
LEV	Low-Emission Vehicle
LID	Low Impact Development
MA	Massachusetts
MAC	Market Advisory Committee
$MMTCO_2e$	million metric tonnes of CO_2 equivalent
MN	Minnesota
MND	Mitigated Negative Declaration

MW	megawatts
N_2O	nitrous oxide
O_2	oxygen
OPR	Office of Planning and Research
PC	passenger car
PFC	perfluorocarbon
ppb	parts per billion
ppm	parts per million
RCx	Facility Retrocommissioning
RECS	Residential Energy Consumption Survey
RPS	Renewables Portfolio Standard
SB 97	Senate Bill 97
SCAQMD	South Coast Air Quality Management District
SCE	Southern California Edison
SF_6	sulfur hexafluoride
sqft	square feet
TBD	to be determined
TDM	Transportation Demand Management
TDV	Time Dependent Valuation
LCR	Lytle Creek Ranch
tonnes	Metric tonnes; 1,000 kilograms
UNEP	United Nations Environment Programme
URBEMIS	Urban Emissions Model
US	United States
USEPA	United States Environmental Protection Agency
VMT	vehicle miles traveled
WMO	World Meteorological Organization

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Executive Summary

Lytle Creek Ranch (LCR) is a proposed mixed use community to be built in San Bernardino County, within and adjacent to the city of Rialto. LCR will result in approximately 8,407 new residences at full build out. The development will also include commercial (i.e., office and retail uses) space and educational institutions. This development will result in both one-time and annual direct and indirect emissions of greenhouse gases (GHGs). The term, "direct emissions of GHGs" refers to GHGs that are emitted directly as a result of the project and include land use change and construction emissions. Indirect emissions are those emissions that the project entitlement will enable, but that are not controlled by the project proponent. This report discusses the scientific and regulatory developments surrounding global climate change and provides an inventory surveying the emissions that would result from approving LCR.

There is a general scientific consensus that most current global warming is the result of human activity on the planet. This man-made, or anthropogenic, warming is primarily caused by increased emissions of GHGs that keep the earth's surface warm. This is called "the greenhouse effect" and contributes to global climate change.

Lawmakers at the national, state and local levels have introduced legislation and regulations aimed at better tracking and controlling GHGs. On the national level, there are some incentives for businesses and individuals to take voluntary steps to limit GHG emissions. However, no federal legislation capping GHG emissions or requiring reporting has been passed. Nearly three years ago, California enacted the California Global Warming Solutions Act of 2006 (Assembly Bill 32 or AB 32), which established mandatory reductions in state-wide GHG emissions by 2020. The California Legislature passed Senate Bill 97 (SB 97), which addresses GHG analysis under the California Environmental Quality Act (CEQA). SB 97 requires that the Office of Planning and Research (OPR) develop guidelines for the mitigation of GHG emissions and their effects for adoption by January 1, 2010 by the California Air Resources Board (ARB). More recently, the Legislature passed Senate Bill 375 (SB 375), which is intended to limit GHG emissions from cars and light trucks by improving the efficiency of regional land development patterns. No binding rules or regulations have been developed that address climate change analysis under CEQA. However, as discussed further below, on April 30, 2009, OPR submitted to the Secretary for Natural Resources its proposed amendments to the state CEQA Guidelines for greenhouse gas emissions. On July 3, 2009, the California Natural Resources Agency proposed amendments to the CEQA guidelines relating to GHG emissions.

Residents and the employees and patrons of commercial and municipal buildings and services use electricity, heating, and are transported by motor vehicles. These activities directly or indirectly emit GHGs. The most significant GHG emissions resulting from such residential and commercial developments are emissions of carbon dioxide (CO_2), methane (CH_4) and nitrous oxide (N_2O). GHG emissions are typically measured in terms of tonnes of CO_2 equivalents (CO_2e), calculated as the product of the mass emitted of a given GHG and its specific global warming potential (GWP).

The emissions inventory presented in this report is consistent with the methodologies established by the California Climate Action Registry (CCAR), where possible. The LCR

emissions inventory considers six categories of GHG emissions: emissions due to vegetation changes, emissions from construction activities, residential emissions, commercial building emissions, mobile source emissions, and municipal emissions. The emissions from construction and land use change are one-time emissions events. The other emissions occur annually throughout the life of the project. The electrical power for the LCR development will be supplied by Southern California Edison (SCE). Accordingly, indirect GHG emissions from electricity usage are calculated using the SCE carbon-intensity factor.

A variety of methods are employed to develop a complete GHG emissions inventory. In addition to well-established emission factors for certain activities and emission estimates based on similar activities in other representative communities; several emissions estimation software programs are used. These include EMFAC, OFFROAD, Urban Emissions Model (URBEMIS), and Building America Research Benchmark Definition (BARBD).

Emissions from the various aspects of LCR are presented in Table ES-1. Both the one-time emissions and emissions that are expected to occur each year after build-out of the LCR development are presented. There are 256,432 tonnes of CO_2e one-time emissions. The annual emissions from the use of the development amount to 98,059 tonnes CO_2e/year. Of the annual emissions, slightly more than 58% result from vehicular emissions associated with residential activities, and 26% result from the energy use associated with residential and non-residential buildings. If the one-time emissions are annualized assuming a 40-year development life[1] (which is likely low), then the one-time emissions account for approximately 6,411 tonnes, or 6% of the annual emissions. Taking these annualized one-time emissions into account, the annual emissions are 104,470 tonnes/year.

This inventory was prepared as a worst-case analysis. For example, it assumes that all emissions from LCR are “new,” in the sense that, absent the development of LCR, these emissions would not occur. Given the global nature of GHG emissions, “new” global GHG emissions are those caused by economic growth and population growth (births)[2]; local development projects accommodate such growth.

[1] The one time emissions are annualized over the estimated lifetime of the project, regardless of the duration of the construction phase. This represents the expected interval before those emissions would recur (e.g. the housing would be replaced). Forty years is a conservative estimate for the lifetime of homes in this area. Life cycle assessment studies typically assume building life spans of 50 to 100 years. Scheuer, C., G.A. Keoleian, and P. Reppe. (2003) Life cycle energy and environmental performance of a new university building: Modeling challenges and design implications. *Energy and Buildings*, **35**(10): p. 1049. Keoleian, G.A., S. Blanchard, and P. Reppe. (2000) Life-cycle energy, costs, and strategies for improving a single family house. *Journal of Industrial Ecology*, **4**(2): p. 135. Sartori, I. and A.G. Hestnes. (2007) Energy use in the life cycle of conventional and low-energy buildings: A review article. *Energy and Buildings*, **39**(3): p. 249.

[2] Population growth leads to increased emission through increases in anthropogenic emission generating activities such as on-road vehicle operation and residential electricity use. Biogenic emissions such as breathing are not included in this analysis.

Table ES-1
Summary of Greenhouse Gas Emissions for Lytle Creek Ranch
Lytle Creek Ranch
Rialto, California

Source	GHG Emissions		Percentage of Annual CO_2e Emissions (%)
Vegetation	tonnes CO_2e total	-1,120	NA
Construction (Non-Building)		118,160	NA
Construction (Buildings)		139,392	NA
Total (one time emissions)		**256,432**	NA
Residential	tonnes CO_2e / year	21,530	22%
Non-Residential		4,386	4%
Mobile		57,265	58%
Municipal		12,509	13%
Area		2,370	2%
Total (annual emissions)		**98,059**	NA
Annualized Total	**tonnes CO_2e / year**	**104,470**	**NA**

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1 Introduction

Lytle Creek Ranch (LCR) development will result in one-time and annual (direct and indirect) emissions of GHGs. Direct emissions of GHGs refers to GHGs that are emitted directly as a result of the project and include land use change and construction emissions. Indirect emissions are those emissions that the project entitlement will enable, but that are not controlled by the project proponent. This report discusses the scientific and regulatory developments surrounding global climate change and provides an estimate of an emissions inventory that would result from entitling LCR. This report also places the emissions inventory from LCR into context.

Residents, employees, and patrons of commercial and municipal buildings use electricity, heat their homes and water (typically with natural gas), and are transported in motor vehicles, all of which directly or indirectly emit GHGs. The principal greenhouse gases resulting from such developments are emissions of carbon dioxide (CO_2), methane (CH_4), and nitrous oxide (N_2O). CO_2 is considered the most important GHG, due primarily to the large emissions produced by fossil fuel combustion, especially for the generation of electricity and powering of motor vehicles. CH_4 and N_2O are also emitted by fossil fuel combustion, though their emissions are much less significant than CO_2. CH_4 is also emitted from the transmission, storage, and incomplete combustion of natural gas.

The effect that each of these gases can have on global warming is a combination of the mass of their emissions and their global warming potential (GWP). GWP indicates, on a pound for pound basis, how much a gas is predicted to contribute to global warming relative to how much warming would be predicted to be caused by the same mass of CO_2. CH_4 and N_2O are substantially more potent GHGs than CO_2, with GWPs of 21 and 310, respectively.[3] In emissions inventories, GHG emissions are typically reported in terms of pounds (lbs) or tonnes[4] of CO_2 equivalents (CO_2e). CO_2e are calculated as the product of the mass emitted of a given GHG and its specific GWP. While CH_4 and N_2O have much higher GWPs than CO_2, CO_2 is emitted in such vastly higher quantities that it accounts for the majority of GHG emissions in CO_2e, both from residential developments and human activity in general.

The LCR project is located within the South Coast Air Quality Management District (SCAQMD) jurisdiction. However, as SCAQMD guidelines for the preparation of GHG inventories have not yet been developed, this inventory has been developed consistent with the methodologies established by the California Climate Action Registry (CCAR) where possible. When guidance from the CCAR is lacking, methodologies established by the Intergovernmental Panel on Climate Change (IPCC)[5] and best available science are used. Legislation and rules regarding climate change, as well as scientific understanding of the extent to which different activities emit

[3] GWP values from IPCC's Second Assessment Report (SAR, 1996) are still used by international convention and are used in this protocol, even though more recent (and slightly different) GWP values were developed in the IPCC's Third Assessment Report (TAR, 2001)

[4] In this report, "tonnes" will be used to refer to metric tonnes (1,000 kilograms). "Tons" will be used to refer to short tons (2,000 pounds).

[5] The WMO and the UNEP established the IPCC in 1988; it is open to all members of the United Nations and WMO.

GHGs, continue to evolve; as such, the inventory in this report is a reflection of the guidance and knowledge currently available.

At the entitlement stage of a development, while the number of homes, the approximate size of commercial areas and the locations of both are known, the exact designs of the homes, businesses and facilities are not. Even so, the types of buildings and the types of facilities at the future LCR site can be used for developing an estimate of the project's anticipated GHG emissions. Energy used in a building depends in part on the built environment; however, actual future emissions from the site will depend heavily upon the future homeowners' and business owners' habits. Because the actual future occupants and their habits are not yet known, average current behavior is assumed. That assumption is likely to be a "worst-case" assumption. Given the current regulatory environment and the media focus on global climate change, it is likely that the actual future occupants will be more sensitive to the GHG emissions caused by their activities and, therefore, their activities will result in lower GHG emissions than average current behavior shows.

1.1 Emissions Inventory

The LCR emissions inventory considers the following categories of GHG emissions:

- emissions due to land use (vegetation) changes,
- emissions from construction activities,
- residential building operations emissions,
- non-residential building operations emissions,
- mobile source operations emissions,
- municipal operations emissions,
- area sources (fireplaces and lawn maintenance) emissions, and

In addition, an estimate of “life-cycle” GHG emissions from building materials is presented. Life cycle emissions include all of the emissions caused by the existence of a product or project, for example, GHG emissions from the processes used to manufacture and transport materials used in the buildings and infrastructure. This estimate is to be used for comparison purposes only and is not included in the final inventory as these emissions would be accounted for under California Global Warming Solutions Act of 2006 (AB 32) in other industry sectors. In addition, life-cycle analyses inherently involve many uncertainties. For example, in a life-cycle analysis for building materials, somewhat arbitrary boundaries must be drawn to define the processes considered in the life-cycle analysis.[6] Although life-cycle emission estimates can provide a broader view of a project’s emissions, life cycle analyses often double count emissions that might be attributable to other sectors in a comprehensive analysis. The applicability of information to a specific geographic location, climatic zone and building type can influence the

[6] For instance, in the case of building materials, the boundary could include the energy to make the materials, the energy used to make the machine that made the materials, and the energy used to make the machine that made the machine that made the materials.

life-cycle GHG emissions. Further uncertainty of life-cycle analyses come from some basic choices, such as the useful life of a building or road which can substantially change the outcome of the life-cycle analysis.

The inventory does not consider GHG emissions from sources outside of LCR that may indirectly service LCR residents (e.g., a landfill) or whether the emissions from LCR are "new" in the sense that, absent the development of LCR, these emissions may not occur. However, emissions from electricity use and construction worker commuting are included.

The timeframe over which GHGs are emitted varies from category to category, which is taken into consideration in the emissions inventory. For most of the categories, GHGs will be emitted every year that the development is inhabited. For these categories (residential buildings, non-residential buildings, mobile sources, municipal services, and area sources), the inventory includes estimates of annual GHG emissions from ongoing development operations. GHG emissions from two of the categories, construction and changes in vegetation, are one-time events that will not be part of the development's ongoing activity. These one-time emissions can be divided by the estimated lifetime of the project to allow direct comparison of these two emissions classes. The inventory presents estimates of these one-time emissions, converts them to annualized estimates, and integrates them into an annual inventory.

It is worth noting that the GHG emissions estimates assume there are no reductions in GHG-generating activities over time. This is clearly unlikely, and presents a conservative analysis, given the expected reductions in GHG emissions from most activities that will take place over the years due to future regulations, greater public awareness and the likely increasing costs of energy. For example, the emissions estimate for electricity consumption assumes that there will not be an increase in energy production from renewables or non-GHG producing sources beyond currently adopted regulations; this is not realistic, given the mandates of AB 32, and other regulatory development, as discussed later in this report.

A variety of methods are employed to develop a complete GHG emissions inventory. In addition to well established emission factors for certain activities and emission estimates based on similar activities in other representative communities; several emissions estimation software programs are used. These include EMFAC, OFFROAD, Urban Emissions Model (URBEMIS), and Building America Research Benchmark Definition (BARBD). Later sections of the report describe these models and other estimation methods. The major emissions sources that exist in residential developments are described later in this report.

1.2 Comparison of GHG Emissions

To date, the SCAQMD and CARB have not established significance thresholds for GHG emissions under the California Environmental Quality Act (CEQA) [7]. To evaluate LCR's GHG emissions, the LCR inventory is compared with a Business as Usual (BAU) scenario to determine if the development is likely to be consistent with rules propagated for California to

[7] Both SCAQMD and ARB have recently released proposed significance thresholds, but these have not been finalized at this time.

meet its 2020 emissions reduction goal by the California Air Resources Board (ARB). In addition to absolute emissions, emissions per capita are compared with the current average per capita emissions of California residents. Finally, to understand the large-scale significance of LCR's GHG emissions, the inventory is compared to state, national and global inventories.

1.3 Report Description

This report contains seven sections. Following this introduction, Sections 2 and 3 detail the state of climate change science and the regulatory setting. Section 4 presents the results of the LCR GHG Inventory. Section 5 compares these results to various benchmarks to gain perspective on what impact the LCR development will have on overall GHG emissions. Section 6 generally discusses Executive Order S-03-5, which sets GHG targets for 2050. Finally, the main findings from the report are summarized in the conclusion, Section 7.

2 State of Science

This section summarizes the scientific issues surrounding climate change and global warming. It also provides a discussion of the actions and phenomena that contribute to climate change and puts into context global, national, and state emissions of GHGs.

2.1 Global Climate Change

Global warming and *global climate change* are both terms that describe changes in the earth's climate. *Global climate change* is a broad term used to describe any worldwide, long-term change in the earth's climate. This change could be, for example, an increase or decrease in temperatures, the start or end of an ice age, or a shift in precipitation patterns. The term *global warming* is more specific than *global climate change* and refers to a general increase in temperatures across the earth. Though global warming is characterized by rising temperatures, it can cause other climatic changes, such as a shift in the frequency and intensity of rainfall or hurricanes. Global warming does not necessarily imply that all locations will be warmer. Some specific, unique locations may be cooler even though the world, on average, is warmer. All of these changes fit under the umbrella of global climate change.[8]

While global warming can be caused by natural processes, there is a general scientific consensus that most current global warming is the result of human activity on the planet.[9] This man-made, or anthropogenic, warming is primarily caused by increased emissions of "GHGs" that keep the earth's surface warm. This is called "the greenhouse effect." The greenhouse effect and the role GHGs play in it are described below.

2.2 The Greenhouse Effect

Greenhouses allow sunlight to enter and then capture some of the heat generated by the sunlight's impact on the earth's surface. The earth's atmosphere acts like a greenhouse by allowing sunlight in, but trapping some of the heat that reaches the earth's surface. When solar radiation from the sun reaches the earth, much of it penetrates the atmosphere to ultimately reach the earth's surface; this solar radiation is absorbed by the earth's surface and then re-emitted as heat in the form of infrared radiation.[10] Whereas the GHGs in the atmosphere let solar radiation through, the infrared radiation is trapped by greenhouses gases, resulting in the warming of the earth's surface.[11] This phenomenon is referred to as the "greenhouse effect".

The earth's greenhouse effect has existed far longer than humans have and has played a key role in the development of life. Concentrations of major GHGs, such as CO_2, CH_4, N_2O, and water vapor have been naturally present for millennia at relatively stable levels in the

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[8] Other definitions of "Greenhouse Effect" and "Global Warming" can be found on Merriam-Webster online: http://www.m-w.com/. A definition for "Climate Change" can be found on dictionary.com which uses Webster's New Millennium™ Dictionary of English, Preview Edition (v 0.9.6).

[9] From the IPCC "Climate Change 2007: The Physical Science Basis, Summary for Policymakers." Available online at: http://www.ipcc.ch/pdf/assessment-report/ar4/wg1/ar4-wg1-spm.pdf

[10] All light, be it visible, ultraviolet, or infrared, carries energy.

[11] Infrared radiation is characterized by longer wavelengths than solar radiation. Greenhouse gases reflect radiation with longer wavelengths. As a result, instead of escaping back into space, greenhouse gases reflect much infrared radiation (i.e., heat) back to Earth.

atmosphere, adequate to keep temperatures on Earth hospitable. Without these GHGs, the earth's temperature would be too cold for life to exist.

As human industrial activity has increased, atmospheric concentrations of certain GHGs have grown dramatically. Figure 2-1 shows the increase in concentrations of CO_2 and CH_4 over time. In the absence of major industrial human activity, natural processes have maintained atmospheric concentrations of GHGs, and, therefore, global temperatures at constant levels over the last several centuries.[12] As the concentrations of GHGs increase due to human activity, more infrared radiation is trapped, and the earth is heated to higher temperatures. This is the process that is described as human-induced global warming.

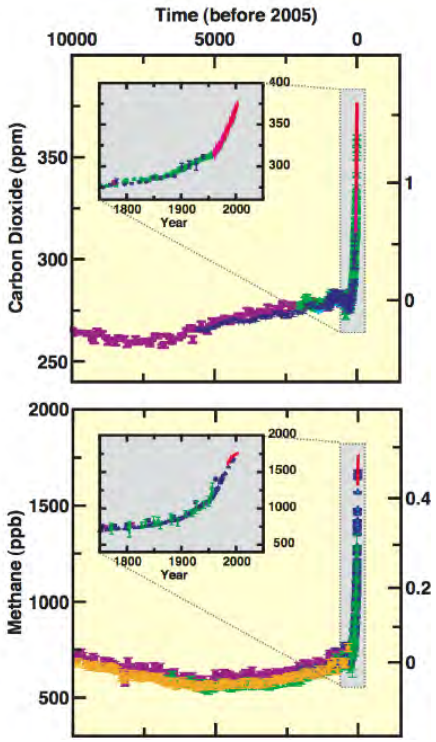

Figure 2-1. Carbon dioxide and methane concentrations have increased dramatically since the industrial revolution.[13]

In 2007, the IPCC began releasing components of its Fourth Assessment Report on climate change. In February 2007, the IPCC provided a comprehensive assessment of climate change science in its Working Group I Report.[14] It states that there is a scientific consensus that the global increases in GHGs since 1750 are mainly due to human activities such as fossil fuel use, land use change (e.g., deforestation), and agriculture. In addition, the report states that it is likely that these changes in greenhouse gas concentrations have contributed to global warming.

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[12] Examples of natural processes include the addition of GHGs to the atmosphere from respiration, fires, and decomposition of organic matter. The removal of greenhouse gases is mainly from plant and algae growth and absorption by the ocean.

[13] Adapted from figure SPM-1 of the IPCC "Climate Change 2007: The Physical Science Basis, Summary for Policymakers." Available online at: http://www.ipcc.ch/pdf/assessment-report/ar4/wg1/ar4-wg1-spm.pdf

[14] Available online at: http://www.ipcc.ch/ipccreports/ar4-wg1.htm

Confidence levels of claims in this report have increased since 2001 due to the large number of simulations run and the broad range of available climate models.

2.3 Greenhouse Gases and Sources of Their Emissions

The term "GHGs" includes gases that contribute to the natural greenhouse effect, such as CO_2, CH_4, N_2O, and water, as well as gases that are only man-made and that are emitted through the use of modern industrial products, such as HFCs, chlorinated fluorocarbons (CFCs), and sulfurhexafluoride (SF_6). These last three families of gases, while not naturally present in the atmosphere, have properties that also cause them to trap infrared radiation when they are present in the atmosphere, thus making them GHGs. These six gases comprise the major GHGs that are recognized by the Kyoto Accords (water is not included).[15] There are other GHGs that are not recognized by the Kyoto Accords, due either to the smaller role that they play in climate change or the uncertainties surrounding their effects. Atmospheric water vapor is not recognized by the Kyoto Accords because there is not an obvious correlation between water concentrations and specific human activities. Water appears to act in a positive feedback manner; higher temperatures lead to higher water concentrations, which in turn cause more global warming.[16]

The effect each of these gases has on global warming is a combination of the volume of their emissions and their GWP. GWP indicates, on a pound for pound basis, how much a gas will contribute to global warming relative to how much warming would be caused by the same mass of CO_2. CH_4 and N_2O are substantially more potent than CO_2, with GWPs of 21 and 310, respectively. However, these natural GHGs are nowhere near as potent as sulfur hexafluoride (SF_6) and fluoromethane, which have GWPs of up to 23,900 and 6,500 respectively.[17] GHG emissions are typically measured in terms of mass of CO_2e. CO_2e are calculated as the product of the mass of a given GHG and its specific GWP.

The most important greenhouse gas in human-induced global warming is CO_2. While many gases have much higher GWPs than the naturally occurring GHGs, CO_2 is emitted in such vastly higher quantities that it accounts for 85% of the GWP of all GHGs emitted by the United States.[18] Fossil fuel combustion, especially for the generation of electricity and powering of motor vehicles, has led to substantial increases in CO_2 emissions and thus substantial increases in atmospheric CO_2 concentrations. In 2005, atmospheric CO_2 concentrations were about 379 parts per million (ppm), over 35 percent higher than the pre-industrial concentrations of about 280 ppm.[19] In addition to the sheer increase in the volume of its emissions, CO_2 is a

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[15] This Kyoto Protocol sets legally binding targets and timetables for cutting the greenhouse-gas emissions of industrialized countries. The US has not approved the Kyoto treaty.

[16] From the IPCC Third Assessment Report: http://www.grida.no/climate/ipcc_tar/wg1/143.htm and http://www.grida.no/climate/ipcc_tar/wg1/268.htm

[17] California Climate Action Registry General Reporting Protocol - Reporting Entity-Wide Greenhouse Gas Emissions. SAR values, Appendix C. http://www.climateregistry.org/resources/docs/protocols/grp/GRP_V3_April2008_FINAL.pdf

[18] Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2006, U.S. Environmental Protection Agency. Available online at: http://epa.gov/climatechange/emissions/downloads/08_CR.pdf

[19] Page 2 of the IPCC "Climate Change 2007: The Physical Science Basis, Summary for Policymakers."

major factor in human-induced global warming because of its lifespan in the atmosphere of 50 to 200 years.

Concentrations of the second most prominent GHG, CH_4, have also increased due to human activities such as rice production, degradation of waste in landfills, cattle farming, and natural gas mining. In 2005, atmospheric levels of CH_4 were more than double pre-industrial levels, up to 1774 parts per billion (ppb) as compared to 715 ppb.[20] CH_4 has a relatively short atmospheric lifespan of only 12 years, but has a higher GWP than CO_2.

Nitrous oxide concentrations have increased from about 270 ppb in pre-industrial times to about 319 ppb by 2005.[21] Most of this increase can be attributed to agricultural practices (such as soil and manure management), as well as fossil-fuel combustion and the production of some acids. Nitrous oxide's 120-year atmospheric lifespan increases its role in global warming.

Besides CO_2, CH_4, and N_2O; there are several gases and categories of gases that were not present in the atmosphere in pre-industrial times but now exist and contribute to warming. These include CFCs, used often as refrigerants, and their more stratospheric-ozone-friendly replacements, HFCs. Fully fluorinated species, such as sulfurhexafluoride (SF_6) and tetrafluoromethane (CF_4), are present in the atmosphere in relatively small concentrations, but have extremely long life spans of 50,000 and 3,200 years each, making them potent GHGs.

2.4 Current and Projected Climatic Impacts of Global Warming

A strong indication that global warming is currently taking place is the fact that the top seven warmest years since the 1890s occurred after 1997. Furthermore, a warming of about 0.2°C per decade is projected by currently accepted models.

There is a scientific consensus that global climate change will increase the frequency of heat extremes, heat waves, and heavy precipitation events. Other likely direct effects include an increase in the areas affected by drought and by floods, an increase in tropical cyclone activity, a rise in sea level, and recession of polar ice caps. The impacts of global warming have already been demonstrated by substantial ice loss in the Arctic.[22] Figure 2-2 shows the rise of global temperatures, the global rise of sea level, and the loss of snow cover from 1850 to the present.

[20] Page 4 of the IPCC "Climate Change 2007: The Physical Science Basis, Summary for Policymakers."

[21] Page 4 of the IPCC "Climate Change 2007: The Physical Science Basis, Summary for Policymakers."

[22] Statistics from IPCC Working Group I and II Reports.

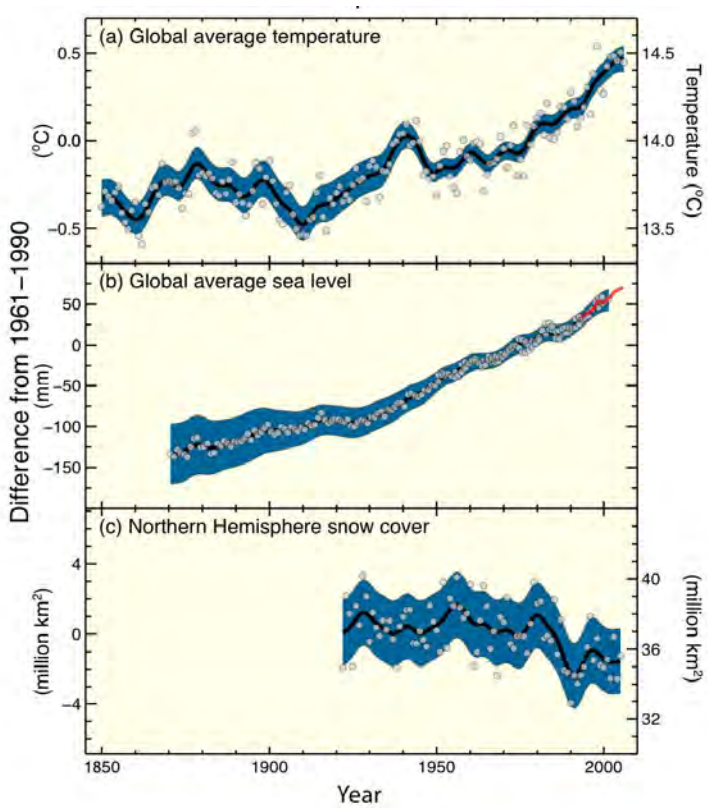

Figure 2-2. Global warming trends and associated sea level rise and snow cover decrease.[23]

2.5 Socioeconomic Impacts of Global Warming

Global temperature increases may have significant negative impacts on ecosystems, natural resources, and human health. Ecosystem structure and biodiversity will be compromised by temperature increases and associated climatic and hydrological disturbances.[24] The availability and quality of potable water resources may be compromised by increased salinisation of ground water due to sea-level rises, decreased supply in semi-arid and arid locations, and poorer water quality arising from increased water temperatures and more frequent floods and droughts.[25] These impacts on freshwater systems, in addition to the effects of increased drought and flood frequencies, can reduce crop productivity and food supply.

In addition to compromising food and water resources, there are other means through which climatic changes associated with global warming can affect human health and welfare. Warmer temperatures can cause more ground-level ozone, a pollutant that causes eye irritation and respiratory problems. Ranges of infectious diseases will likely increase, and some areas will face greater incidences of illness and mortality associated with increased flooding and drought events.

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[23] Figure SPM-3 of the IPCC "Climate Change 2007: The Physical Science Basis, Summary for Policymakers."

[24] From the IPCC Working Group II Report.

[25] From the IPCC Technical Paper VI: "Climate Change and Water". Available online at: http://www.ipcc.ch/pdf/technical-papers/climate-change-water-en.pdf

In its April 2007 Working Group II Report, the IPCC provided an assessment of the "current scientific understanding of impacts of climate change on natural, managed and human systems, the capacity of these systems to adapt and their vulnerability".[26] Here, the IPCC states that although some people will gain and some will lose because of global climate change, the overall change will be one of social and economic losses. California in particular is an area that could be negatively impacted by global warming. Global warming could alter the seasonal pattern of snow accumulation and snowmelt, which serve as primary sources for California's drinking water and irrigation water supplies. The scientific community projects extensions in the periods of high forest fire risk. Climatic changes would also affect agriculture, a major California industry, which could result in economic losses. For example, the heat wave in July 2006 is estimated to have cost the California dairy industry in excess of one billion dollars.[27]

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It is important to recognize that the climatic conditions experienced by the Project over its designed lifetime are likely to be substantially different from those observed over the past century. Consequently, it is useful to consider the implications of changing climatic conditions for Project performance. Scenarios[28] for 2100 modeled in the IPCC Fourth Assessment Report (FAR) include:

Temperature Increase

- Low Emissions Scenario: 1.8°C (best estimate), with a range of 1.1°C to 2.9°C
- High Emissions Scenario: 4.0°C (best estimate), with a range of 2.4°C to 6.4°C

Sea Level Rise

- Low Emissions Scenario: 0.18 to 0.38 meters (range)
- High Emissions Scenario: 0.26 to 0.59 meters (range)

Potential implications for the Project include:

Sea level: Rising sea levels are unlikely to directly impact the proposed Project due to its distance from the coast and relative elevation.

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[26] Available online at: http://www.ipcc-wg2.org/index.html

[27] Office of the Governor.

[28] Future GHG emissions are the product of very complex dynamic systems, determined by driving forces such as demographic development, socio-economic development, and technological change. Their future evolution is highly uncertain. Scenarios are alternative images of how the future might unfold and are an appropriate tool with which to analyze how driving forces may influence future emission outcomes and to assess the associated uncertainties. They assist in climate change analysis, including climate modeling and the assessment of impacts, adaptation, and mitigation. The possibility that any single emissions path will occur as described in scenarios is highly uncertain. More information on the IPCC's selection of scenarios is available at http://www.ipcc.ch/ipccreports/sres/emission/index.htm

Temperature: Rising temperatures could have a variety of impacts, including stress on sensitive populations (e.g., sick and elderly), additional burden on building systems (e.g., demand for conditioning), and, indirectly, increasing emissions of greenhouse gases and criteria pollutants associated with energy generation. It is not possible to reliably quantify these risks at this time.

Precipitation: Climate change is expected to alter seasonal and inter-annual patterns of precipitation. These changes continue to be one of the most uncertain aspects of future scenarios. For this Project, the most relevant direct impacts are likely to be changes in the timing and volume of stormwater runoff and changes in demand for irrigation. It is not possible to reliably quantify the implications of these changes at this time.

Wildfire: Changes in temperature and precipitation may combine to alter risks of wildfire. Changes in wildfire hazard have the potential to impact the Project; however, it is not possible to reliably quantify the implications of these changes at this time.

Water supply reliability: Changes in temperature and precipitation may also influence seasonal and inter-annual availability of water supplies. Consequently, it is reasonable to consider that climate change may affect water supply reliability. It is not possible to reliably quantify these risks for the Project at this time. For more information on the Project's water supply, please refer to the Water Supply Assessment in the EIR.

2.6 Global, National, and California-wide GHG Emissions Inventories

Worldwide emissions of GHGs in 2004 were 26.8 billion tonnes of CO_2e.[29] In 2004, the United States (US) emitted about 7 billion tonnes of CO_2e or about 24 tonnes of CO_2e per year per person.[30] Over 80% of the GHG emissions in the United States are comprised of CO_2 emissions from energy related fossil fuel combustion. In 2004, California emitted 0.492 billion tonnes of CO_2e, or about 7% of the US emissions. If California were a country, it would be the 16th largest emitter of GHGs in the world.[31] This large number is due primarily to the sheer size of California. Compared to other states, California has one of the lowest per capita GHG emission rates in the country. This is due to California's higher energy efficiency standards, its temperate climate, and the fact that it relies on substantial out-of-state energy generation.

In 2004, 81% of greenhouse gas emissions (in CO_2e) from California were comprised of CO_2 emissions from fossil fuel combustion, with 4% comprised of CO_2 from process emissions. CH_4 and N_2O accounted for 5.7% and 6.8% of total CO_2e respectively, and high GWP gases[32] accounted for 2.9% of the CO_2e emissions. Transportation is by far the largest end-use

[29] Sum of Annex I and Annex II countries without counting Land-Use, Land-Use Change and Forestry (LULUCF) http://unfccc.int/ghg_emissions_data/predefined_queries/items/3814.php For countries that 2004 data was unavailable, the most recent year was used.

[30] 2006 Inventory of U.S. Greenhouse Gas Emissions and Sinks. Available online at: http://yosemite.epa.gov/oar/globalwarming.nsf/UniqueKeyLookup/RAMR6MBLP4/$File/06ES.pdf

[31] Anywhere between the 12th and 16th depending upon methodology. Inventory of California Greenhouse Gas Emissions and Sinks: 1990 to 2004. California Energy Commission.

[32] Such as HFCs and PFCs.

category of GHG emissions. Transportation includes that used for industry (i.e., shipping) as well as residential use.

2.7 Potential for Reduction of GHG Emissions

In May 2007, the IPCC produced its Working Group III Report on the "scientific, technological, environmental, economic and social aspects" of reducing GHG emissions to alleviate climate change.[33] The report concluded that, even with current policies for sustainable development and mitigation of climate change, global GHG emissions will continue to grow over the next several decades.

[33] Available online at: http://www.ipcc.ch/ipccreports/ar4-wg3.htm

3 Regulatory Setting

Climate change has only recently been widely recognized as a threat to the global climate, economy and population. As a result, the climate change regulatory setting – federal, state and local – is complex and evolving. This section identifies key legislation, executive orders, and seminal court cases related to climate change germane to Lytle Creek Ranch project GHG emissions.

3.1 Federal Action on Greenhouse Gas Emissions

3.1.1 Federal Action on Greenhouse Gas Emissions

In 2002, President George W. Bush set a national policy goal of reducing the GHG emission intensity (tons of GHG emissions per million dollars of gross domestic product) of the U.S. economy by 18% by 2012. No binding reductions were associated with the goal. Rather, the U.S. EPA administers a variety of voluntary programs and partnerships with GHG emitters in which the U.S. EPA partners with industries producing and utilizing synthetic GHGs to reduce emissions of these particularly potent GHGs.

3.1.2 April 2007 Supreme Court Ruling

In *Massachusetts et al. vs. Environmental Protection Agency et al.* (April 2, 2007) the U.S. Supreme Court ruled that the Clean Air Act authorizes the U.S. EPA to regulate CO_2 emissions from new motor vehicles. The Court did not mandate that the U.S. EPA enact regulations to reduce GHG emissions, but found that the only instances where the U.S. EPA could avoid taking action were if it found that GHGs do not contribute to climate change or if it offered a "reasonable explanation" for not determining that GHGs contribute to climate change. On April 24, 2009 the U.S. EPA issued a proposed endangerment finding, stating that high atmospheric levels of greenhouse gases "are the unambiguous result of human emissions, and are very likely the cause of the observed increase in average temperatures and other climatic changes." The U.S. EPA further found that "atmospheric concentrations of greenhouse gases endanger public health and welfare within the meaning of Section 202 of the Clean Air Act." The finding itself does not impose any requirements on industry or other entities. The public comment period for this proposed endangerment finding ended June 23, 2009, and the finding is now under final review.[34]

3.1.3 Corporate Average Fuel Efficiency Standards

In response to the *Massachusetts et al. vs. Environmental Protection Agency et al.* ruling, the Bush Administration issued an executive order on May 14, 2007, directing the U.S. EPA and Departments of Transportation (DOT) and Energy (DOE) to establish regulations that reduce GHG emissions from motor vehicles, non-road vehicles, and non-road engines by 2008. On December 19, 2007, the Energy Independence and Security Act of 2007 (EISA) (discussed below) was signed into law, which requires an increased Corporate Average Fuel Economy (CAFE) standard of 35 miles per gallon for the combined fleet of cars and light trucks by model year 2020. EISA requires establishment of interim standards (from 2011 to 2020) that will be

[34] Available at http://www.epa.gov/climatechange/endangerment.html

the “maximum feasible average fuel economy” for each fleet. On October 10, 2008, the National Highway Traffic Safety Administration (NHTSA) released a final environmental impact statement analyzing proposed interim standards for model years 2011 to 2015 passenger cars and light trucks. NHTSA issued a final rule for model year 2011 on March 23, 2009.[35]

On May 19, 2009, President Obama announced a national policy for fuel efficiency and emissions standards in the U.S. auto industry. The proposed rulemaking is a collaboration between the DOT and USEPA with the support of the United Auto Workers. The proposed federal standards apply to passenger cars, light-duty trucks, and medium duty passenger vehicles built in model years 2012 through 2016. If finalized, the proposed rule would surpass the 2007 CAFE standards and require an average fuel economy standard of 35.5 mpg in 2016. On May 22, 2009, the DOT and USEPA issued a notice of upcoming joint rulemaking on this issue.[36,37] On June 30, 2009 the U.S. EPA granted the waiver for California for its greenhouse gas emission standards for motor vehicles; this is described in more detail below.

3.1.4 Energy Independence and Security Act of 2007

In addition to setting increased CAFE standards for motor vehicles, the EISA includes other provisions:

- Renewable Fuel Standard (RFS) (Section 202);
- Appliance and Lighting Efficiency Standards (Section 301–325);
- Building Energy Efficiency (Sections 411–441).

Additional provisions of the EISA address energy savings in government and public institutions, promoting research for alternative energy, additional research in carbon capture, international energy programs, and the creation of “green jobs.”

3.1.5 Reporting Requirements

Congress passed “The Consolidated Appropriations Act of 2008” (HR 2764) in December 2007, which includes provisions requiring the establishment of mandatory GHG reporting requirements. The measure directs U.S. EPA to publish draft rules by September 2008, and final rules by June 2009 mandating reporting “for all sectors of the economy.” The USEPA published draft GHG reporting rules on April 10, 2009. The comment period ended on June 9, 2009. As of the time of release of this document, the U.S. EPA has not published final rules as directed by the Act.

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[35] See http://www.nhtsa.dot.gov/portal/site/nhtsa/menuitem.43ac99aefa80569eea57529cdba046a0/

[36] See http://yosemite.epa.gov/opa/admpress.nsf/6fa790d452bcd7f58525750100565efa/451902cb77d4add5852575bb006d3f9b!OpenDocument

[37] See http://www.nhtsa.dot.gov/portal/site/nhtsa/menuitem.43ac99aefa80569eea57529cdba046a0/

3.2 Regional Agreements

3.2.1 Western Regional Climate Action Initiative (WCI)

The WCI is a partnership among seven states, including California, and four Canadian provinces that are implementing a regional, economy-wide cap-and-trade system to reduce global warming pollution. The WCI will cap the region's electricity, industrial, and transportation sectors with the goal of reducing the heat-trapping emissions that cause global warming 15% below 2005 levels by 2020. California is working closely with the other states and provinces to design a regional GHG reduction program that includes a cap-and-trade approach. CARB plans to develop a cap-and-trade program that will link California and the other member states and provinces.

3.3 California Legislation

California has enacted a variety of legislation that relates to climate change, much of which sets aggressive goals for GHG reductions within the state. However, none of this legislation provides definitive direction regarding the treatment of climate change in environmental review documents. As discussed below, the Office of Planning and Research (OPR) has been directed to develop guidelines for the mitigation of GHG emissions and their effects; ARB must adopt regulations by January 1, 2010. OPR recently released a guidance document, discussed below, for treatment of GHG under CEQA, but this document is purely advisory and serves as guidance only. On January 8, 2009, OPR released Preliminary Draft CEQA Guideline Amendments for Greenhouse Gas Emissions. These amendments propose specific obligations of public agencies to address GHG emissions as part of the CEQA requirements to determine a project's effects on the environment. In addition, on October 24 2008, ARB released a draft staff proposal entitled "Recommended Approaches for Setting Interim Significance Thresholds for Greenhouse Gases under the California Environmental Quality Act" (Draft ARB Thresholds). More detail was provided in another document released on December 9th, 2008. On April 13, 2009, OPR submitted proposed amendments to the state CEQA Guidelines for greenhouse gas emissions to the Secretary for Natural Resources.[38,39,40] On July 3, 2009, the Natural Resources Agency commenced the Administrative Procedure Act rulemaking process for certifying and adopting these amendments. Public comments will be accepted through August 20, 2009. The Draft ARB Thresholds provide a framework for developing CEQA significance thresholds for industrial, commercial and residential projects. But as of the release date of this document, many details remain unresolved and the ARB Thresholds document is still in draft form.

At the time of this report, few local, state, or regional agencies have promulgated binding regulations for the treatment of GHG analysis or mitigation in CEQA documents. The discussion below provides a brief overview of the ARB and OPR documents and of the primary legislation that relates to climate change which may affect the emissions associated with the proposed project.

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[38] See http://opr.ca.gov/index.php?a=ceqa/index.html

[39] See http://ceres.ca.gov/ceqa/guidelines/

[40] See http://www.arb.ca.gov/cc/localgov/ceqa/ceqa.htm

3.3.1 Assembly Bill 32 (Statewide GHG Reductions)

The California Global Warming Solutions Act of 2006, widely known as AB 32, requires ARB to develop and enforce regulations for the reporting and verification of statewide greenhouse gas emissions. ARB is directed to set a greenhouse gas emission limit, based on 1990 levels, to be achieved by 2020. The bill sets a timeline for adopting a scoping plan for achieving greenhouse gas reductions in a technologically and economically feasible manner.

The heart of the bill is the requirement that statewide GHG emissions must be reduced to 1990 levels by 2020. California needs to reduce GHG emissions by approximately 28.3% below business-as-usual predictions of year 2020 GHG emissions to achieve this goal. The bill requires ARB to adopt rules and regulations in an open public process to achieve the maximum technologically feasible and cost-effective GHG reductions. Key AB 32 milestones are as follows:

- June 30, 2007—Identification of discrete early action greenhouse gas emissions reduction measures. On June 21, 2007, ARB satisfied this requirement by approving three early action measures. These were later supplemented by adding six other discrete early action measures.
- January 1, 2008—Identification of the 1990 baseline GHG emissions level and approval of a statewide limit equivalent to that level. Adoption of reporting and verification requirements concerning GHG emissions. On December 6, 2007, ARB approved a statewide limit on GHG emissions levels for the year 2020 consistent with the determined 1990 baseline.
- January 1, 2009—Adoption of a scoping plan for achieving GHG emission reductions. On October 15, 2008, ARB issued a "discussion draft" Scoping Plan entitled "Climate Change Draft Scoping Plan: A Framework for Change" (Draft Scoping Plan). ARB adopted the Draft Scoping Plan at its December 11, 2008 meeting.
- January 1, 2010—Adoption and enforcement of regulations to implement the “discrete” actions.
- January 1, 2011—Adoption of GHG emissions limits and reduction measures by regulation.
- January 1, 2012—GHG emissions limits and reduction measures adopted in 2011 become enforceable.

3.3.2 Executive Order S-3-05 (Statewide GHG Targets)

California Executive Order S-03-05 (June 1, 2005) mandates a reduction of GHG emissions to 2000 levels by 2010, to 1990 levels by 2020, and to 80% below 1990 levels by 2050. Although the 2020 target is the core of AB 32, and has effectively been incorporated into AB 32, the 2050 target remains the goal of the Executive Order.

3.3.3 Low Carbon Fuel Standard (LCFS)

Executive Order S-01-07 (January 18, 2007) requires a 10% or greater reduction in the average fuel carbon intensity for transportation fuels in California regulated by ARB. ARB identified the

LCFS as a Discrete Early Action item under AB 32, and the final resolution (09-31) was issued on April 23, 2009.[41]

3.3.4 Senate Bill 1368 (GHG Emissions Standard for Baseload Generation)

Senate Bill (SB) 1368 prohibits any retail seller of electricity in California from entering into a long-term financial commitment for baseload generation if the GHG emissions are higher than those from a combined-cycle natural gas power plant. This performance standard applies to electricity generated out-of-state as well as in-state, and to publicly owned as well as investor-owned electric utilities.

3.3.5 Assembly Bill 1493 (Mobile Source Reductions)

AB 1493 requires ARB to adopt regulations by January 1, 2005, to reduce GHG emissions from noncommercial passenger vehicles and light-duty trucks of model year 2009 and thereafter. The bill requires the California Climate Action Registry to develop and adopt protocols for the reporting and certification of greenhouse gas emissions reductions from mobile sources for use by ARB in granting emission reduction credits. The bill authorizes ARB to grant emission reduction credits for reductions of greenhouse gas emissions prior to the date of enforcement of regulations, using model year 2000 as the baseline for reduction.

In 2004, ARB applied to the U.S. EPA for a waiver under the federal Clean Air Act to authorize implementation of these regulations. The waiver request was formally denied by the U.S. EPA in December 2007 after California filed suit to prompt federal action. In January 2008 the State Attorney General filed a new lawsuit against the U.S. EPA for denying California's request for a waiver to regulate and limit GHG emissions from these automobiles. In January 2009, President Barack Obama issued a directive to the USEPA to reconsider California's request for a waiver. On June 30, 2009 the U.S. EPA granted the waiver for California for its greenhouse gas emission standards for motor vehicles. As part of this waiver, EPA specified the following provision: ARB may not hold a manufacturer liable or responsible for any noncompliance caused by emission debits generated by a manufacturer for the 2009 model year.

3.3.6 Senate Bills 1078 and 107 (Renewables Portfolio Standard)

Established in 2002 under Senate Bill 1078 and accelerated in 2006 under Senate Bill 107, California's Renewables Portfolio Standard (RPS) requires retail suppliers of electric services to increase procurement from eligible renewable energy resources by at least 1% of their retail sales annually, until they reach 20% by 2010.

3.3.7 Executive Order S-14-08 (Renewables Portfolio Standard)

California Executive Order S-14-08 (November 11, 2008) mandates retail suppliers of electric services to increase procurement from eligible renewable energy resources to 33% by 2020. This is a further increase in RPS over Senate Bills 1078 and 107.

[41] See http://www.arb.ca.gov/fuels/lcfs/lcfs.htm

3.3.8 Senate Bill 375 (Land Use Planning)

SB 375 provides for a new planning process to coordinate land use planning and regional transportation plans and funding priorities in order to help California meet the GHG reduction goals established in AB 32. SB 375 requires regional transportation plans, developed by Metropolitan Planning Organizations (MPOs) relevant to the project area (including the Southern California Association of Governments (SCAG))[42], to incorporate a "sustainable communities strategy" in their regional transportation plans that will achieve GHG emission reduction targets set by ARB. SB 375 also includes provisions for streamlined CEQA review for some infill projects such as transit oriented development. SB 375 will be implemented over the next several years.

SB 375 is similar to the Regional Blueprint Planning Program, established by the California Department of Transit, which provides discretionary grants to fund regional transportation and land use plans voluntarily developed by MPOs working in cooperation with Council of Governments. The Metropolitan Transportation Commission (MTC) is currently developing its 2009 Regional Transit Plan (RTP) with AB 32 goals in mind, and its 2013 RTP will be its first plan subject to SB 375.

3.3.9 Energy Conservation Standards

Energy Conservation Standards for new residential and non-residential buildings were adopted by California Energy Resources Conservation and Development Commission in June 1977 and most recently revised in 2008 (Title 24, Part 6 of the California Code of Regulations [CCF]).[43] Title 24 requires the design of building shells and building components to conserve energy. The standards are updated periodically to allow for consideration and possible incorporation of new energy efficiency technologies and methods. The 2006 Appliance Efficiency Regulations (Title 20, CCR Sections 1601 through 1608), dated December 2006, were adopted by the California Energy Commission on October 11, 2006, and approved by the California Office of Administrative Law on December 14, 2006. The regulations include standards for both federally-regulated appliances and non-federally regulated appliances. While these regulations are now often seen as “business as usual,” they do exceed the standards imposed by any other state and reduce GHG emissions by reducing energy demand.

On July 17, 2008, the California Building Standards Commission adopted the nation’s first green building standards. The California Green Building Standards Code (proposed Part 11, Title 24) was adopted as part of the California Building Standards Code (Title 24, California Code of Regulations). Part 11 establishes voluntary standards, that will become mandatory in the 2010 edition of the Code, on planning and design for sustainable site development, energy efficiency (in excess of the California Energy Code requirements), water conservation, material conservation, and internal air contaminants.

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[42] See http://www.scag.ca.gov/region/index.htm

[43] Although new building energy efficiency standards were adopted in April 2008, these standards do not go into effect until January 1, 2010. Thus, the 2005 standards that went into effect on October 1, 2005 remain the current Title 24 standards.

3.3.10 Senate Bill 97 (CEQA Guidelines)

SB 97 requires that OPR prepare guidelines to submit to the California Resources Agency regarding feasible mitigation of greenhouse gas emissions or the effects of greenhouse gas emissions as required by CEQA. The Resources Agency is required to certify and adopt these revisions to the State CEQA Guidelines by January 1, 2010. The Guidelines will apply retroactively to any incomplete environmental impact report, negative declaration, mitigated negative declaration, or other related document. On January 8, 2009, OPR released Preliminary Draft CEQA Guideline Amendments for Greenhouse Gas Emissions. As currently proposed, these amendments state that the lead agency should consider the following when assessing the significance of impacts from GHG emissions on the environment

- Extent the project helps or hinders the goals of AB32.
- Extent project may increase consumption of fuel and energy resources.
- Extent project impacts or emissions exceed any threshold of significance

No specific methodologies for performing an assessment are indicated, but rather it is left to the lead agency to determine the appropriate methodologies in context of a particular project.

The proposed amendments state that lead agencies should consider all feasible means of mitigating greenhouse gas emissions that substantially reduce energy consumption or GHG emissions. These potential mitigation measures may include carbon sequestration. If off-site or carbon offset mitigation measure are proposed they must be part of reasonable plan of mitigation that the agency itself is committed to implementing. No threshold of significance or any specific mitigation measures are indicated.

3.3.11 Office of Planning and Research Advisory on CEQA and Climate Change

In June 2008, the OPR published a Technical advisory entitled *CEQA and Climate Change: Addressing Climate Change Through CEQA* (OPR Advisory). This guidance, which is purely advisory, proposes a three-step analysis of GHG emissions:

1. *Mandatory Quantification of GHG Project Emissions.* The environmental impact analysis must include quantitative estimates of a project's GHG emissions from different types of air emission sources. These estimates should include both construction-phase emissions, as well as completed operational emissions, using one of a variety of available modeling tools.
2. *Continued Uncertainty Regarding "Significance" of Project-Specific GHG Emissions.* Each EIR document should assess the significance of the project's impacts on climate change. The OPR Advisory recognizes uncertainty regarding what GHG impacts should be determined to be significant and encourages agencies to rely on the evolving guidance being developed in this area. According to the OPR Advisory, the environmental analysis should describe a "baseline" of existing (pre-project) environmental conditions, and then add project GHG emissions on to this baseline to evaluate whether impacts are significant.
3. *Mitigation Measures.* According to the OPR Advisory, "all feasible" mitigation measures or project alternatives should be adopted if an impact is significant, defining feasibility in relation to scientific, technical, and economic factors. If mitigation measures cannot

sufficiently reduce project impacts, the agency should adopt whatever measures are feasible and include a fact-based statement of overriding considerations explaining why additional mitigation is not feasible. OPR also identifies a menu of GHG emissions mitigation measures, ranging from balanced "mixed use" master-planned project designs to construction equipment and material selection criteria and practices.

In addition to this three-step process, the OPR Advisory contains more general policy-level guidance. It encourages agencies to develop standard GHG emissions reduction and mitigation measures. The OPR Advisory directs ARB to recommend a method for setting the GHG emissions threshold of significance, including both qualitative and quantitative options.

3.3.12 ARB Preliminary Draft Proposal: Recommended Approaches for Setting Interim Significance Thresholds for Greenhouse Gases Under the California Environmental Quality Act (Draft ARB Thresholds)

In October 2008, ARB released a draft proposal for identifying CEQA thresholds of significance for industrial, commercial and residential developments. The Draft ARB Thresholds propose a framework for developing thresholds of significance that rely upon the incorporation of a variety of performance measures to reduce GHG emissions associated with a project, as well as a numerical threshold of significance above which a project must include detailed GHG analysis in an EIR and incorporate all feasible mitigation measures. Although ARB proposed a 7,000 tons per year threshold for industrial projects, a numerical threshold for commercial and residential projects was not proposed, but is under development. In addition, the Draft ARB Thresholds incorporate SB 375 by providing that commercial and residential projects that comply with a previously approved plan, which, essentially, satisfies SB 375 and for which a certified final CEQA document has been prepared, is presumed to have a less than significant impact related to climate change. As of this time, ARB has suspended its work on CEQA thresholds.

3.4 Local Air Quality Management District (SCAQMD) Policies

On December 5, 2008, the SCAQMD Governing Board adopted its staff proposal for an interim CEQA GHG significance threshold for projects where the SCAQMD is the lead agency. Currently, the Board has only adopted thresholds relevant to industrial (stationary source) projects. To achieve a policy objective of capturing 90% of GHG emissions from new residential/commercial development projects and implement a "fair share" approach to reducing emission increases from each sector, SCAQMD staff has proposed combining performance standards and screening thresholds. The performance standards suggested have primarily focused on energy efficiency measures beyond Title 24 Part 6, California's building Energy Efficiency Standards, and a screening level of 3,000 tonnes CO_2e per year based on direct operational emissions. Above this screening level, project design features designed to reduce GHGs must be implemented to reduce the impact to below a level of significance. SCAQMD staff are performing additional analyses to further define the performance standards as well as coordinating with ARB's interim GHG proposal. At this time SCAQMD is waiting for ARB's recommendations for the residential/commercial sector. Once ARB adopts the statewide

significance thresholds, staff will report back to the Board regarding any recommended changes or additions to the SCAQMD's interim threshold.[44]

3.5 San Bernardino County Policies

The County has no specific GHG emissions reduction goals or policies.[45]

The following information presents a general discussion of certain County statutes, regulations, and policies that may be applicable to an understanding of the project's regulatory setting. A portion of the project is currently within the jurisdiction of the County but, as proposed, will be annexed into the City. Should any portion of the project site remain in the County or until such time as annexation to the City occurs, the County General Plan and County Development Code policies and ordinances will continue to apply.

- San Bernardino County Superior Court Case No. CIVSS 700329. On August 21, 2007, the County and the Office of the California Attorney General entered into a settlement agreement following the State's asserting that the County General Plan FPEIR failed to adequacy consider the potential adverse effects of the County General Plan on air quality and climate change. The settlement agreement was executed following the Attorney General's filing of a petition in San Bernardino Superior Court on April 12, 2007 challenging the adequacy of the County General Plan Final Program EIR, alleging that the EIR did not comply with the requirements of CEQA in its analysis of greenhouse gas emissions, climate change, and diesel exhaust emissions. Under the settlement agreement, the County shall prepare an amendment to the County General Plan adding a policy that describes the County's goal of reducing those greenhouse gas emissions reasonably attributable to the County's discretionary land-use decisions and the County's internal government operations and shall adopt a greenhouse gas emissions reduction plan. The Attorney General agreed to take no action to prevent or halt the immediate effectiveness of the County General Plan subject to that action.
- San Bernardino County General Plan. As indicated in the County General Plan, the air pollutants of greatest concern in the County are ozone (O_3) and particulate matter less than 10 microns (PM_{10}) because of the current non-attainment status with the AAQS. The "worst air quality occurs in the southwestern portion of the County. Approximately 78.0 percent of the total population residents in this area and drive over 28 million miles per day. Other contributors include pollution transported from upwind areas in the SCAB region and other major sources of air pollution in San Bernardino County, such as military bases, highways, and railroad facilities, cement manufacturing, and mineral processing."[46] In the context of the proposed project, those air quality goals, objectives, and programs presented in the County General Plan that appear to be most closely related to the unincorporated County portion of the project site are presented below.

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[44] See http://www.aqmd.gov/hb/2008/December/081231a.htm

[45] Although the County has a "Green County" program, no specific reduction goals are mandated. See http://www.sbcounty.gov/greencountysb/about_gc.htm

[46] *Op. Cit*., County of San Bernardino 2007 General Plan, Conservation Element, pp. V-10 and V-11.

- Goal CO4. The County will ensure good air quality for its residents, businesses, and visitors to reduce impacts on human health and the economy. Although the program described below is related to air quality, it will also have the co-benefit of reducing GHG emissions from tailpipe exhaust.
  - Programs. Locate and design new development in a manner that will minimize direct and indirect emissions of air contaminants through such means as: [a] Promoting mixed-use development to reduce the length and frequency of vehicle trips. [b] Providing for increased intensity of development along existing and proposed transit corridors. [c] Providing for the location of ancillary employee services at major employment centers for the purpose of reducing midday vehicle trips. Policy CO4.5. Reduce emissions through reduced energy consumption.[47]
  - Policy LU8.2 Review development proposals to minimize impacts, such as air emissions, on sensitive receptors.[48]

[47] *Ibid*., pp. V-22 through V-25.

[48] *Ibid*., Land Use Element, p. II-36.

4 Greenhouse Gas Inventory

This section describes the methods that ENVIRON International Corporation (ENVIRON) used to estimate GHG emissions from LCR after development and full build out. It includes some aspects that are fully within the control of Lytle Development Company, such as grading and the placement of utilities; some aspects that are in control of the individuals building the houses and commercial buildings, such as construction emissions; and some aspects for which control over emissions is shared by the developers and the residents, such as energy use in the built environment and emissions from traffic by the development's future residents and employees in the commercial areas. In addition, an estimate of "life-cycle" GHG emissions (i.e., GHG emissions from the processes used to manufacture and transport materials used in the buildings and infrastructure) is presented. This estimate is to be used for comparison purposes only and is not included in the final inventory as these emissions would be attributable to other industry sectors under AB 32. The inventory does not consider GHG emissions from most sources outside of LCR that may indirectly service the residents (e.g., a landfill) or whether the emissions from the development are "new" in the sense that, absent the development, the emissions may not occur. Each aspect of the GHG inventory is described in this section. Actual GHG emissions at full build-out at LCR are expected to be substantially lower due to regulatory developments; therefore, the GHG emissions reported in this section are a conservative estimate.

4.1 GHG Emissions Baseline

The CEQA Guidelines specify that the physical environmental conditions at the time the notice of preparation (NOP) is published "will normally constitute the baseline physical conditions by which a lead agency determines whether an impact is significant." CEQA Guidelines § 15125(a). This report takes a conservative approach and uses the physical environmental conditions at the time of Publication of the Project's NOP as the CEQA baseline. The project location is undeveloped with the exception of an existing golf course and one industrial source of less than 15,000 square feet. It is assumed that GHG emissions from these sources are de minimis.

4.2 Evaluation of "New" Emissions

Given the global nature of GHG impacts, it is difficult to determine which emissions from a given project are "new" on a global scale. As described in this section, there are methods of estimating emissions from certain aspects of projects, such as that from the additional vehicle travel associated with the project. However, it is not clear how to determine what proportion of those emissions are truly additional, or new, in the global sense, or what proportion of those emissions would have occurred globally without the project.

Analyses for evaluating the airborne criteria pollutant impacts of new projects for inclusion in environmental documents have already, in a sense, addressed the issue of what is "new". However, the impacts of GHG emissions differ from those of criteria pollutants in that they are a function of global concentrations rather than local concentrations and, therefore, specific locations of where emissions occur is less important than for criteria pollutants. The calculation

of “project” criteria pollutants (oxides of nitrogen, sulfur oxides, carbon monoxide, volatile organic compounds, lead, and particulate matter) in air quality emissions inventories for use in EIRs has a long history. The South Coast Air Quality Management District (SCAQMD) first published a comprehensive manual on the analysis of air quality impacts in 1993, and the Bay Area Air Quality Management District (BAAQMD) followed in 1999. Other smaller districts have prepared detailed guidance documents that describe the methods that should be used to calculate emissions inventories for EIRs from projects, including residential and commercial projects.

The goal of estimating emissions of criteria pollutants from projects is to understand whether there are significant new emissions in California’s air basins, which have a limited ability to absorb additional criteria pollutant emissions without adverse air quality impacts. A review of how air quality analyses typically address the issue of whether emissions are “new” is instructive as to how to address the emissions of GHGs. However, unlike with criteria pollutants, the impacts of GHG emissions are a function of their global concentrations, rather than local concentrations. Thus, the question of whether or not a project’s GHG impacts are significant, both on a project basis and on a cumulative basis, must be asked based on global, rather than basin-wide, considerations.

When evaluating the air quality impacts for a new project, such as a residential development, the vehicular emissions associated with the residents as they work and shop within the basin are counted as new emissions in traditional air quality analyses, even if those new residents would have moved from another house in the same air basin. The typical rationale for this approach is that the new residential development represents growth in the basin. As a result, all emissions associated with its residents’ vehicle travel should be counted as new emissions, even if this might lead to some over-counting of criteria pollutant emissions from the project.

World rankings of nations’ GHG emissions generally depend on which gases are accounted for, and whether land use changes are considered. Without considering land use changes, in recent years, the US has been the top GHG-emitting country in the world. When all of the developing countries are grouped together, they contribute approximately 52% of the world-wide GHG emissions.[49]

To understand the global scale impact of GHGs, it is useful to understand that the increase of new GHG emissions globally is caused by economic and population growth. Emission growth rates are the highest among developing countries. While GHG emissions in developed countries were unchanged over the 1990-2002 period, emissions increased by 47% in developing countries during that same time period. Emissions in China grew about 50% during that time period -- preliminary estimates show that China’s GHG emissions increased 35% in 2003 and 2004 alone. This increase in developing country GHG emissions is due to the increasing demand for higher standards of living as a result of GDP growth, requiring more vehicles and greater electricity demand. Also, developing countries often lack the technology or capital to

[49] Baumert, K.A., T. Herzog, J. Pershing. 2005. Navigating the Numbers: Greenhouse Gas Data and International Climate Policy. (http://www.wri.org/climate/pubs_description.cfm?pid=4093)

utilize energy efficient products or to construct cleaner burning power plants. GHG emissions in China are growing slightly faster than primary energy use as the fuel mix increasingly favors coal, a high-carbon fuel. China accounts for 39% of the projected increase between 2004 and 2030, and will overtake the United States as the world's biggest emitter before 2010.[50]

In the developed world, GHG increases are directly tied to population growth. Therefore, it makes sense to consider operational emissions (including vehicular emissions) from new residences as growth, as residences are rarely removed from the housing supply once constructed. There are exceptions, such as when one housing development replaces another, and, in those cases, the replacement residential development need not be considered growth.

However, it is not clear that non-residential (i.e. office space, retail space, and industrial buildings) development should be considered new growth for vehicular travel purposes. To the extent that non-residential development serves existing residential development, its vehicular travel may not be new. For instance, if the new non-residential area serves an area with a high residential/ non-residential balance, then this new non-residential growth will reduce shopping and work trip lengths and will reduce GHG emissions associated with mobile sources. If, however, the new non-residential area results in longer trips for its workers and shoppers than they would have previously made, then it adds GHGs emissions. Non-residential development that could potentially increase VMT would be facilities that draw trips from far away that otherwise would not be made. A theme park, for example, may be viewed as such a development.

In this report, it is assumed that the new non-residential area serves an area with a high residential/ non-residential balance. Therefore, this new non-residential growth likely will reduce shopping and work trip lengths from existing residences, and can reduce GHG emissions associated with mobile sources.

The approach described above is different than that for criteria emissions. For criteria pollutants, if new emissions move into the basin, although there is a reduction in criteria emissions elsewhere, these emissions are new to the basin and therefore counted. For GHGs, if the emissions simply moved from one basin to another, the emissions would not be new on a global scale. To evaluate the sustainability of new non-residential developments, one must ask if the shoppers' and workers' travel distances to the new non-residential development are longer or shorter than the distances those same individuals currently travel to their non-residential areas.

To the extent that new non-residential development serves new residential development, much of the non-residential vehicle travel would already be counted in the evaluation of the new residential development. Although the vehicle trips would be already counted elsewhere, the operational emissions from heating and cooling the non-residential areas would be considered to be new, as there are new non-residential buildings that goes along with growth in residential areas.

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[50] http://www.iea.org/textbase/weo/fact_sheets/fs_GlobalEnergyTrends.pdf (accessed June 12, 2007) World Energy Outlook 2006: Fact Sheet- Global Energy Trends The World's Energy Future: Where Are We Headed?

Accordingly, GHG emissions from VMT serving non-residential areas will only be counted if the non-residential areas contribute to greater VMT as a result of their locations. If the non-residential development lowers VMT, then it will be considered to have a zero or negative GHG contribution as a result of the fact that it has generated shorter operational vehicle trip lengths than would have otherwise occurred. It should be noted that as LCR is a mixed use community, this issue does not directly affect LCR VMT calculations; all VMT from LCR residents are calculated regardless of internal or external destinations or purpose of trip.

4.3 Units of measurement: Tonnes of CO_2 and CO_2e

The term "GHGs" includes gases that contribute to the natural greenhouse effect, such as CO_2, CH_4, N_2O, and water, as well as gases that are only man-made and that are emitted through the use of modern industrial products, such as hydrofluorocarbons (HFCs) and CFCs. The most important greenhouse gas in human-induced global warming is CO_2. While many gases have much higher GWPs than CO_2, CO_2 is emitted in such vastly higher quantities that it accounts for 85% of the GWP of all GHGs emitted by the United States.[51]

The effect each of these gases has on global warming is a combination of the volume of their emissions and their GWP. GWP indicates, on a pound for pound basis, how much a gas will contribute to global warming relative to how much warming would be caused by the same mass of CO_2. CH_4 and N_2O are substantially more potent than CO_2, with GWPs of 21 and 310, respectively. GHG emissions are typically measured in terms of mass of CO_2e. CO_2e are calculated as the product of the mass of a given GHG and its specific GWP.

In many sections of this report, including the final summary sections, emissions are presented in units of CO_2e either because the GWPs of CH_4 and N_2O were accounted for explicitly, or the CH_4 and N_2O are assumed to contribute a negligible amount of GWP when compared to the CO_2 emissions from that particular emissions category.

In this report, "tonnes" will be used to refer to metric tonnes (1,000 kilograms). "Tons" will be used to refer to short tons (2,000 lbs).

Additionally, exact totals presented in all tables and report sections may not equal the sum of components due to independent rounding of numbers.

4.4 Resources

To estimate GHG emissions from LCR, ENVIRON directly or indirectly relied primarily on five different types of resources: emissions estimation guidance from government-sponsored organizations, government-commissioned studies of energy use patterns, energy surveys by other consulting firms, emissions estimation software, and building energy modeling software. These sources are described below.

[51] Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2004, U.S. Environmental Protection Agency. Available online at:
http://yosemite.epa.gov/oar/globalwarming.nsf/UniqueKeyLookup/RAMR6MBSC3/$File/06_Complete_Report.pdf

4.4.1 Emissions Estimation Guidance

This inventory was developed using guidance from two government-sponsored organizations to assist in the estimation of GHG emissions. The first is the CCAR, which was established by the California Legislature to assist willing parties in estimating and recording their GHG emissions to use as a baseline for meeting future emissions reduction requirements. Publications by the CCAR include not only recommendations on how to compile a GHG emissions inventory, but also relevant data on energy use and emissions that are utilized in this protocol. The second organization is the IPCC, which was established in 1988 by the United Nations Environment Programme (UNEP) and the World Meteorological Organization (WMO). The IPCC's main role is to assess information on climate change which is synthesized in IPCC reports, including methodology reports. These reports also include relevant emission factors and specific scientific data that can be used to estimate GHG activities from various activities.

4.4.2 Emissions and Energy Use Studies

For estimating emissions based on electrical and natural gas energy use, literature information on patterns of energy use must often be employed. Studies commissioned by the United States Energy Information Administration (EIA) and the CEC provide data on energy use patterns associated with municipal activities, natural resource distribution, and other activities that will take place in LCR. These data were used to estimate energy use patterns which were applied to the specific characteristics of LCR to estimate GHG emissions. In addition to EIA and CEC studies, studies performed by individual municipalities or scientific organizations are also used in this report.

4.4.3 Emissions Estimation Software

The ARB, the SCAQMD, and other public and private organizations have developed several software programs to facilitate the calculation of emissions from construction, motor vehicles, and urban developments by streamlining emissions estimation from these sources. This inventory was developed using several models to estimate GHG emissions from the LCR development. These are the OFFROAD2007 model, the EMFAC model, the URBEMIS model, the Building America Research Benchmark Definition model, and the Micropas model. The features of each of these models are described below.

OFFROAD – OFFROAD2007 is the most recent version of a model developed by the ARB to estimate the activity and emissions of off-road mobile emissions sources, such as construction equipment. OFFROAD contains a database of default values for horsepower, load factor, and hours per day of operation and can calculate emission factors based on the type of equipment and year of use. OFFROAD2007 emission rates are incorporated into URBEMIS2007.

EMFAC – EMFAC, also developed by ARB, compiles real fleet data on the county-level for the state of California, including vehicle model year distributions, vehicle class (e.g., light-duty auto (LDA), medium-duty truck, heavy-heavy-duty truck) distributions, and emission rate information to generate fleet-average emission factors for most criteria pollutants and CO_2. EMFAC2007 is the newest version of the program. Emission factors from EMFAC depend on the vehicle class, vehicle technology, speed, year of operation, average ambient air temperature, and relative humidity.

URBEMIS – The URBEMIS software was created by SCAQMD, although it is used by other air districts as well. It estimates emissions associated with different aspects of urban development. The Operational Data module in URBEMIS calculates emissions from mobile sources operating during the use of a development based on emission factors from EMFAC and traffic use information specific to a development. Mobile source emissions during the construction phase are calculated separately in the construction module of URBEMIS. URBEMIS provides county, air district / air basin, or state wide averages for number of daily trips per housing unit and per student at an elementary school in the absence of more specific information from traffic engineers. URBEMIS also provides air district-specific default values for vehicle fleet characteristics (vehicle class distribution and technology categories) and travel conditions (average trip length, trip speed, and relative frequency of each type of trip). URBEMIS (Version 9.2.4), uses EMFAC2007 emission factors and calculates CO_2 emissions using District-specific default parameters for various inputs including vehicle fleet characteristics and travel conditions. URBEMIS incorporates OFFROAD2007 emission rates for off-road mobile sources.

In addition to mobile source emissions, URBEMIS can also calculate emissions associated with the construction phase of a development and emissions from area sources, such as fireplaces, once the development is operational. The URBEMIS construction module enables separate emissions calculations from each of the typical stages of any construction project: demolition, site grading, and building construction[52]. Based on the timing of construction and size of the development, URBEMIS defaults can be used to estimate emissions. Alternatively, the user can override these defaults by entering specific information about the construction project, such as what types and numbers of equipment are going to be used. In terms of area sources, URBEMIS is equipped to estimate GHG emissions from three types of GHG-emitting area sources based either on program defaults or more specific project information inputted by the user. These uses are natural gas fuel combustion, hearth fuel combustion, and landscaping equipment.

Building America Research Benchmark Definition– Building America Research Benchmark Definition (BARBD) was developed by NREL in consultation with home developers and builders within the Building America Program. This benchmark tool was developed to provide a means for tracking progress toward residential energy savings. The model includes a series of user profiles, intended to represent the behavior of a typical set of occupants. This benchmark is frequently updated, with the most recent benchmark model released December 18, 2008. This information was used to determine the energy use for appliances and plug in energy use in homes.

4.5 Indirect GHG Emissions from Electricity Use

As noted above, indirect GHG emissions are created as a result of electricity use. When electricity is used in a building, the electricity generation typically takes place offsite at the power plant; electricity use in a building generally causes emissions in an indirect manner. The LCR

[52] Grading can be differentiated as Mass Site or Fine Site Grading. In addition to these typical phases, URBEMIS 9.2.4 includes the ability to calculated emissions from trenching, paving, and architectural coating phases. Software User's Guide: URBEMIS2007 for Windows. Version 9.2. Appendix A. Page A-1

development is supplied with power by Southern California Edison (SCE). Accordingly, indirect GHG emissions from electricity usage are calculated using the SCE carbon-intensity factor of 631 lb CO_2e per MW-hr.[53] This emission factor takes into account the current mix of energy sources used to generate electricity for SCE and the relative carbon intensities of these sources.[54]

4.6 Vegetation Change

This section presents the calculation of the positive and negative GHG emissions associated with vegetation removal and re-vegetation at the LCR development. The permanent removal of existing vegetation can contribute to net GHG increases by reducing existing carbon sequestration capacity.[55] Areas that are temporarily disturbed but re-vegetated with the same vegetation type are assumed to have no net impact. Following completion of the LCR project, some areas will become re-vegetated with trees, shrubs and other vegetation. These areas could potentially sequester more CO_2 from the atmosphere than was sequestered pre-development. The difference between the total before-development sequestered CO_2 and the after-development sequestered CO_2 is the one-time CO_2 released from clearing the vegetation less the CO_2 sequestered by new plantings.[56] The overall CO_2 emissions due to vegetation change will result from two processes: 1) the change in the amount of CO_2 sequestered by vegetation, which would lead to a one-time GHG release, and 2) the amount that can be expected to be sequestered by new plantings. Both issues are discussed in this section.

In this section of this report, the units CO_2 and CO_2e are used interchangeably. CH_4 and N_2O are assumed to contribute a negligible amount of GWP when compared to the CO_2 emissions from vegetation change.

4.6.1 Quantifying the One-Time Release by Changes in Carbon Sequestration Capacity

The one-time release of GHGs due to permanent changes in carbon sequestration capacity was calculated using the following four steps:[57]

1. Identify and quantify the change in area of various land types due to the development (i.e. alluvial scrub, non-native grassland, agricultural, etc.). – These area changes include not only the area of land that will be converted to houses, but also areas disrupted by the construction of utility corridors, water tank sites, and associated borrow and grading areas.

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[53] California Climate Action Registry (CCAR) Database. Southern California Edison Company PUP Report. 2007.

[54] When calculating indirect emissions due to electricity usage, it is important to consider that indirect emissions from using a given amount of electricity will vary with the fuel-mix used to produce electricity. For example, CO_2 emissions per kW-hr from a coal-fired power plant are significantly higher than CO_2 emissions per kW-hr from a natural gas-fired power plant. Therefore, to most accurately estimate GHG emissions from the LCR development, the carbon intensity of the specific mix of energy sources SCE uses to generate electricity was used to calculate emissions since SCE is the most likely source of electricity for LCR.

[55] In this section, it is assumed that all mature land-types (at least 20 years old) are at steady-state. See The World Resource Institute (WRI) "Land Use, Land-Use Change, and Forestry Guidance for GHG Project Accounting" protocol available online at: http://www.ghgprotocol.org/DocRoot/97hb6BCSAAG2bImO7c9d/LULUCF%20Final.pdf

[56] In this section we assume that mature ecosystems do not have a net influx or outflux of carbon.

[57] This section follows the IPCC guidelines, but has been adapted for ease of use for the LCR development.

Areas temporarily disturbed that will eventually recover to become vegetated will not be counted as vegetation removed as there is no net change in vegetation or land use.[58]

2. Estimate the biomass associated with each land type. – For the purposes of this report, ENVIRON has listed the land types that are present at the LCR development site and characterized them using the available general vegetation types found in the IPCC publication Guidelines for National Greenhouse Gas Inventories (IPCC Guidelines).[59] This characterization is shown in Table 4-1. The general IPCC vegetation types are as follows:

   - Forest Land;
   - Grass Land;
   - Wetland;
   - Cropland and
   - Settlements.

   California vegetation is heavily dominated by scrub and chaparral vegetation which may not be accurately characterized by default forest or grass land properties. Consequently, ecological zones and biomass based subdivisions identified in the IPCC Guidelines were used to sub-categorize the vegetation as tree or scrub dominated. The biomass values for each vegetation type are based on these categories which relate the LCR vegetation to the IPCC vegetation types. Forest land, grass land and crop land categories and subcategories were used to determine the CO_2 emissions resulting from land use impacts at LCR.

3. Calculate CO_2 emissions from the net change of vegetation. – When vegetation is removed, it may undergo biodegradation,[60] or it may be combusted. Either pathway results in the carbon (C) present in the plants being combined with oxygen (O_2) to form CO_2. To estimate the mass of carbon present in the biomass, biomass weight is multiplied by the mass carbon fraction, 0.47.[61] The mass of carbon is multiplied by 3.67[62] to calculate the final mass of CO_2, assuming all of this carbon is converted into CO_2. The results of this calculation are shown in Table 4-2 for each type of vegetation.

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[58] This assumption facilitates the calculation as a yearly growth rate and CO_2 removal rate does not have to be calculated. As long as the disturbed land will indeed return to its original state, this assumption is valid for time periods over 20 years.

[59] Available online at http://www.ipcc-nggip.iges.or.jp/public/2006gl/vol4.htm

[60] Cleared vegetation may also be deposited in a landfill or compost area, where some anaerobic degradation which will generate CH_4 may take place. However, for the purposes of this section, we are assuming that only aerobic biodegradation will take place which will result in CO_2 emissions only.

[61] The fraction of the biomass weight that is carbon. Here, a carbon fraction of 0.47 is used for all vegetation types from IPCC (2006), default forestland and agricultural land ratio. CCAR assumes a similar value of 0.5 in its Forest Selector Protocol.

[62] The ratio of the molecular mass of CO_2 to the molecular mass of carbon is 44/12 or 3.67.

4. Calculate the overall change in sequestered CO_2. – For all types of land that change from one type of land to another,[63] initial and final values of sequestered CO_2 are calculated using the equation below.

Overall Change in Sequestered CO_2 [tonne CO_2]

$$= \sum_i (SeqCO_2)_i \times (area)_i - \sum_j (SeqCO_2)_j \times (area)_j$$

Where:

$SeqCO_2$	=	mass of sequestered CO_2 per unit area [tonne CO_2/acre]
area	=	area of land for specific land use type [acre]
i	=	index for final land use type
j	=	index for initial land use type

Table 4-1 shows the effective change in the amount of sequestered CO_2 due to the change in land use of the developed area for each land type. The total equivalent CO_2 emissions attributable to the net change of vegetation are approximately 19,400 tonnes.

4.6.2 Calculating CO_2 Sequestration by Trees

Planting individual trees on residential property and elsewhere in LCR will sequester CO_2. Changing vegetation as described above results in a one-time carbon-stock change. Planting trees is also considered to result in a one-time carbon-stock change. Table 4-3 presents default annual CO_2 sequestration rates on a per tree basis, based on values provided by the IPCC. An average of 0.035 tonne CO_2 per year per tree can be assumed for trees planted, if the tree type is not known.

Urban trees are only net carbon sinks when they are actively growing. The IPCC assumes an active growing period of 20 years. Thereafter, the accumulation of carbon in biomass slows with age, and will be completely offset by losses from clipping, pruning, and occasional death. Actual active growing periods are subject to, among other things, species, climate regime, and planting density. In this report, the IPCC default value of 20 years will be assumed. Note that trees may also be replaced at the end of the 20-year cycle, which would result in additional years of carbon sequestration. However, this would be offset by the potential net release of carbon from the removal of the replaced tree.

Approximately 30,000 new net trees will be planted in LCR community.[64] Planting these trees in the community will sequester approximately 20,520 tonnes CO_2. This was calculated by using the sequestration rate of 0.032 tonne CO_2 per year per pine tree for LCR's 8,000 new pine trees, the average tree sequestration rate of 0.035 tonne CO_2 per year per tree for LCR's 22,000 new trees of undefined type, and assuming 20 years of growth. This sequestration

[63] For example from forestland to grassland, or from cropland to permanently developed.

[64] Site-specific planting data provided by Lytle Development Company.

brings the net CO_2 emissions from vegetation to: 19,400 tonnes (land use changes) – 20,520 tonnes (30,000 net new trees in the community) = -1,120 tonnes (or a net decrease in the amount of CO_2 released. The net CO_2 emissions from vegetation changes are presented in Table 4-4.

4.7 Construction Activities

This section describes the estimation of GHG emissions from construction activities at LCR. There are three major construction phases for an urban development: demolition, site grading, and building construction. The building construction phase can be broken down into three subphases: building construction, architectural painting, and asphalt paving. GHG emissions from these construction phases are largely attributable to fuel use from construction equipment and worker commuting.

CO_2 emissions associated with different aspects of urban development can be estimated using a combination of software programs. The OFFROAD2007[65] and the EMFAC2007[66] models are used to generate emission factor data for construction equipment and motor vehicles, respectively. These values serve as inputs for the URBEMIS[67] model, which estimates emissions from several different aspects of urban development including from construction sources based on emission factors and information specific to the development.

In this section of this report, the units CO_2 and CO_2e are used interchangeably for diesel construction equipment because CH_4 and N_2O are assumed to contribute a negligible amount of GWP when compared to the CO_2 emissions from construction equipment.[68] For worker commuting, CH_4 and N_2O are explicitly calculated and therefore CO_2 and CO_2e for worker commuting are not equal.

4.7.1 Estimating GHG Emissions from Construction Equipment

This section describes how emissions from off-road equipment used during demolition, grading, building construction, and paving are calculated. It was assumed that negligible GHG emissions are produced by architectural painting equipment. It is important to note that GHG calculations are intended to estimate long-term emissions, while air quality emission calculations are intended to estimate worst-case daily scenarios. As such, the methodology presented in this section of the report will be different than the approach described in the corresponding air quality section.

ENVIRON calculated emissions from demolition, grading, building construction, and paving using the URBEMIS methodology. ENVIRON was provided with the number and type of

[65] California Air Resources Board Mobile Source Emissions Inventory Program. December 2006. http://www.arb.ca.gov/msei/offroad/offroad.htm

[66] Emission Factors (EMFAC2007) model (Version 2.3). November 2006. California Air Resources Board. http://www.arb.ca.gov/msei/onroad/latest_version.htm

[67] Urban Emissions Model (URBEMIS) (Version 8.7 – 2002 / Version 9.2.4 – 2008). Jones & Stokes Associates. Prepared for: South Coast Air Quality Management District. http://www.urbemis.com

[68] The OFFROAD2007 model (Dec 15, 2006 version) includes emission rates for CH_4 based on a fraction of the total hydrocarbon emission rate. Emission factors for CH_4 represent on average 0.3% of greenhouse gas emissions (taking into account GWP), with a maximum of 1.1%

equipment that will be used in the construction of LCR, as well as the duration of the different construction phases.[69] ENVIRON assumed that each piece of equipment will operate for 8 hours a day, five days a week during a given phase duration. An equipment hour is defined as one hour of a piece of equipment being used. Table 4-5 contains specifications for each type of construction equipment (horsepower, load factor, and GHG emission factor) provided by OFFROAD2007[70] and describes the detailed GHG calculations. CO_2 emissions for each type of construction equipment were calculated as follows:

> *Equipment Emissions [grams] = Total equipment-hours * emission factor [grams per brake horsepower-hour] * equipment horsepower * load factor*[71]

The contributions of CH_4 and N_2O to overall GHG emissions from diesel construction equipment[72] are small (< 1.1% of total CO_2e[73]) and were therefore not included in this calculation.

The total GHG emissions from all construction equipment is 139,370 tonnes CO_2.

4.7.2 GHG Emissions from Worker Commuting

Emissions from worker commuting are associated with workers involved in the demolition, site grading phase and all construction subphases (construction, paving, architectural coating). Emissions related to trips made by vendors were calculated separately (see Section 4.6.3). GHGs are emitted from worker vehicles in two ways: running emissions, produced by driving the vehicle, and startup emissions, produced by turning the vehicle on. The majority of worker commute emissions are running emissions. Table 4-6 details emission calculations for worker commutes.

Running emissions were calculated using the same general method for the demolition, grading, building and paving phases. For the architectural coating phase, both running and starting emissions were assumed to equal 20% of construction phase emissions, which is the URBEMIS default value. Total running emissions from worker commuting during each phase were calculated by estimating the total Vehicle Miles Traveled (VMT) by construction workers, and then multiplying this value by the representative GHG emission factors for the vehicles they are expected to drive. The total VMT by construction workers for a given phase is calculated as follows:

> VMT = Number of worker one-way trips x average one-way commute length

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[69] Received in URBEMIS files provided by PCR Services Corporation on 6/5/2009.

[70] OFFROAD2007 emission factors and documentation are available on-line: http://www.arb.ca.gov/msei/offroad/downloads/models/offroad2007_1215_exe.zip, http://www.arb.ca.gov/msei/offroad/pubs/offroad_overview.pdf

[71] Load factor is the percentage of the maximum horsepower rating at which the equipment normally operates.

[72] California Climate Action Registry (CCAR). 2008. *General Reporting Protocol*. Version 3.0. ENVIRON estimates these emissions to be less than 1% of total GHG contributions for diesel fueled equipment.

[73] The OFFROAD2007 model (Dec 15, 2006 version) includes emission rates for CH_4 based on a fraction of the total hydrocarbon emission rate. Emission factors for CH_4 represent on average 0.3% of greenhouse gas emissions (taking into account GWP), with a maximum of 1.1%

For the grading and paving phases, the number of worker roundtrips is equal to the number of worker-days. URBEMIS estimates that the worker-days needed for the demolition, grading, and paving phases is equal to the number of equipment-days multiplied by 1.25. The length of the average one-way commute was assumed to be the URBEMIS default of 12.7 miles.

For the building construction phase, the number of worker trips was determined by the type and number of buildings being constructed. URBEMIS provides trip generation rates based on four general land use categories: multifamily, single-family, commercial/retail/school/recreation, and office/industrial. The total daily roundtrips are the sum of the following:

0.36 * number of multifamily units

0.72 * number of single-family units

0.32 * (commercial/retail/school/recreation sq ft)/1000

0.42 * (office/industrial sq ft)/1000

After total VMT for LCR is calculated, GHG emissions for this development can be calculated from the following equation:

CO_2 emissions = VMT * [0.5 * EF_{LDA} + 0.25 * (EF_{LDT1} + EF_{LDT2})]

Where:

VMT = vehicle miles traveled
- EF_{LDA} = emission factor of light duty autos
- EF_{LDT1} = emission factor of light duty trucks: up to 6000 GVW
- EF_{LDT2} = emission factor of light duty trucks: up to 8500 GVW

The CO_2 calculation involves the following assumptions:

URBEMIS defaults assume that half of the workers commute with light duty trucks (LDTs) and half commute in light duty autos (LDAs).[74]

Half of the LDTs were assumed to be type 1 and the other half type 2.

The emission factor depends upon the speed of the vehicle. The URBEMIS default value of 30 miles per hour was used.

EMFAC emission factors from the year 2009 were used for EF_{LDA}, EF_{LDT1}, and EF_{LDT2}. The running emission factors for 2016 and later years were adjusted to account for the impact of

[74] Page A-9 of the URBEMIS user manual.

Pavley standards. According to ARB, CO_2e emissions from light-duty vehicles would be reduced by 11% relative to 2002 in 2016, and by 20% relative to 2002 in 2020.[75]

Startup emissions are CO_2 emitted from starting a vehicle. For construction workers during all phases, the startup emissions were calculated using the following assumptions:

The number of round trips were equal to the number of worker days,

The breakdown in vehicles was 50% light duty autos and 50% light duty trucks,

Two engine startups per day with a 12 hour wait before each startup.[76]

The USEPA recommends assuming that CH_4, N_2O, and HFCs account for 5% of GHG emissions from on-road vehicles, taking into account their GWPs.[77] To incorporate these additional GHGs into the calculations, the total GHG footprint was calculated by dividing the CO_2 emissions by 0.95.

Table 4-6 summarizes the emission calculations for worker commutes. The total amount of GHG emissions from worker commuting during all phases is a one-time emission of 69,928 tonnes.

4.7.3 GHG Emissions from Vendor Trips

Similar to worker commuting trips, GHGs emitted from vendor vehicles trips are based on running and startup emissions. The number of daily vendor trips was based on the size and type of buildings specified and URBEMIS defaults, which are based on four general land use categories: multifamily, single-family, commercial/retail/school/recreation, and office/industrial. The total roundtrips are the sum of the following:

0.11 * number of multifamily units

0.11 * number of single-family units

0.05 * (commercial/retail/school/recreation sqft)/1000

0.38 * (office/industrial sqft)/1000

The total number of daily round trips is multiplied by the number of work days, one-way trip length (13.3 miles) and a factor of 2 to account for roundtrip to give the VMT. After total VMT

[75] California Air Resources Board. 2008. Comparison of Greenhouse Gas Reductions for the United States and Canada Under U.S. CAFE standards and California Air Resources Board Greenhouse Gas Regulations an Enhanced Technical Assessment. February 25.

[76] The emission factor grows with the length of time the engine is off before each ignition. Consequently, use of a 12 hour wait between starts is a moderately conservative assumption for workers on an 8-hour shift schedule.

[77] USEPA. 2005. Emission Facts: Greenhouse Gas Emissions from a Typical Passenger Vehicle. Office of Transportation and Air Quality. February.

for LCR is calculated, CO_2 emissions from mobile running for this development can be calculated from the following equation:

$$CO_2 \text{ emissions from mobile running} = VMT * EF_{HHD}$$

Where:

VMT = vehicle miles traveled (based on 13.3 miles one-way trip distance)
EF_{HHD} = emission factor of heavy heavy-duty trucks

The CO_2 calculation involves the following assumptions:

URBEMIS defaults assume that vendor trips use heavy heavy-duty trucks (HHDs).[78]

The emission factor depends upon the speed of the vehicle. The URBEMIS default value of 30 miles per hour was used.

EMFAC emission factors from the year 2009 were used for EF_{HHD}.

Startup emissions are CO_2 emitted from starting a vehicle. Startup emissions for vendor trips were calculated using the following assumptions:

The breakdown in vehicles was all heavy heavy-duty trucks,

Two engine startups per day with a 12 hour wait before each startup.[79]

The USEPA recommends assuming that CH_4, N_2O, and HFCs account for 5% of GHG emissions from on-road vehicles, taking into account their GWPs.[80] To incorporate these additional GHGs into the calculations, the total GHG footprint was calculated by dividing the CO_2 emissions by 0.95. The total amount of GHG emissions from vendor trips during building construction is a one-time emission of 48,232 tonnes of CO_2e as shown in Table 4-7.

4.7.4 Demolition Hauling

Demolition hauling involves removing material from the site during demolition phases. URBEMIS assumes that each demolition hauling truck carries 20 cubic yards of material and travels 30 miles roundtrip. Based on URBEMIS defaults, it is estimated that there will be 372.0 demolition hauling trips for LCR. The number of roundtrips is multiplied by the roundtrip length to determine total VMT. After total VMT for the demolition hauling at LCR is calculated, CO_2 emissions from mobile running for this development can be calculated from the following equation:

[78] Page A-12 of the URBEMIS user manual.

[79] The emission factor grows with the length of time the engine is off before each ignition. Use of a 12 hour wait between starts is a moderately conservative assumption.

[80] USEPA. 2005. Emission Facts: Greenhouse Gas Emissions from a Typical Passenger Vehicle. Office of Transportation and Air Quality. February.

CO_2 emissions from mobile running = VMT * EF_{HHD}

Where:

VMT = vehicle miles traveled (based on 15 miles round trip distance)
EF_{HHD} = emission factor of heavy heavy-duty trucks

The CO_2 calculation involves the following assumptions:

URBEMIS defaults assume that demolition hauling trips use heavy heavy-duty trucks (HHDs).[81]

The emission factor depends upon the speed of the vehicle. The URBEMIS default value of 30 miles per hour was used.

EMFAC emission factors from the year 2009 were used for EF_{HHD}.

Startup emissions are CO_2 emitted from starting a vehicle. Startup emissions for demolition hauling trips were calculated using the following assumptions:

The breakdown in vehicles was all heavy heavy-duty trucks,

Two engine startups per day with a 12 hour wait before each startup.[82]

The USEPA recommends assuming that CH_4, N_2O, and HFCs account for 5% of GHG emissions from on-road vehicles, taking into account their GWPs.[83] To incorporate these additional GHGs into the calculations, the total GHG footprint was calculated by dividing the CO_2 emissions by 0.95. The total amount of GHG emissions from demolition hauling is a one-time emission of 22.4 tonnes of CO_2e as shown in Table 4-8.

Table 4-9 shows total one-time GHG emissions for construction, including off-road equipment, worker commuting, vendor trips, and demolition hauling to be 257,552 tonnes CO_2e for the LCR development.

4.7.5 Uncertainties in Construction GHG Emissions Calculations

ENVIRON was provided with the phase length and the number of each type of construction equipment used during construction of buildings.[84] The number of worker and vendor trips represent URBEMIS default values and settings. As such, these values are somewhat uncertain.

[81] Page A-12 of the URBEMIS user manual.

[82] The emission factor grows with the length of time the engine is off before each ignition. Use of a 12 hour wait between starts is a moderately conservative assumption.

[83] USEPA. 2005. Emission Facts: Greenhouse Gas Emissions from a Typical Passenger Vehicle. Office of Transportation and Air Quality. February.

[84] Provided by PCR Services Corporation on 6/5/2009.

In addition, emissions were estimated assuming "worst day" conditions (i.e., maximum equipment usage) for the entire phase duration. As a result, the emissions presented here are very conservative.

4.8 GHG Emissions Associated with Residential Buildings

Residential buildings include single-family homes of various sizes, attached homes, apartments, and condominiums. This section describes the methods used to estimate the GHGs associated with activities in those buildings.

The amount of energy—and, therefore, the amount of associated GHG emissions emitted per dwelling unit— will vary with the type of residential building. Accordingly, information on the types of residential buildings that are planned for LCR is required to estimate GHG emissions. Lytle Development Company provided data summarizing the main residential building categories for LCR. The major types of residential buildings are:

- Single-family detached;
- Single-family attached homes; and
- Multi-family attached units.

GHGs are emitted as a result of activities in residential buildings when electricity and natural gas are used as energy sources. Combustion of any type of fuel emits CO_2 and other GHGs directly into the atmosphere; when this occurs in a residential building, it is a direct emission source[85] associated with that building. GHGs are also emitted during the generation of electricity from fossil fuels. When electricity is used in a residential building, the electricity generation typically takes place offsite at the power plant; electricity use in a residential building generally causes emissions in an indirect manner.

While fuel combustion generates CH_4 and N_2O, the emissions of these GHGs typically comprise less than 1% of CO_2e emissions from electricity generation and natural gas consumption.[86] Fuel oil, kerosene, liquefied petroleum gas, and wood can also be used as fuels, but will likely contribute only in small amounts as combustion sources within residential buildings. Wood burning hearths are addressed in the area sources section of this report.

Energy use in residential buildings is divided into (1) energy consumed by the built environment, and (2) energy consumed by uses that are independent of the construction of the building, such as plug-in appliances. In California, Title 24 governs energy consumed by the built environment, including the HVAC system, water heating, and some fixed lighting. Non-building or 'plug-in' energy use can be further subdivided by specific end-uses (refrigeration, cooking, lighting, etc.). Energy use for each was calculated separately, as described in the following sections. The resulting energy use quantities were then converted to GHG emissions by

[85] California Climate Action Registry (CCAR) General Reporting Protocol (GRP), Version 3.0 (April). Available at: http://www.climateregistry.org/resources/docs/protocols/grp/GRP_V3_April2008_FINAL.pdf , Chapter 8

[86] Ibid. Tables C1 and C2. The methane and nitrous oxide emission factors are negligible compared to the total CO_2 emission factor for electricity generation in California.

multiplying by the appropriate emission factors, incorporating information on local electricity production.[87] As discussed in sections 3.3.6 and 3.3.7, California's Renewables Portfolio Standard (RPS) requires retail suppliers of electric services to increase procurement from eligible renewable energy resources until they reach 20% by 2010. California Executive Order S-14-08 mandates a further increase in procurement from eligible renewable energy resources to 33% by 2020. Although the project will be operational in 2030, ENVIRON conservatively assumed that 20% of the electricity would be from renewable resources, consistent with the currently enacted law. The resulting reduction in the emission factor for SCE was calculated as outlined in Table 6-1 and applied to these calculations. The emission reductions that would result from a RPS of 33% were California Executive Order S-14-08 to become law were also calculated for illustrative purposes.

In this section, the units CO_2 and CO_2e are used interchangeably for residential buildings because CH_4 and N_2O are assumed to contribute a negligible amount of GWP when compared to the CO_2 emissions from residential buildings.

4.8.1 Estimate of Residential Energy Use Intensity

ENVIRON developed CO_2 intensity values (i.e., CO_2 emissions per Dwelling Unit per year) for the residential building types found in LCR using the Energy Information Administration's 2005 Residential Energy Consumption Survey (RECS) database[88] and estimation methods presented in the Department of Energy technical report entitled, 'Building America Research Benchmark Definition'.[89] Three building types representative of the planned residences at LCR were evaluated: single-family detached houses, single-family attached homes, and units in multi-family apartment buildings (with five or more units). The methods that were used and the assumptions that were made in estimating energy use are described below.

4.8.2 Energy Use in the Built Environment

New Californian homes must be designed to meet building Energy Efficiency Standards (Title 24). Compliance with Title 24 is determined from the total daily valuation (TDV) of energy use in the built-environment (on a per square foot per year basis). The regulated energy uses include space heating and cooling, domestic hot water heating, and hard-wired lighting. TDV energy use is a parameter that reflects the burden that a building imposes on an electricity supply system. In general, there is a larger electricity demand and, hence, higher stress on the supply system during the day (peak times) than at night (off peak). To account for this variation, the calculation of TDV assigns different weights for energy used at different times. For example, a building that uses a given amount of electricity during the peak mid-day period will have a higher

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[87] The Southern California Edison specific emission factor for electricity deliveries is 641 lbs CO_2/MWh. From the California Climate Action Registry Database: Southern California Edison Company 2006 PUP Report. 2008. Although this emission factor accounts for only CO_2, the emissions associated with N_2O and CH_4 contribute to less than 1% of the electricity generation CO_2e emissions. Available at: https://www.climateregistry.org/CARROT/public/Reports.aspx

[88] US Energy Information Administration (EIA). Public Use Microdata. http://www.eia.doe.gov/emeu/recs/contents.html. Accessed June 16, 2009.

[89] Robert Hendron. "Building America Research Benchmark Definition, Updated December 20, 2007". National Renewable Energy Laboratory Technical Report. NREL/TP-550-42662. January 2008. Available at: http://apps1.eere.energy.gov/buildings/publications/pdfs/building_america/42662.pdf

TDV value than a building using an equivalent amount of electricity during off-peak hours. Title 24 determines compliance by comparing the energy use of a modeled (or 'proposed') home to a minimally Title 24 compliant 'standard home' of equal dimensions. Title 24 focuses on building energy efficiency per square foot; it places no limits upon the size of the house or the actual energy used per dwelling unit.

The 2005 Energy Information Administration's Residential Energy Consumption Survey (RECS) database was used to determine annual energy use for Title 24-regulated uses (space heating, space cooling, and domestic hot water systems). Estimates for hard-wired lighting will be discussed later in this section. Energy use estimates for this analysis are based on RECS data that was filtered by state, square footage, and dwelling type. However, it is important to note that the RECS dataset is comprised of mostly older buildings, which are typically less energy efficient (on a per square foot basis) than newer buildings constructed to meet increasingly stricter efficiency standards. Although many of the homes in the RECS database are likely less energy efficient than Title 24-compliant buildings, the energy use estimates were used to represent 2001Title-24 compliant homes. The Title 24 standards have been updated twice (in 2005 and 2008) since the RECS study, and CEC has published reports estimating the percentage deductions in energy use resulting from these new standards.[90,91] Because buildings at Lytle Creek Ranch would conform to the most updated (and most stringent) standards, ENVIRON accounted for the impact of the Title 24 updates by deducting the estimated percentage savings from the RECS energy use estimates.

The RECs database analysis provides annual electricity use for the heating and cooling system and annual natural gas usage for both the heating and domestic hot water (DHW) systems per building. HVAC electricity use and natural gas use values are presented in Table 4-10 . Built-in lighting covered by Title 24 was calculated using values from BARBD for hard-wired lighting.

Title 24 compliant electricity use on a per dwelling unit basis is 3,418 kWh per year for single family detached homes, 2,662 kWh per year for single-family attached homes, and 2,825 kWh per year for multi-family units. Natural gas use for Title 24 uses in Title 24 compliant residences on a per dwelling unit basis is 41 MBTU per year for single family detached homes, 18 MBTU per year for single-family attached homes, and 17 MBTU per year for multi-family units.

Lytle Development Company has committed to making all new homes 15% more energy efficient than 2008 Energy Efficiency Standards requirements, i.e., 15% more energy efficient on a TDV basis. Although ENVIRON is aware that annual energy and TDV energy do not necessarily scale linearly with each other, ENVIRON assumed that all sources covered by Energy Efficiency Standards would uniformly use 15% less annual energy. These calculations are shown in Table 4-10. For each type of home, the Energy Efficiency Standards compliant

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[90] California Energy Commission. 2003. Impact Analysis: 2005 Update to the California Energy Efficiency Standards for Residential and Nonresidential Buildings. Available at: http://www.energy.ca.gov/title24/2005standards/archive/rulemaking/documents/2003-07-11_400-03-014.PDF

[91] California Energy Commission. 2007. Impact Analysis: 2008 Update to the California Energy Efficiency Standards for Residential and Nonresidential Buildings. Available at: http://www.energy.ca.gov/title24/2008standards/rulemaking/documents/2007-11-07_IMPACT_ANALYSIS.PD F

energy use was calculated with RECS database and BARBD as described above. These energy use numbers were then each multiplied by 0.85 to account for Lytle Development Company's commitment to a 15% energy efficiency improvement over 2008 Energy Efficiency Standards. This improvement over 2008 Energy Efficiency Standards reduces the electricity use to 924 kWh per year for single-family detached homes, 821 kWh per year for single-family attached homes, and 1,052 kWh per year for multi-family units. For natural gas, this improvement over 2008 Energy Efficiency Standards reduces usage on a per dwelling unit basis to 37 MBTU per year for single-family detached homes, 16 MBTU per year for single-family attached homes, and 16 MBTU per year for multi-family units. Because Energy Efficiency Standards do not address the plug-in energy use, the improvement over Energy Efficiency Standards was not applied to appliances and plug-in lighting. The calculations for major appliances and plug-in energy use are discussed in the next sections.

4.8.3 Building America Research Benchmark Definition – Major Appliances

Major household appliances such as refrigerators, clothes washers and dryers, dishwashers, and cooking ranges are typically provided with a new residential unit; as a result, the developer has influence on the energy performance of these items. The energy use for these major appliances was estimated using guidance from the Department of Energy's Building America Research Benchmark Definition (BARBD). This technical manual presents empirical equations for electricity usage derived using data from the 2001 Residential Energy Consumption Survey. The electricity usage of the major appliances was estimated using equations based on the number of bedrooms per dwelling unit. The exception is refrigerator energy use, which was set to one value for all residence types, because it was assumed not to be influenced by the floor area or number of bedrooms of the dwelling unit. For dryers and cooking ranges, which can be either gas or electric, it is assumed that 50% of the houses will use electric and 50% will use natural gas appliances. Therefore, values provided represent 50% of natural gas usage for natural gas models, and 50% electricity usage for both electric and natural gas (if applicable) models.

Table 4-11 summarizes the estimated major appliance energy use for the three residential types. The annual electricity use of major appliances is 1,889 kWh per year for single family detached homes, 1,690 kWh for single-family attached homes, and 1,560 kWh per year for multi-family units. In addition the annual natural gas use of major appliances is 5.6 MBtu per year for single family detached homes, 4.7 MBtu per year for single-family attached homes, and 4.1 MBtu per year for multi-family units

Lytle Development Company has committed to requiring Energy Star appliances for all major appliances rated by Energy Star in newly built residences when the builder supplies appliances with the new home. This includes refrigerators, dishwashers, and clothes washers. There is no Energy Star rating for dryers at this time since there is no considerable difference in energy use between different dryer models. Energy Star ratings also are not available for cooking ranges. The average energy improvement for Energy Star rated appliances over standard appliances as reported in Energy Star Annual Report was used to determine the percent reduction in energy use from major appliances.

Table 4-12 shows the calculations for the improvement in energy use from Lytle Development Company's commitment to a 15% improvement over 2008 Energy Efficiency Standards and their commitment to requiring Energy Star major appliances where available. This results in a 12% reduction in electricity use from Energy Star and an average combined electricity savings of 16.60%.

4.8.4 Building America Research Benchmark Definition - Plug-in Energy Use

Additional energy use from loads such as plug-in lighting, office equipment, plug-in cooking equipment, and electronics are also part of the anticipated energy use for a residential development. Similar to the major appliances above, energy use values for plug-in appliances, lighting and miscellaneous energy loads (MELs) were estimated using guidance from the Department of Energy's Building America Research Benchmark Definition (BARBD).[92] Plug-in lighting energy use was estimated based on the finished floor area, whereas the electricity usage for miscellaneous energy loads (e.g. home entertainment devices, computers, and small kitchen appliances) were determined by equations involving the number of bedrooms, finished floor area, and a California-specific load multiplication factor.

Table 4-11 summarizes the estimated plug-in energy use for each residence type. The annual electricity use for plug-in appliances, lighting, and miscellaneous energy loads (on a per dwelling unit per year basis) is 3,015 kWh for single family detached homes, 2,461 kWh for single-family attached homes, and 2,296 kWh for multi-family units. Table 4-10 summarizes the combined energy use including the Title 24 systems, major appliances, and plug-ins. It should be noted that the residential plug-in energy-use values presented here are likely overestimates. The estimates are based upon currently available technologies, which are likely less energy-efficient than future equipment models. If future LCR residents install Energy Star appliances, use more energy-efficient equipment, and replace incandescent lights with fluorescent lights, the actual electricity use for plug-ins will be lower than is estimated here. Conversely, future residents may have more small plug-ins (e.g. MP3 players, cell phones, miscellaneous equipment) that could somewhat offset the savings from more energy-efficient equipment. However, because refrigerators, lighting, and large appliances contribute to the bulk of the electricity load, and these types of equipment will likely improve in energy efficiency in the future, the estimates presented here are still likely overly conservative.

4.8.5 Estimation of Annual Greenhouse Gas Emissions from Residential Buildings

Energy use data from Table 4-12 were multiplied by the emission factors presented in Table 4-13 to generate CO_2 intensity values (i.e., CO_2 emissions per dwelling unit) for each building type. Emission factors taking into account reductions from a 20% Renewable Portfolio Standard were used.[93] The builder has control over energy use for the built environment and the initial

[92] Robert Hendron. "Building America Research Benchmark Definition, Updated December 20, 2007". National Renewable Energy Laboratory Technical Report. NREL/TP-550-42662. January 2008. Available at: http://apps1.eere.energy.gov/buildings/publications/pdfs/building_america/42662.pdf

[93] Table 4-15 shows the reductions in CO_2 intensity that would be achieved if the 33% RPS for 2020 described in California Executive Order S-14-08 were implemented.

major appliances. As shown in Table 4-14, the homes that are 15% more energy efficient than 2008 Energy Efficiency Standards have lower CO_2 emissions. When combined with Energy Star appliances, as shown in Table 4-14, the single-family detached homes, single-family attached homes, and multifamily units emit 16% less CO_2 per year than standard homes for the built environment and major appliances. As shown in Table 4-14, when plug-in loads are considered, the single-family detached homes, single-family attached homes and multifamily units emit 18%, 18% and 18% less CO2 per year, respectively, than the Energy Efficiency Standards compliant homes without energy star appliances.

Table 4-16 shows the yearly CO_2 emissions from LCR by incorporating the aforementioned emission factors from Table 4-14 and the number of dwelling units for each building type for Title 24 systems.[94] Total CO_2 emissions from Title 24 systems would be 17,576 tonnes per year without improvements over 2008 Title 24 standards. Specifically, the single family detached homes (3,409 dwelling units) would emit 9,904 tonnes per year, single-family attached homes (3,673 dwelling units) would emit 5,575 tonnes per year, and the multi-family units (1,325 dwelling units) would emit 2,097 tonnes per year. With 15% improvements over 2008 Energy Efficiency Standards the annual CO_2 emissions would be reduced to 8,210 tonnes (2.4 tonnes per unit) for single-family detached homes, 4,579 tonnes (1.2 tonnes per unit) for single-family attached homes, and 1,719 tonnes (1.3 tonnes per unit) for multi-family units. The total emissions in this scenario would be 14,508 tonnes per year, which represents a 17% reduction in GHG emissions.

Table 4-16 shows the combined yearly CO_2 emissions from Title 24 systems and major appliances for each building type. Total CO_2 emissions would be 23,995 tonnes per year without improvements over 2008 Title 24 standards and with standard major appliances Specifically, the single family detached homes (3,409 dwelling units) would emit 12,758 tonnes per year, the single-family attached homes (3,673 dwelling units) would emit 8,262 tonnes per year, and the multi-family units (1,325 dwelling units) would emit 2,975 tonnes. With 15% improvements over 2008 Energy Efficiency Standards and Energy Star appliances, annual CO_2 emissions would be reduced to 10,721 tonnes (3.1 tonnes per unit) for single family detached homes, 6,933 tonnes (1.9 tonnes per unit) for single-family attached homes, and 2,485 tonnes per year (1.9 tonnes per unit) for multi-family units. The total emissions in this scenario would be 20,138 tonnes per year, which represents a 16% reduction in GHG emissions.

Table 4-16 shows the yearly CO_2 emissions from LCR by incorporating the aforementioned emission factors and the number of dwelling units for each building type for Title 24 systems and all plug-in energy. Total CO_2 emissions would be 28,397 tonnes per year without improvements over 2008 Energy Efficiency Standards and with standard major appliances. Specifically, the single-family detached homes (3,409 dwelling units) would emit 13,856 tonnes per year, the single-family attached homes (3,673 dwelling units) would emit 9,073 tonnes per year, and the multi-family units (1,325 dwelling units) would emit 3,254 tonnes. With 15% improvements over 2008 Energy Efficiency Standards, Energy Star appliances, annual CO_2

[94] Table 4-17 shows the CO_2 emissions from residential energy taking into account the 33% RPS for 2020 described in California Executive Order S-14-08

emissions would be reduced to 11,394 tonnes (3.3 tonnes per unit) for single family detached homes, 7,468 tonnes (2.0 tonnes per unit) for single-family attached homes, and 2,667 tonnes per year (2.0 tonnes per unit) for multi-family units. The total emissions in this scenario would be 21,530 tonnes per year, which represents a 23% reduction in GHG emissions.

The above estimates for CO_2 emissions from the residential buildings do not take into account the State of California's requirement for builders to offer solar panels as an option to homeowners. It is unknown how many future homeowners will chose this option, therefore, while the exact reduction in CO_2 emissions due to this project design feature can not be quantified it will decrease the CO_2 emissions for those residential buildings that choose to install renewable energy.

4.8.6 Uncertainties in Residential Building GHG Calculations

Several factors lead to uncertainties in the above analysis. As described below, it is believed that these uncertainties result in conservative estimates of the GHG emissions for the residential buildings at LCR.

- Energy use will vary considerably depending upon the design of the home. The residential units to be built in LCR will vary considerably in size, layout, and overall design. Energy use estimates for a given dwelling type were calculated using RECS data for a range of dwelling sizes centered around the average square footage of each dwelling type.
- Built environment energy use will vary considerably depending upon the home owners' habits regarding energy use. For instance, homeowners determine the set point of thermostats, the duration of showers, and the usage of air conditioning, among other things. Lytle Development Company will have little, if any, influence over these choices made by the homeowner. Current median behavior attributes were assumed for this report. To the extent that individuals are becoming more energy conscious, this will tend to overestimate energy use in the future.
- Plug-in energy use will also vary considerably depending upon the appliances, lights, and other plug-ins installed by the homeowner. Lytle Development Company will have little, if any, influence over these choices made by the homeowner. As above, the current median behavior attributes are represented here. To the extent that individuals are becoming more energy conscious, or appliances are becoming more energy efficient, the estimates provided here will tend to overestimate energy use in the future.

4.9 GHG Emissions Associated with Non-Residential Buildings

Non-residential buildings include all structures except residences that may exist in a development such as government, municipal, commercial, retail, and office space. This section describes the methods used to estimate the GHGs associated with activities in non-residential buildings.

The amount of energy used and the associated GHG emissions emitted per square foot of available space vary with the type of non-residential building. For example, food stores are far

more energy intensive than warehouses, which have little climate-conditioned space. Lytle Development Company provided data[95] summarizing the general non-residential building categories planned for LCR and the area of floor space planned for each building type. For new developments, the exact types of buildings are typically unknown. As such, not all building categories that may actually exist in LCR are represented below. However, all of the non-residential building area is accounted for, and the tables provided in this section present the differences in energy intensities from building type to building type. The types of non-residential buildings as provided to ENVIRON are:

a. Commercial

b. School

I. Elementary (1)

II. K through 8 (1)

Similar to the case for residential buildings, GHGs are emitted as a result of activities in non-residential buildings for which electricity and natural gas are used as energy sources. Combustion of any type of fuel emits CO_2 and other GHGs directly into the atmosphere; when this occurs in a non-residential building this is a direct emission source[96] associated with that building. GHGs are also emitted during the generation of electricity from fossil fuels. When electricity is used in a non-residential building, the electricity generation typically takes place offsite at the power plant; electricity use in a non-residential building generally causes emissions in an indirect manner.

While fuel combustion generates CH_4 and N_2O, the emissions of these GHGs typically comprise less than 1% of CO_2e emissions from electricity generation and natural gas consumption.[97] Fuel oil, kerosene, liquefied petroleum gas, and wood can also be used as fuels, but generally contribute only in small amounts as combustion sources within non-residential buildings. As such, these minor emissions are not accounted for here.

Similar to energy use in residential buildings, energy use in non-residential buildings is divided into energy consumed by the built environment and energy consumed by uses that are independent of the construction of the building such as plug-in appliances. In California, Title 24 governs energy consumed by the built environment, mechanical systems, and some fixed lighting. Non-building energy use, or “plug-in” energy use can be further subdivided by specific end-use (refrigeration, cooking, office equipment, etc.). The following two steps were performed to quantify the energy use due to non-residential buildings:

[95] The LCR Specific Plan was used to estimate total square footage of buildings. Information from Lytle Development Company was used to refine the types of building present.

[96] California Climate Action Registry (CCAR) General Reporting Protocol (GRP), Version 3.0 (April). Available at: http://www.climateregistry.org/resources/docs/protocols/grp/GRP_V3_April2008_FINAL.pdf, Chapter 8

[97] Ibid., Tables C1 and C2. The methane and nitrous oxide emission factors are negligible compared to the total CO_2 emission factor for electricity generation in California.

1. Calculate energy use from systems covered by Title 24[98] (HVAC system, water heating system, and the lighting system).
2. Calculate energy use from office equipment, plug-in lighting, and other sources not covered by Title 24.

The resulting energy use quantities were then converted to GHG emissions by multiplying by the appropriate emission factors obtained by incorporating information on local electricity production.[99] The total GHG emissions for non-residential buildings in LCR is estimated to be 4,386 tonnes CO_2 per year. The following sections describe the methodologies employed to estimate GHG emissions.

In this section of this report, the units CO_2 and CO_2e are used interchangeably for non-residential buildings because CH_4 and N_2O are assumed to contribute a negligible[100] amount of GWP when compared to the CO_2 emissions from non-residential buildings.

4.9.1 Estimate of Non-residential Energy Use Intensity

ENVIRON developed CO_2 intensity values (CO_2 emissions per sqft per year) for building types found in LCR using data from the California Commercial End-Use Survey (CEUS).[101] The methods that were used to estimate these emissions for LCR are described below.

4.9.1.1 CEUS Database

The overall electricity use for the building types was calculated based on data provided by the CEC.[102] The building types and subcategories are shown in Table 4-19. Table 4-19 also provides the mapping used to relate LCR building types to CEUS building types.

The CEUS data is based on a survey conducted in 2002 of existing buildings. Each building type has a characteristic electricity and natural gas use per square foot of building space. Electricity use per square foot (electricity intensity) for each building sample was extracted from the CEUS data. Similarly, the natural gas use per square foot (natural gas intensity) for each building sample was also extracted.

For this analysis, energy use was based upon buildings in California climate zone 10. Table 4-19 lists the breakdown of electricity use among several end uses for electricity in various non-residential building types. Table 4-20 lists the percentage breakdown of end uses for natural

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[98] Title 24, Part 6, of the California Code of Regulations: California's Energy Efficiency Standards for Residential and Nonresidential Buildings. http://www.energy.ca.gov/title24/

[99] The Southern California Edison specific emission factor for electricity deliveries is 631 lbs CO_2/MWh. From the California Climate Action Registry Database. Southern California Edison PUP Report. 2007.

[100] The Southern California Edison specific emission factor for electricity deliveries is 631 lbs CO_2/MWh. From the California Climate Action Registry Database. Pacific Gas and Electric PUP Report. 2007. Although this emission factor accounts for only CO_2, the emissions associated with N_2O and CH_4 contribute to less than 1% of the electricity generation CO_2e emissions.

[101] California Energy Commission (CEC). California Commercial End-Use Survey Results. Data available from Itron Inc. at http://capabilities.itron.com/CeusWeb/Chart.aspx

[102] Workbooks for "SCE – FCZ10" downloaded from http://capabilities.itron.com/CeusWeb/Chart.aspx for all building categories. Access 6/12/2009.

gas in various non-residential building types. The end use data provide an estimate of the percent of the total energy use comprised by Title 24 regulated (built environment) and plug-in electricity in each building type. The Title 24-regulated electricity use (cooling, space heating, water heating, lighting, ventilation) and the non-built electricity use (office equipment, refrigeration, cooking, etc.) are presented in Table 4-19. The Title 24-regulated natural gas use and the non-built natural gas use (primarily from cooking) are presented in Table 4-20.

The electricity and natural gas use per square foot for each building type are converted to GHG emissions as shown in the next section.

4.9.2 Estimation of Annual Greenhouse Gas Emissions from Non-Residential Buildings

Lytle Development Company has committed to making all new non-residential buildings 15% more energy efficient than 2008 Energy Efficiency Standards or 15% more energy efficient on a TDV basis. Although ENVIRON is aware that annual energy use and TDV energy do not necessarily scale linearly with each other, as discussed in the residential section, ENVIRON assumed that all sources covered by Energy Efficiency Standards would uniformly use 15% less annual energy. These calculations are shown in Table 4-22. Non-Energy Efficiency Standards regulated energy use is assumed to still use the same amount of energy as a minimally Energy Efficiency Standards compliant building. There is no credit taken for any Energy Star appliances in the non-residential building category since it is difficult to determine which appliances may be present in the various non-residential building categories. In addition these are generally not supplied with the building. Baseline Energy Efficiency Standards usage rates shown in this table have been adjusted to reflect improvements in Energy Efficiency Standards since their introduction in 2002. CEC discusses average savings for improvements from 2002 to 2005 ("Impact Analysis for 2005 Energy Efficiency Standards") as well as from 2005 to 2008 ("Impact Analysis 2008 Update to the California Energy Efficiency Standards for Residential and Nonresidential Buildings"). ENVIRON used these CEC average savings percentages to account for reductions in energy use due to Energy Efficiency Standards. The average savings percentages are: for electricity: 8.5% reduction in 2005 and 4.9% reduction in 2008; for natural gas: 5.8% reduction in 2005 and 9.4% reduction in 2008. This methodology results in a reduction of energy use for all building types. Because plug-ins are not covered under Energy Efficiency Standards, the decrease in energy use is typically less than 15%, yet still substantial. For instance, GHG emissions in commercial buildings decreased from 4.81 to 4.29 tonnes CO_2e per 1,000 sqft; an 11% decrease in GHG emissions.

Energy use data from Tables 4-19 and 4-20 were multiplied by the emission factors presented in Table 4-21 to generate CO_2 intensity values (CO_2 emissions per sqft building area). The results are shown in Table 4-22. The CO_2 intensity values presented in Table 4-22 represent the non-residential building types in LCR described earlier. The annual CO_2 emissions for different building types at Lytle Creek Ranch range from 2.85 tonnes per 1,000 sqft for schools to 4.29 tonnes per 1,000 sqft for commercial space.

Table 4-22 also shows the yearly CO_2 emissions from LCR by incorporating the emission factors developed as discussed above and the square footage of each of the main building categories. Due to the project design feature of reducing built energy use 15% below that in

2008 Energy Efficiency Standards, a reduction of 551 tonnes of CO_2 per year is realized from the non-residential buildings, or approximately 13% of the CO_2 emissions associated with non-residential buildings. These measures bring the overall CO_2 emissions associated with non-residential energy use down to 4,386 tonnes CO_2 per year.

4.9.3 Uncertainties in Non-residential Building GHG Calculations

Several factors lead to uncertainties in the above analysis. These are described below.

- For new developments, the exact types of buildings are typically unknown. As such, not all building categories that may actually exist in LCR are represented in this analysis. However, all of the commercial building area is accounted for and the best available assessment of the building type composition of LCR was used. The tables provided in this section present the differences in energy intensities from building type to building type.
- Although it is unknown exactly how the buildings will be designed, each building will be Title 24 compliant. Therefore all design features of the building that make it less energy efficient will be offset by design features that make it more energy efficient.

4.10 Mobile Sources

This section estimates GHG emissions from mobile sources in LCR. The mobile source emissions considered for this project will be from the typical daily operation of motor vehicles by LCR residents.

ENVIRON estimated GHG emissions based upon all miles traveled by LCR residents regardless of internal or external destinations or purpose of trip. Traffic patterns, trip rates, and trip lengths are based upon modeling results provided by Crain and Associates.[103] Appendix B is a memorandum from Crain and Associates describing the modeling methodology and results.

Mobile source emissions from new residences are considered to be growth, as residences are rarely removed from the housing supply once constructed. There are exceptions, such as when one housing development replaces another, and, in those cases, the replacement residential development need not be considered growth. However, it is not clear that commercial development should be considered new growth for vehicular travel purposes. To the extent that commercial development serves existing residential development its vehicular travel may not be new. For instance, if the new commercial area serves an area with a high residential/commercial balance, then this new commercial growth will reduce shopping and work trip lengths and will reduce GHG emissions associated with mobile sources. If, however, the new commercial area results in longer trips for its workers and residents than they would have previously made, then it adds GHG emissions. Commercial development that could potentially increase VMT would be facilities that draw trips from far away that otherwise would not be made. A theme park, for example, may be viewed as such a development.

[103] Memorandum from George Rhyner of Crain and Associates to Peter Lewandowski of Environmental Impact Sciences dated 9/15/2009.

In this report, it is assumed that new non-residential (i.e. office space, retail space, and industrial buildings) area serves an area with a high residential/ non-residential balance. Therefore, this new non-residential growth will not, independent of the new residential areas, result in new shopping and work trips. Accordingly, new non-residential space in the LCR development area will not contribute to mobile GHG emissions. However, the emissions from heating and cooling the non-residential areas would be considered to be new, as that would reflect growth in non-residential areas that goes along with growth in residential areas.

Accordingly, GHG emissions from VMT serving non-residential areas will only be counted if the non-residential areas contribute to greater VMT as a result of its location. It should be noted that as LCR is a mixed use community, this issue does not directly affect LCR VMT calculations; all VMT from LCR residents is calculated regardless of internal or external destinations or purpose of trip.

The CCAR GRP[104] recommends estimating GHG emissions from mobile sources at an individual vehicle level, assuming knowledge of the fuel consumption rate for each vehicle as well as the miles traveled per car. Since these parameters are not known for a future development, the CCAR guidance is too specific to use as recommended.

For mobile sources, CH_4 and N_2O are explicitly calculated, multiplied by their respective GWP, and added to the CO_2 emissions, to result in total CO_2e emissions from mobile sources.

4.10.1 Estimating VMT from Mobile Sources

This section summarizes the general approach used to estimate VMT made by the residents of LCR. Model results were provided to ENVIRON by Crain and Associates.

Traditional traffic models focus upon designing roads and planning a development such that traffic delays will be avoided during peak travel hours. Traditional traffic analyses also provide the total number of daily vehicles on a road which can then be used to calculate toxic or criteria emissions that may have localized health effects. Several steps must be taken to go from a traditional traffic model to a set of calculations that describe VMT made by LCR residents.

The trip generation data was taken from the East Valley Transportation Model (EVTM) which was also used to generate the traffic analysis. The EVTM was run by the Southern California Association of Government (SCAG) Inland Empire office based on inputs provided by Crain and Associates and the Lytle Development Company. Trip ends are then adjusted based on the proportion of production ends only, based on the methodology of the federally issued Urban Transportation Planning Software (UTPS) package.[105] The analysis is described in Appendix B. Added daily trips, based on weekday estimates, as well as added VMT are shown in Table 4-24.

[104] California Climate Action Registry (CCAR). 2008. *General Reporting Protocol*. Version 3.0. April.

[105] Memorandum from George Rhyner of Crain and Associates to Peter Lewandowski of Environmental Impact Sciences dated 9/15/2009.

4.10.1.1 Calculate final VMT based upon the above scenarios

Trips for each neighborhood are associated with an average trip length as provided by Crain and Associates.[106] Total vehicle miles traveled (VMT) were calculated by multiplying the number of trips by the average trip length for each type of trip.

VMT = Number of Trips * Average Trip Length

The value calculated here includes all VMT generated by LCR residents commuting within LCR and all VMT generated by LCR residents commuting to and from LCR. According to the methodology above, each LCR dwelling unit generates 21,638 VMT per year. The total VMT for LCR residents is 181,911,255 as shown in Table 4-25. This VMT was multiplied by the appropriate emission factors in the next section to calculate GHG emissions from mobile sources at LCR.

4.10.2 Estimating GHG Emissions from Mobile Sources

The CO_2 emissions from mobile sources were calculated with the trip rates, trip lengths and emission factors for running and starting emissions from EMFAC2007 as follows:

CO_2 emissions = VMT * $EF_{running}$

Where:

VMT = vehicle miles traveled
$EF_{running}$ = emission factor for running emissions

The CO_2 calculation involves the following assumptions:

- The emission factor depends upon the speed of the vehicle. Here, it was assumed that internal trips were 30 miles per hour[107].
- EMFAC emission factors from the year 2030 were used for $EF_{running}$ based on San Bernardino County fleet mix.

Startup emissions are CO_2 emitted from starting a vehicle. Startup emissions were calculated using the following assumptions:

- The number of starts is equal to the number of trips made annually.
- The breakdown in vehicles was EMFAC fleet mix for San Bernardino County in 2030.
- The emission factor for startup was calculated based on a conservative assumption of long waits between starts.

Fleet distribution types from EMFAC2007 were used for the year 2030, a year selected to represent full build out.

[106] Ibid.

[107] URBEMIS defaults to a vehicle speed of 30 mph for all trip types if no project specific data is entered.

Table 4-25 shows the CO_2 emissions from vehicles associated with residents of LCR as calculated according to the methodology described above. Since the EVTM modeled trip generation rates were based on weekday conditions, ENVIRON calculated weekend traffic by applying differences between the weekend and the weekday traffic based upon the analysis conducted by Crain and Associates based on Institute of Transportation Engineers (ITE) weekend and weekday trip generation rates. The ITE projection for the weekend trip ends was less than five percent less than the weekday trip end generation value.[108] Weekend traffic was assumed to be 95% of the weekday capacity.[109] Consequently, CO_2 emissions in Table 4-25 were multiplied by 98.6% to account for the difference between weekday and weekend conditions.

Nitrous oxide, CH_4, and HFCs[110] are also emitted from mobile sources. The USEPA recommends assuming that CH_4, N_2O, and HFCs account for 5% of mobile source GHG emissions, taking into account their GWPs.[111] Therefore, CO_2 emissions in Table 4-25 were divided by 0.95 to account for non-CO_2 GHGs. Vehicles associated with the LCR development will emit approximately 71,114 tonnes CO_2e per year without taking into account future regulatory activity.

As discussed in Section 3.3.5, the U.S. EPA recently granted the waiver for California for its greenhouse gas emission standards for motor vehicles. AB 1493 is expected to reduce running emissions for passenger cars and light trucks by 20% relative to the year 2009 by the year 2020.[112] Starting emissions will not be affected. Table 4-26 shows the CO_2 emissions from vehicles associated with residents of LCR as calculated incorporating the emissions reductions resulting from AB 1493. CO_2 emissions in Table 4-26 were divided by 0.95 to account for non-CO_2 GHGs. Vehicles associated with the LCR development will emit approximately 57,265 tonnes CO_2e per year. A sample EMFAC run for San Bernardino County is given in Appendix D.

4.10.3 Uncertainty Analysis

In an effort to evaluate the assumptions described in the section it should be noted that the VMT and GHG emissions will change based on further reductions that are likely due to the benefits of the community design to encourage mode shifts. In addition changes in estimated fleet distribution and emission factors will likely improve based on current and anticipated regulations.

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[108] Memorandum from George Rhyner of Crain and Associates to Peter Lewandowski of Environmental Impact Sciences dated 9/15/2009

[109] A conservative adjustment for weekend travel was assumed for all the trips since information was not available to distinguish between trips on major highways and trips on small streets.

[110] HFCs can be emitted from air conditioning systems.

[111] USEPA. 2005. *Emission Facts: Greenhouse Gas Emissions from a Typical Passenger Vehicle.* Office of Transportation and Air Quality. February. (http://www.epa.gov/otaq/climate/420f05004.pdf)

[112] CARB. "Comparison of Greenhouse Gas Reductions for the United States and Canada Under U.S. CAFÉ Standards and California Air Resources Board Greenhouse Gas Regulations". February 25, 2008. Table 11.

4.11 Municipal Sources

This section explains estimates for emissions stemming from municipal sources such as drinking water and wastewater supply and treatment, lighting in public areas, and municipal vehicles.

4.11.1 Water and wastewater supply and treatment systems

In general, the majority of municipal sector GHG emissions are related to the energy used to convey, treat and distribute water and wastewater. Thus, these emissions are generally indirect emissions from the production of electricity to power these systems. Additional emissions from wastewater treatment include CH_4 and N_2O, which are emitted directly from the wastewater.

The amount of electricity required to treat and supply water depends on the volume of water involved. According to Lytle Development Company, the development would generate a total water demand of 10,174 acre-feet (AF) per year. The entire amount is assumed to be potable water supplied by West Valley Water District.[113] Three processes are necessary to supply potable water to residential and commercial users: (1) supply and conveyance of the water from the source; (2) treatment of the water to potable standards; and (3) distribution of the water to individual users. After use, the wastewater is treated and reused as reclaimed water.

Indirect emissions resulting from electricity use were determined by multiplying electricity use by the CO_2 emission factor provided by the local electricity supplier, Southern California Edison, (SCE). Energy use for different aspects of water treatment (e.g. source water pumping and conveyance, water treatment, distribution to users) was determined using the stated volumes of water and energy intensities values (i.e., energy use per unit volume of water) provided by reports from the California Energy Commission (CEC) and a report by Robert Wilkinson on energy use for California's water systems[114]. The emission factors and GHG emissions for all these processes are shown in Table 4-28. The annual emissions from water treatment and distribution, wastewater treatment, and distribution of recycled water are approximately 8,891 tonnes CO_2e per year. Details on the emissions generated by specific aspects of water treatment and supply systems are provided in the following sections.

4.11.2 Potable Water Source Supply and Conveyance

Water is typically supplied to communities from several sources including the local underground aquifer, the State Water Supply, and recycled and reclaimed water.

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[113] West Valley Water District expects that the water for Lytle Creek Ranch will be sourced from groundwater basins, surface water, and purchased water. Groundwater sources are the Lytle Creek, Rialto, Chino, North Riverside, and Bunker Hill basins. Surface water is from Lytle Creek, and purchased water is from the State Water Project. http://www.scag.ca.gov/rcp/pdf/uwmp/SanBernardino/WVWD-UWMP-2006-2.pdf

[114] CEC 2005. California's Water-Energy Relationship. Final Staff Report. CEC-700-2005-011-SF, CEC 2006. Refining Estimates of Water-Related Energy Use in California. PIER Final Project Report. Prepared by Navigant Consulting, Inc. CEC-500-2006-118. December.

Wilkinson, Robert. 2000. Methodology for Analysis of the Energy Intensity of California's Water Systems, and An Assessment of Multiple Potential Benefits through Integrated Water-Energy Efficiency Measures.

Supplying and conveying water in LCR is estimated to account for 3,212 tonnes of CO_2e emissions per year. To supply the annual demand for 10,174 acre-feet (AF) of potable water LCR will draw upon water from the State Water Project, groundwater, and surface water.[115] The energy needed to supply and convey LCR's water will be used to pump this water from the sources and distribute it throughout the development. The CEC estimated that 950 kW-hr would be required to extract one AF of water from Chino Basin groundwater, and 370 kW-hr would be required to extract one AF of water from surface water. Wilkinson estimated that 3,236 kW-hr would be required to extract one AF of water from the State Water Project. Using these energy intensity factors, the expected potable water demand, and the SCE carbon-intensity factor, GHG emissions from potable water supply and conveyance were calculated (see Table 4-28). Supplying and conveying water in LCR from the State Water Project, groundwater, and surface water is estimated to account 1,053 tonnes, 1,940 tonnes, and 219 tonnes of CO_2e emissions per year, respectively.

4.11.3 Potable Water Treatment and Distribution

Treating and distributing potable water in LCR are estimated to account for 1,371 tonnes[116] and 1,157 tonnes of CO_2e emissions per year, respectively. Based on the estimated potable water demand, these energy intensity factors, and the SCE-carbon intensity factor, GHG emissions from potable water treatment and distribution were calculated as shown in Table 4-28.

4.11.4 Wastewater Treatment

Emissions associated with wastewater treatment include indirect emissions necessary to power the treatment process and direct emissions from degradation of organic material in the wastewater. Wastewater treatment indirect emissions in LCR are estimated to account for 2,411 tonnes of CO_2e emissions per year. Wastewater treatment direct emissions in LCR are estimated to account for 2,070 tonnes of CO_2e emissions per year.

Indirect GHG emissions from the electricity necessary to power the wastewater treatment process were calculated for LCR. The electricity required to operate a wastewater treatment plant is estimated to be 815 kW-hr per AF.[117] Based on the expected amount of wastewater requiring treatment (10,174 AF per year, this energy intensity factor and the SCE carbon-intensity factor, indirect emissions due to wastewater treatment were calculated as shown in Table 4-28.

Direct emissions from wastewater treatment include emissions of CH_4 and N_2O. A per capita emission factor for these GHG emissions was developed based on a 2005 US GHG inventory for domestic and industrial wastewater treatment (25 teragrams CO_2e/year or 25 million tonnes CO_2e/year)[118] and the 2005 US population (approximately 296,410,404)[119]. Direct emissions

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[115] Lytle Creek Ranch water supplies are based on West Valley Water District expected sources for the area. It is estimated that 69% will come from groundwater, 11% will come from the State Water Project, and 20% will come from surface water.

[116] Treatment is based on the average value presented by CEC. CEC 2005. California's Water-Energy Relationship. Final Staff Report. CEC-700-2005-011-SF.

[117] CEC 2005. California's Water-Energy Relationship. Final Staff Report. CEC-700-2005-011-SF.

[118] USEPA. 2007. Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2005. #430-R-07-002. April.

from wastewater treatment were calculated using the emission factor developed from this data (0.084 tonnes CO_2e per capita per year) and the projected population at LCR (24,539 residents[120]) as shown in Table 4-28.

In total, all water and wastewater supply, treatment and distribution for LCR is expected to produce 10,221 tonnes of CO_2e annually.

4.11.5 Public Lighting

Lighting sources contribute to GHG emissions indirectly, via the production of the electricity that powers these lights. Lighting sources considered in this source category include streetlights, traffic signals, area lighting for parks and lots, and lighting in public buildings. The emission factor for public lighting is shown in Table 4-28. Data from a report by the City of Duluth shows that the amount of electricity demand for all types of public lighting is 149 kW-hr per capita per year.[121] Lytle Development Company plans to incorporate energy-saving light fixtures where feasible. Energy savings from this potential measure were not quantified for this analysis. Using the Duluth study, the SCE-specific carbon-intensity emission factor and the expected LCR population of 24,539, emissions from public lighting were calculated.[122] Thus, the LCR-specific emission factor for public lighting would be 0.043 tonnes CO_2e per capita per year. Public lighting emissions in LCR are estimated to account for 1,061 tonnes CO_2 per year. This number is likely a conservative estimate since LCR is a master-planned compact community and may require fewer lights than the City of Duluth.

4.11.6 Municipal Vehicles

GHG emissions from municipal vehicles are due to direct emissions from the burning of fossil fuels. Municipal vehicles considered in this source category include vehicles such as police cars, fire trucks, and garbage trucks. The emission factor for municipal vehicles is shown in Table 4-28. Data from reports by Medford, MA; Duluth, MN; Northampton, MA; and Santa Rosa, California[123] show that the CO_2 emissions from municipal vehicles would be approximately[124] [125] 0.05 tonnes per capita per year. Using these studies and the expected LCR

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http://epa.gov/climatechange/emissions/downloads06/07Waste.pdf

[119] This per capita emission factor distributes both domestic (municipal sewage) and industrial waste treatment emissions over the population.

[120] Provided to ENVIRON by Lytle Development Company.

[121] Skoog., C. 2001. This factor was calculated by summing the total electricity needs for municipal uses and dividing by the Duluth population. The Duluth population was calculated by dividing the city's reported GHG emissions by its reported per capita emissions. The City of Duluth is assumed to contained balanced commercial and residential land uses.

[122] Population estimate provided by Lytle Development Company.

[123] City of Medford. 2001. Climate Action Plan. October. http://www.massclimateaction.org/pdf/MedfordPlan2001.pdf

City of Northampton. 2006. Greenhouse Gas Emissions Inventory. Cities for Climate Protection Campaign. June. http://www.northamptonma.gov/uploads/listWidget/3208/NorthamptonInventoryClimateProtection.pdf

City of Santa Rosa. 2001. Cities for Climate Protection: Santa Rosa. http://ci.santa-rosa.ca.us/City_Hall/City_Manager/CCPFinalReport.pdf

Skoog., C. 2001. Greenhouse Gas Inventory and Forecast Report. City of Duluth Facilities Management and The International Council for Local Environmental Initiatives. October.http://www.ci.duluth.mn.us/city/information/ccp/GHGEmissions.pdf

[124] In an effort to be conservative, the largest per capita number from these four reports was used.

population of 24,539, emissions from municipal vehicles in LCR were calculated. Municipal vehicle emissions in LCR are estimated to account for 1,227 tonnes CO_2e per year.

In total, all municipal sources including water, wastewater, public lighting and municipal vehicles for LCR is expected to produce 12,509 tonnes of CO_2e annually.

4.12 Area Sources

Area sources emissions stem from hearths (including gas fireplaces, wood-burning fireplaces, and wood-burning stoves) and small mobile fuel combustion sources such as lawnmowers. Fuel combustion associated with these sources produce direct GHG emissions. Emissions from natural gas-fired stoves and natural gas heating are already included in the residential and non-residential source (see Table 4-11 through 4-23).[126] Calculations based on the URBEMIS method were performed for the remaining types of area sources, natural gas fireplaces and lawn maintenance.

LCR will have 8,407 natural gas fireplaces in its residential units. Wood-burning stoves or fireplaces are prohibited. Direct GHG emissions from these sources were estimated by multiplying the energy use per year by the CO_2 emission factor for natural gas combustion. Annual energy use was determined by the number of fireplaces, the average energy use of each fireplace, and the URBEMIS default fireplace usage rate value of 200 hours/year. In the absence of site-specific energy use values for fireplaces at LCR, the URBEMIS default values of 20,000 BTU/hour/fireplace for multi-family residences, and 30,000 BTU/hour/fireplace for single-family houses were used. Table 4-27 and 4-29 shows an estimated 2,339 tonnes CO_2 will be generated annually by fuel combustion in natural-gas fireplaces.

Landscaping emissions originate from equipment such as lawn mowers, blowers, trimmers and chain saws.[127] For residential areas, landscape-based GHG emissions are directly related to the number of residential units, the annual equipment usage rate, and landscape equipment CO_2 emissions factors. URBEMIS default values were employed for the annual usage rate. Table 4-27 and 4-29 shows an estimated 31 tonnes CO_2 will be generated per year.

4.13 Emissions Sources Not Quantified in Inventory

Several emissions sources were not quantified in this inventory, due to their estimated relatively small[128] contribution to GHG emissions. These sources include emissions from recreational

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[125] While the emission factor used is expressed as a per capita value, emissions due to residential and non-residential land uses were incorporated into the total emissions distributed among the population.

[126] The methods used to calculate natural gas use for heating, water heating, and cooking described in the residential emission calculations are conservative and may cause slight differences in the natural gas usage determined using URBEMIS as was used in the air quality section of the draft EIR for Lytle Creek Ranch. Both methods are appropriate for the purpose of the individual sections. URBEMIS is designed for worst day local emissions of criteria pollutants as opposed to total emissions of GHGs.

[127] According to Appendix B of the URBEMIS User's Guide, landscaping emissions from non-residential land uses also includes contributions from air compressors, generators and pumps, which are affiliated with commercial applications.

[128] Typically less than 1% of the overall inventory based upon previous studies.

sources and refrigeration leaks which are described in more detail below.[129] Emissions from these sources are expected to be de minimis.

4.13.1 Pools and Recreation Centers

The LCR Specific Plan includes neighborhood community areas and parks which may also include pools and recreation centers. At the entitlement stage of development, the degree of uncertainty in the potential end-uses of these recreational areas make a meaningful quantification of GHG emissions difficult. As a result of this uncertainty, ENVIRON did not quantify these emissions at this time.

4.13.2 Refrigeration Leaks

Emissions associated with leaks of high global warming potential gases such as from refrigeration leaks were not quantified. At the entitlement stage of development, the degree of uncertainty in the potential facilities with sources that may have refrigeration leaks make a meaningful quantification of GHG emissions difficult. In addition, since refrigeration systems will be new, they are likely efficient and should be designed to reduce the amount of leaks of high global warming potential gases. As a result of this uncertainty, ENVIRON did not quantify these emissions at this time.

4.14 Project Design Features that Reduce GHG Emissions

The LCR development incorporates many design features to reduce GHG emissions. This section describes the design features that were incorporated into this analysis either directly or indirectly. This section also lists those features that were not quantified in this analysis, but would likely yield further GHG emissions reductions.

4.14.1 Project Design Features whose Emissions Reductions were Incorporated into the Analysis

4.14.1.1 Reductions in emissions from mobile sources

- Project design will provide physical linkages between land uses that promote walking and bicycling and provide alternatives to automobile use.
- Lytle Creek Ranch will link together parks and other activity nodes on-site via a 23.5-acre “Grand Paseo”.
- The compact building design approach to be used at LCR will reduce its footprint and allow for transportation and open space corridors.
- The commercial areas in each will be centrally located and walkable.
- The circulation system has been designed to encourage residents to make multiple stops per trip[130].

[129] Black carbon was also not considered. Major sources of black carbon emissions are not present at LCR.

[130] This design encourages pass-by trips, which decrease overall VMT as estimated by URBEMIS. Pass-by trips are discussed in section 4.10.1.5.

4.14.1.2 Vegetation preservation

- 829 acres will be preserved in its existing natural habitat, as part of the Open Space and Conservation Plan prepared for Lytle Creek Ranch.
- Up to 30,000 trees will live within Lytle Creek Ranch.

4.14.1.3 Energy Savings

- Homes and businesses will exceed the 2008 Energy Efficiency Standards by at least 15%.
- Where appliances are offered by homebuilders, Energy Star appliances will be installed.
- The following project design features, while not individually quantified, may be incorporated to meet the 15 percent reduction over 2008 Energy Efficiency Standards to which the applicant has committed. Installation of (a) energy-efficient heating and cooling systems, equipment, and control systems: (b) GE Energy Monitoring Dashboards to provide real-time and historical feedback to residents on their homes' energy consumption; lighting control systems; and (d) light-colored "cool" roofs.

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4.14.1.4 Area Sources

- Wood-burning fireplaces are prohibited.

4.14.2 Features whose Emissions Reductions were not Incorporated into the Analysis but would yield further GHG emissions savings

There are number of design features that will result in the reduction of GHG emissions from the project. These can not be quantified, but they are listed in this section.

4.14.2.1 Energy Use in the Built Environment

- Purchase of green power beyond the requirements of the Renewables Portfolio Standard
- Installing additional energy efficient appliances (clothes dryers, ventilation fans, and ceiling fans) – e.g., Energy Star or equivalent
- Installing efficient pumps and motors for pools and spas
- Installing LEDs for traffic and street
- Providing education on energy efficiency, water conservation, and waste recycling services
- Installing Heating, Ventilation, and Air-Conditioning, refrigeration, and fire suppression equipment that do not contain CFCs
- For mechanically or naturally ventilated spaces in the building, meet the minimum requirements of Section 121 of the California Energy Code or the applicable local code, whichever is more stringent
- MERV 6 or higher filters are installed on central air and heating systems

4.14.2.2 Reductions in emissions from mobile sources

- Connections to mass transit facilitate and promote alternative transportation.

- Bicycle friendly environment

4.14.2.3 Water conservation

- Turf will not occupy more than 60% of the landscaped area in the home lots.

4.14.2.4 Solid Waste

- Recycling centers will be provided in readily accessible areas within buildings for depositing, storage, and collection of non-hazardous materials for recycling.

4.15 Summary of Emissions from LCR

The emissions and relative magnitude of emissions from the various aspects of LCR when AB 1493 is taken into account are presented in Table 4-31. One-time vegetation emissions are estimated to be -1,120 tonnes CO_2; the negative value indicates a one-time net decrease in emissions. One-time construction emissions are estimated to be 257,552 tonnes CO_2e. Emissions from mobile sources are estimated to be 53,144 tonnes CO_2e per year, or 58% of the annual project emissions. Emissions from residential buildings of 21,530 tonnes CO_2e per year comprise 22% of the annual project emissions. Emissions from non-residential buildings of 4,386 tonnes CO_2e per year comprise 4% of the annual project emissions. Emissions from municipal sources (water distribution, public lighting, and municipal vehicles) are estimated to be 13% of the annual project emissions. Emissions from area sources (fireplaces and lawn maintenance) are estimated to be 2,370 tonnes, or 2% of annual project emissions. If the one-time emissions are annualized assuming a 40-year development life the annual emissions are 104,470 tonnes per year.

As noted in Section 3 of this report, AB 32 requires that GHG emissions from California be reduced to 1990 levels by 2020. This represents a reduction of approximately 28.3% from projected 2020 growth. In addition to reducing overall energy consumption, the goals of AB 32 are likely to be reached by increasing renewable or non-carbon producing electricity production, and changing the transportation system to rely on a set of low carbon fuels. Although some measures that are being implemented as a part of AB 32 are incorporated into the calculations, such as the new fuel efficiency standards and the 33% renewable power standard, other measures that have yet to be implemented are not included. Accordingly, actual emissions are likely to be lower as more measures to implement AB 32 are enacted. Section 5 puts LCR emissions in context and includes an analysis of a Business as Usual (BAU) scenario compared to LCR.

Furthermore, Governor Schwarzenegger's Executive Order S-3-05 set a target to reduce GHG emissions by 2050 to levels 80% less than the 1990 levels. It is likely that future measures will be implemented to reach this goal that similarly may result in reductions of GHG emissions for sources in LCR beyond those stated in this report.

4.16 Life Cycle Emissions of Building Materials

An estimate of "life-cycle" GHG emissions (i.e., GHG emissions from the processes used to manufacture and transport materials used in the buildings and infrastructure) is presented in this section and attached as Appendix E. This estimate is to be used for comparison purposes only and is not included in the final inventory as these emissions would be attributable to other

industry sectors under AB 32. For instance, the concrete industry is required by law to report emissions and undergo certain early action emission reduction measures under AB 32. Furthermore, for a life-cycle analysis for building materials, somewhat arbitrary boundaries must be drawn to define the processes considered in the life-cycle analysis.[131] Recognizing the uncertainties associated with a life-cycle analysis, the California Air Pollution Control Officers Association (CAPCOA) released a white paper which states: "The full life-cycle of GHG emissions from construction activities is not accounted for in the modeling tools available, and the information needed to characterize GHG emissions from manufacture, transport, and end-of-life of construction materials would be speculative at the CEQA analysis level.[132]"

The calculations and results discussed here and presented more fully in Appendix E are estimates and should be used only for a general comparison to the overall GHG emissions estimated in the Climate Change Technical Report. Life Cycle Assessment (LCA) emissions vary based on input assumptions and assessment boundaries (e.g., how far back to trace the origin of a material). Assumptions made in this report are generally conservative. However, due to the open-ended nature of LCAs, the analysis is highly uncertain.

Appendix E is an ENVIRON report that evaluates the life cycle GHG emissions associated with the building materials for this project. The life cycle GHG emissions include the embodied energy from the materials manufacture and the energy used to transport those materials to the site. The report then compares the life cycle GHG emissions to the overall annual operational emissions. The materials analyzed in the report include materials for 1) residential and non-residential buildings, and 2) site infrastructure. This report calculates the overall life cycle emissions from construction materials to be approximately 32,061 – 345,545 tonnes CO_2 / year. This represents 1% – 9% of the annualized GHG emissions[133] from the LCR area, assuming a 40 year lifespan of the project as described below.

The report estimated the life cycle GHG emissions for buildings by conducting an analysis of available literature on LCAs for buildings. According to these studies, approximately 75 - 97% of GHG emissions from buildings are associated with energy usage during the operational phase; the other 3 - 25% of the GHG emissions are due to material manufacture and transport. Using the GHG emissions from the operation of buildings, 3% to 25% of building emissions corresponds to approximately 0.8 - 9% of the project emissions.

The report calculated the life cycle GHG emissions for certain components of infrastructure (roads, storm drains, utilities, gas, electricity, and cable). This analysis considered the manufacture and transport of concrete and asphalt only, as ENVIRON assumed that other construction materials such as steel would be present in much smaller quantities. Because the

[131] For instance, in the case of building materials, the boundary could include the energy to make the materials, the energy used to make the machine that made the materials, and the energy used to make the machine that made the machine that made the materials.

[132] CAPCOA. 2008. CEQA & Climate Change: Evaluating and Addressing Greenhouse Gas Emissions from Projects Subject to the California Environmental Quality Act. Available online at: http://www.capcoa.org/ceqa/?docID=ceqa&PHPSESSID=df1348d6f7eff0fc2a8263d19f6d10dd

[133] The LCA emissions occur one time throughout the life of the project, and consequently are annualized over a 40 year project life for comparison to the annual project emission total.

manufacture of concrete has a higher CO_2 emission factor and most construction estimates higher quantities of concrete than asphalt, the majority of the emissions for infrastructure result from the manufacture of concrete. Because the asphalt and concrete are locally sourced, the transportation emissions are relatively small. If a 40 year lifespan of the infrastructure is assumed, the total annualized emissions from embodied energy in infrastructure materials are approximately 0.2% of the project emissions.

The overall life cycle emissions, annualized by 40 years, are 1,044 – 8,881 tonnes CO_2 / year, or 1.1% – 9% of the annualized GHG emissions from the LCR project. The bulk of these emissions (0.8 – 9%) are from general life cycle analysis studies and do not reflect specific information from LCR.

Again, note that the calculations and results presented in this life cycle report are estimates and should be used only for a general comparison to the overall GHG emissions estimated in the Climate Change Technical Report. LCA emissions vary based on input assumptions and assessment boundaries (e.g., how far back to trace the origin of a material). Assumptions made in this report are generally conservative. However, due to the open-ended nature of LCAs, and the fact that literature evaluation, not site specific studies were used to analyze the embodied energy, the analysis should be considered to yield highly uncertain results. Additionally, these estimates likely double count emissions from other industry sectors.

5 Inventory in Context

5.1 LCR Greenhouse Gas inventory in Context

This section is intended to place the GHG emissions from the proposed residential development in context with respect to intensity, consistency with AB 32 goals, and magnitude. For the intensity comparison, we compare the built environment emissions with that from a BAU comparison of standard energy use for buildings in California in the same climate zone. In addition, we compare anticipated mobile emissions to San Bernardino County and emissions savings from water usage in the development. For comparison with AB 32 goals, we compare the GHG emissions with the levels likely to be mandated under AB 32. Finally, the emissions from the project at build-out are compared to California and global GHG emissions in order to put the project emissions in a global context.

5.2 Characterization of Emissions

In 2004, 81% of greenhouse gas emissions (in CO_2e) from California were comprised of CO_2 emissions from fossil fuel combustion, with 4% comprised of CO_2 from process emissions. CH_4 and N_2O accounted for 5.6% and 6.8% of total CO_2e respectively, and high GWP gases[134] accounted for 2.9% of the CO_2e emissions. Transportation is by far the largest end-use category of GHGs. Transportation includes that used for industry (i.e., shipping) as well as residential use.

5.3 Comparison with AB 32-mandated Emissions Limits

As noted earlier, AB 32 requires that statewide GHG emission in 2020 be equal to 1990 levels. California-wide GHG emissions in 1990 were 0.427 billion tonnes.[135] It is projected that emissions in 2020 under a Business As Usual (BAU) scenario accounting for growth will be 0.596 billion tonnes[136]. This would require a 28.3% decrease in emissions from BAU by 2020 to achieve AB 32 goals. The population in California is projected to be 42,210,000 in 2020. In order to achieve AB 32 mandated goals, the per capita emissions would have to be 10.1 tonnes CO_2e (see Table 5-1 for calculation details). LCR has estimated emissions of 98,059 tonnes per year[137], or 4.0 tonnes per capita per year.[138] The California per capita CO_2 emissions includes industries such as heavy industry, refining, and transportation of materials while the LCR per capita CO_2 emissions do not include these emissions. AB 32 will be reducing emissions in a variety of different ways, including increasing energy efficiency and introducing more renewable energy sources. It is difficult to compare the Project per capita emissions to the AB 32 goals as it is not clear what fraction of the reduction will be achieved in which sectors, or the apportionment of reduction between energy efficiency and renewable resources. This is discussed more fully below.

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[134] Such as HFCs and PFCs.

[135] http://www.arb.ca.gov/cc/inventory/1990level/1990level.htm. California Air Resources Board.

[136] http://www.arb.ca.gov/cc/inventory/data/forecast.htm#summary_forescast

[137] This value does not include the annualized one-time emissions, to avoid potential inconsistencies in the period over which one-time emission are annualized for comparison purposes.

[138] Based upon 24,539 residents.

5.4 Business as Usual Comparison

In order to put the GHG emission inventory into context and justify an improvement heading towards meeting the reduction goals set for 2020, it is necessary to compare the GHG emission inventory expected for LCR to the GHG emissions that would occur from a community that would be built today without the project design features and energy reduction commitments made by Lytle Development Company, and without the regulations that have been promulgated to comply with AB 32. This baseline comparison is referred to as the BAU scenario. This represents the GHG emission inventory if things were continued to be built according to current standards, and was the scenario that ARB used to estimate the required 28.3% reduction in emissions. The major categories of the GHG emission inventory are considered separately. These include residential and non-residential buildings, mobile sources, municipal lighting, and water sources. The remaining categories include municipal vehicles and area sources. These categories represent a small fraction of the total inventory and do not have appropriate emission factors to quantify the reductions that are likely to occur at LCR compared to BAU.

5.4.1 Vegetation

Lytle Development Company has committed to preserving 908 acres of land in its natural state instead of building out in this area. In addition, Lytle Development Company has committed to planting 30,000 new trees. The BAU analysis for vegetation assumes that neither of these commitments are taken and the land is fully developed, without replanting. Tables 5-2 through 5-5 follow the same methodology presented in section 4.5 of this report. The BAU vegetation results in a one-time release of 12,988 tonnes CO_2e, the sequestration capacity of the removed vegetation. This is a 109% increase in CO_2e emissions from the project.

5.4.2 The Built Environment

The energy use and GHG emissions from the modeled homes for LCR were compared to the energy use and GHG emissions from a minimally Title 24 compliant building of the same size, based on 2005 Title 24 requirements. It was also assumed that the comparison homes had standard appliances instead of Energy Star appliances. Finally, it was assumed that the fraction of renewable energy supplied to the project would remain at present levels. The same distribution of home sizes and climate zone location is used for the BAU analysis. As illustrated in the tables presented in Section 4.7, LCR is 29% better than the BAU home for emissions from energy use covered by 2008 Energy Efficiency Standards. In addition, when major appliances are considered, the homes of LCR are 27% better than homes meeting the 2005 Energy Efficiency Standards (and approximately 22% better than the 2008 Energy Efficiency Standards homes). When the rest of plug-in energy use is considered, LCR homes are 29% better than 2005 homes and approximately 24% better than the 2008 Energy Efficiency Standards homes. These comparisons are summarized in Table 4-17. It is important to recognize that areas in which the developer has control over the energy use, i.e. building envelope and major appliances, show an improvement over BAU. This comparison does not take into account the energy use of occupants, which is expected to decrease as people become more conscious of energy use and climate change issues, and more sensitive to the cost of energy.

CO_2 emissions per DU for LCR homes are approximately 13.5 tonnes per DU per year excluding renewable energy reductions. For the BAU housing, emissions are approximately

16.7 tonnes per DU per year. LCR homes, per DU, emit approximately 3.2 tonnes less CO_2 per year than the BAU housing.

Homes in LCR are 15% more energy efficient than a minimally 2008 Energy Efficiency Standards compliant home. As such, LCR residential units are heading toward meeting AB 32 goals on a per DU basis, without any decrease in GHG intensity from energy production, which is likely to occur. It also does not account for changes in occupant behavior and on-site renewable energy.

A similar comparison for non-residential buildings compares LCR non-residential building energy use and GHG emissions from a minimally 2005 Energy Efficiency Standards compliant building[139]. The same mix of non-residential building types and square footage is assumed. For energy use subject to Title 24, the LCR non-residential buildings will be 15% better than the 2008 Energy Efficiency Standards (per the Lytle Development Company's commitment). Unlike residential homes, the developer has little control over the appliances and plug-in energy use that will occur in the buildings. When typical plug-in energy use is considered for the non-residential buildings, LCR is 25% better than 2005 Energy Efficiency Standards. This does not account for non-residential occupants using energy efficient appliances.

There are some uncertainties and limitations that need to be pointed out for the non-residential building BAU comparison. ENVIRON used a baseline energy use value for non-residential buildings based upon survey data of current building stock. Although the correct comparison for BAU is with the Title 24 standards that were in effect in 2008 (i.e., the 2005 version of Title 24) as assumed in the scoping plan[140], a direct comparison with these standards are not available. Current building stock is likely less efficient than the requirements for new buildings under Title 24, however, this was assumed to be the baseline values in this analysis since a better comparison of a standard Title 24 compliant building was not available.[141] Additionally, a generic mix of non-residential building uses was assumed in determining percentage reduction from electricity and natural gas. To the extent that LCR's mix changes the calculated savings may differ.

5.4.3 Transportation

Consistent with one of the options in the OPR Guidance, this section discusses a comparison of project emissions with the goals of AB 32.

ENVIRON estimated the trip rates for a BAU scenario assuming no project design features including mixed use, local serving retail, and pedestrian friendliness. In addition, it was assumed that the same 8,407 dwelling units would be developed at a lower density, comparable to that of the nearby areas of the City of Rialto. It was further assumed that the 8,407 dwelling

[139] The comparison is to the 2005 Title 24 standards, which were in effect in 2008.

[140] Standards in effect in 2008 were the 2005 Title 24 Standards. 2008 Standards take effect in 2009.

[141] In a comparative analysis it is important to consider the percent difference between the proposed scenario and the BAU scenario. The proposed scenario is based on energy consumption data for current building stock (rather than new buildings compliant with current building energy standards). Since the BAU scenario is based on the same core data set, the calculated percent difference is due only to the differences between the two scenarios.

units would be built with a mix of single family and multifamily residences proportional to that in the City of Rialto. The density for single family homes in the BAU case was based on the minimum lot size in the City of Rialto. The density for multi-family homes in the City of Rialto was based on URBEMIS defaults.[142,143]

URBEMIS methodology was used to estimate the impact on trip generation of both the increased density of the project relative to the BAU scenario and the mitigation factors. Two scenarios were modeled in URBEMIS, one using the LCR housing mix and density as well as the LCR mitigation factors[144] (the "mitigated scenario") and one using the housing mix and density based on the City of Rialto, and not including mitigation factors (the "low-density unmitigated scenario"). The URBEMIS methodology for adjusting ITE trip generation rates results in an increase in the trip rates associated with these 8,407 dwelling units in the low-density unmitigated scenario due to the decreased density of the dwelling units and removal of other project design features. Table 5-7 shows the residential land use inputs and the trip rates and daily trips for the two scenarios, based on the URBEMIS output.[145]

5.4.3.1 Estimating reduction in trip generation rates

This section summarizes the general approach used to estimate trip rates made by the residents for the BAU scenario. As described above, the first step was to quantify the impact of the density of the LCR project and the mitigation factors included in the project relative to the BAU scenario. This was done using URBEMIS. Both scenarios were modeled using the same methodology, described in more detail below.

As discussed above, the trips generated by the residents of LCR represent growth. However, new non-residential areas do not necessarily represent growth since people would already be taking these trips. The new non-residential areas will only serve to displace the location of trips. Therefore we will only account for trips generated from the residential land uses to determine the GHG emissions from the LCR scenario and the low-density unmitigated scenario.

URBEMIS uses the trip generation rates based on ITE trip generation rates for each land use type. ITE trip generation rates vary over a range depending on several factors. For housing types, a key feature that changes trip rate is housing density. It has been determined that housing density scales with trip rates according to the following equation[146]:

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[142] The ratio of single family to multi-family houses in the BAU case was based on 2005-2007 census data for the City of Rialto. 1-unit attached, 1-unit detached, and 2-unit buildings were considered to be single family. All others excluding mobile homes and vans were assumed to be multi-family.

[143] The default for low-rise apartments (three or fewer levels) and condo/townhouses (two or fewer levels) was used. It is ENVIRON's understanding that Rialto has few, if any, residential high-rises.

[144] The input parameters to the URBEMIS operational mitigation component that were used to model the mitigated scenario are shown in Table 5-6.

[145] URBEMIS files provided to ENVIRON by PCR Services Corporation on 6/5/2009.

[146] Appendix D page D-15 of URBEMIS User's Guide.

$$Trip\ reduction = 0.6 \cdot \frac{1 - 19749 \cdot \left(\frac{4.814 + DU / Ac}{4.814 + 7.14} \right)^{-.0639}}{25914}$$

Where:

Trip reduction = The percent reduction from average ITE trip generation rate.

DU/ac = The number of dwelling units per acre for a specific land use type.

Thus, there is a sizable reduction in trips as compared to the average ITE trip generation rate for the housing density planned for LCR. URBEMIS has adopted the methodology of accounting for other project design features as reductions in the number of trips taken for a specific land use. For LCR, this includes a trip reduction for mixed-use development, local serving retail, mass transit, a pedestrian factor, and a bicycle friendliness factor.[147] These along with housing density modify the trip rate for the housing land use categories.

It is likely that a portion of the LCR residents would take public transportation when travelling out of LCR. Lytle Development Company has committed to enhancements of the public transportation in the region. Trip reductions due to bus and Metrolink rail travel were taken into account in the URBEMIS model, as were reductions due to pedestrian and bicycle-friendly design. URBEMIS uses a Transit Service Index which incorporates frequency of service but weights rail more heavily than bus transit. Trip reductions due to mode shifts incorporate the Transit Service Index and a pedestrian/bicycle score.[148]

The value calculated here includes all VMT generated by LCR residents commuting within LCR and all VMT generated by LCR residents commuting to and from LCR. According to the methodology above, 49,946[149] added trips per day are associated with LCR (the mitigated scenario), as shown in Table 5-7. The low-density unmitigated scenario generates an added 70,377 added trips per day, or 141% of the trips associated with the mitigated scenario.

This ratio of trips generated for the low-density unmitigated scenario relative to the mitigated scenario was used to scale the VMT estimated using the EVTM model, resulting in an estimate of the VMT associated with the BAU scenario. This approach assumes that trip distances are the same in the two scenarios. This methodology results in an estimate of 66,970 added trips per day and 702,010 added vehicle miles traveled per day associated with the BAU scenario, as shown in Table 5-8.

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[147] All of these trip rate reductions follow the methods described in URBEMIS User's Guide Appendix D.

[148] Equations can be found on page 38 of the URBEMIS User's Guide.

[149] 49,946 added weekday trips were predicted using the URBEMIS model as described in this section. This URBMIS based value was used in this analysis only to establish the percent trip reduction relative to the BAU scenario also modeled in URBEMIS. The EVTM model estimate of 47,545 added daily trips provided by Crain and Associates was used to calculate project emissions. Note that the difference between the two methodologies is less than 5%.

These modified trip rates were applied to the same methodology outlined for the traffic calculations including the weekend trip rate adjustment. Table 5-8 shows a total VMT for the BAU scenario as 256,263,761 miles per year. In addition the BAU scenario would release 100,168 tonnes of CO_2e per year. Table 5-9 shows that this is 30,479 miles per dwelling unit. LCR represents a 42% reduction in VMT and CO_2e emissions per year compared to BAU.

Additionally, there has been no reduction taken for changes in vehicle emissions anticipated from current regulations. Vehicle emissions will be reduced in the future independent of the development location, as the implementation of AB 32 will require improvements in vehicle mileage, increased use of public transit, and the incorporation of low-carbon fuels into the transportation fuel supply.[150] Transportation emissions presented here are based upon EMFAC2007 values, which are based upon past vehicle emission trends and do not incorporate the known regulatory actions as described above. In fact, on a VMT basis, EMFAC2007 assumes that CO_2 emissions in 2030 are slightly higher than they are currently. This is clearly unlikely, given the mandates of AB 32 and the likelihood of federal regulation.

The annual VMT per dwelling unit for LCR is 21,638 miles. A 1995 study prepared for ARB determined that annual VMT per dwelling units under “smart growth” principles should be 22,000 to 25,000 miles for sub urban level 3 areas[151]. Thus, LCR will generate less VMT on a per dwelling unit basis than the ARB report suggests for a "smart growth" development.

5.4.4 Municipal Sources

5.4.4.1 Water and Wastewater

The BAU comparison for water and wastewater treatment and distribution was based on a community that would use approximately 10,174 acre-feet of water annually with 10,174 acre-feet of potable water, no recycled water, and 10,174 acre-feet of wastewater. Since Lytle Development Company does not plan to implement any project design features beyond BAU for water and wastewater, these CO_2e emissions from Lytle Creek Ranch are expected to be equivalent to BAU. Table 5-11 summarizes this analysis. The implementation of the RPS will reduce carbon dioxide emissions from this source, somewhat, but this has not been quantified.

5.4.4.2 Public Lighting

The BAU comparison for public lighting assumes that energy efficient street lights will not be used. The Lytle Creek Ranch Specific Plan encourages, but does not require, strategies to improve energy efficiency in lighting public areas[152]. Lytle Development Company plans to incorporate energy-saving lighting fixtures where feasible; however, any potential benefits were not quantified for this analysis. Therefore, Table 5-11 shows that LCR’s public lighting is equivalent to BAU.

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[150] The Low Carbon Fuel Standard (LCFS) mandated under Governor Schwarzenegger's Executive Order S-01-07 and currently being developed by the California Air Resources Board (ARB) requires a reduction in carbon intensity of California's transportation fuels by at least 10% by 2020.

[151] JHK & Associates, Inc. 1995. Transportation-Related Land Use Strategies to Minimize Motor Vehicle Emissions: An Indirect Source Research Study. June.

[152] Draft Lytle Creek Ranch Specific Plan. December 2008. p. 4-124.

5.5 Comparison with State, Global, and Worldwide GHG Emissions

The emissions from the project at build-out are compared to California and global GHG emissions to put the emissions from the project in context. The project's annual emissions are approximately 98,059 metric tonnes CO_2e per year, and 256,432 tonnes of one-time emissions. If the one-time emissions are annualized by a development lifetime of 40 years (6,411 tonnes CO_2e per year), the overall yearly emissions are approximately 104,470 tonnes CO_2e per year. This is equivalent to approximately 4.3 tonnes per capita per year.[153]

Worldwide emissions of GHGs in 2004 were 26.8 billion tonnes of CO_2e per year.[154] In 2004, the US emitted about 7 billion tonnes of CO_2e.[155] Over 80% of the GHG emissions in the US are comprised of CO_2 emissions from energy related fossil fuel combustion. In 2004, California emitted 0.480 billion tonnes of CO_2e, or about 7% of the US emissions. 98,059 tonnes of CO_2e per year from LCR would be approximately 0.00037% of the world wide emissions, 0.00140% of the United State's emissions, or 0.0204% of California's annual GHG emissions.

[153] Assuming a LCR population of 24,539.

[154] Sum of Annex I and Annex II countries without counting Land-Use, Land-Use Change and Forestry (LULUCF) http://unfccc.int/ghg_emissions_data/predefined_queries/items/3814.php For countries that 2004 data was unavailable, the most recent year was used.

[155] 2006 Inventory of U.S. Greenhouse Gas Emissions and Sinks. Available online at: http://www.epa.gov/climatechange/emissions/downloads06/06_Complete_Report.pdf

6 Executive Order S-03-05

Executive order S-03-05 mandates that California emit 80% less GHGs in 2050 than it emitted in 1990. As of 2004, California was emitting 12% more GHG emissions than in 1990. For California to emit 80% less than it emitted in 1990, the emissions would be only 18% of the 2004 emissions. Accounting for a population growth from 35,840,000 people in 2004 to approximately 55,000,000 people in 2050, the emissions per capita would have to be only 12% of what they were in 2004. This means 88% reductions in per capita GHG emissions from today's emissions intensities must be realized in order to achieve California's 2050 GHG goals. Clearly, energy efficiency and reduced vehicle miles traveled will play important roles in achieving this aggressive goal, but the decarbonization of fuel will also be necessary.

The extent to which GHG emissions from traffic at LCR will change in the future depends on the quantity (e.g. number of vehicles, average daily mileage) and quality (i.e. carbon content) of fuel that will be available and required to meet both regulatory standards and residents' needs. As discussed above, renewable power requirements, the low carbon fuel standard, and vehicle emissions standards will all decrease GHG emissions per unit of energy delivered or per vehicle mile traveled. In this section we discuss the impact that future regulated fuel decarbonization may have on vehicular emissions at LCR.

The California Energy Commission (CEC) published "State Alternative Fuels Plan"[156] in which it noted the existence of "challenging but plausible ways to meet 2050 [transportation] goals." The main finding from this analysis is that reducing today's average per capita driving miles by about 5 percent (or back to 1990 levels), in addition to the decarbonization strategies listed below, would achieve S-03-05 goals of 80% below 1990 levels. The approach described below is directly[157] from the CEC report.

An 80 percent reduction in GHG emissions associated with personal transportation can be achieved even though population grows to 55 million, an increase of 50 percent. The following set of measures could be combined to produce this result:

1. Lowering the energy needed for personal transportation by tripling the energy efficiency of on-road vehicles in 2050 with:
   a. Conventional gas, diesel, and flexible fuel vehicles (FFVs) averaging more than 40 miles per gallon (mpg).
   b. Hybrid gas, diesel, and FFVs averaging almost 60 mpg.
   c. All electric and plug-in hybrid electric vehicles (PHEVs) averaging well over 100 mpg (on a greenhouse gas equivalents (GGE) basis) on the electricity cycle.
   d. Fuel cell vehicles (FCVs) averaging over 80 mpg (on a GGE basis).

[156] State Alternative Fuels Plan. December 2007 CEC-600-2007-011-CMF. Available online at: http://www.energy.ca.gov/2007publications/CEC-600-2007-011/CEC-600-2007-011-CMF.PDF

[157] Ibid. Page 67 and 68.

2. Moderating growth in per capita driving, reducing today's average per capita driving miles by about 5 percent or back to 1990 levels.
3. Changing the energy sources for transportation fuels from the current 96 percent petroleum-based to approximately:
    a. 30 percent from gasoline and diesel from traditional petroleum sources or lower GHG emission fossil fuels such as natural gas.
    b. 30 percent from transportation biofuels.
    c. 40 percent from a mix of electricity and hydrogen.
4. Producing transportation biofuels, electricity, and hydrogen from renewable or very low carbon-emitting technologies that result in, on average, at least 80 percent lower life cycle GHG emissions than conventional fuels.
5. Encouraging more efficient land uses and greater use of mass transit, public transportation, and other means of moving goods and people.

The measures described above are the types of measures that will yield required reductions. Although these types of measures are expected to occur and are consistent with the LCR development plan, LCR is not claiming any credit for these measures.

7 Conclusion

ENVIRON prepared an emissions inventory for the LCR development. This emissions inventory was prepared consistent with the methodologies established by the CCAR where possible. The LCR emissions inventory considers seven categories of GHG emissions: emissions due to vegetation changes, emissions from construction activities, residential emissions, commercial building emissions, mobile source emissions, municipal emissions, and area source emissions. Emission from recreation centers were not calculated since they are a small fraction of the overall inventory. The emissions from construction and land use change would be one-time emissions events, while the other emissions would occur annually, throughout the life of the project.

A variety of methods were employed to develop the GHG emissions inventory. In addition to well established emission factors for certain activities and emission estimates based on similar activities in other representative communities, several different estimation software were used. These included EMFAC, OFFROAD, BARBD, and URBEMIS.

Emissions from the various components of the LCR development are presented in Table 4-31. This table identifies the one-time emissions that would be attributable to project entitlement, and the annual emissions expected to occur each year after the full build out of the development. There are approximately 256,432 tonnes of CO_2e one-time emissions. The annual emissions from the use of the development amount to approximately 98,059 tonnes. Of this amount, 58% result from vehicular emissions associated with residential and commercial activities, and 26% result from the energy use associated with residential and non-residential buildings. If the one-time emissions are annualized assuming a 40-year development life (which is likely low), then the one-time emissions account for approximately 6% of the overall emissions. As discussed below, these figures reflect conservative assumptions that likely overstate the GHG emissions that would result from this project.

Compared to California's 2020 BAU per capita emissions, 14.1 tonnes CO_2e per capita, a 28.3% decrease in emissions by 2020 is required to achieve AB 32 goals. In order to achieve AB 32 mandated goals, the per capita emissions would have to be 10.1 tonnes CO_2e. LCR has estimated emissions of 98,059 tonnes per year[158], or 4.0 tonnes per capita per year.[159] This estimate does not include emissions from heavy industry, refining, or commercial transportation.

As a result of the various design elements incorporated into the LCR project, the development meets AB 32's goal of 28.5% below BAU overall. As designed, homes in LCR are expected to be 18% more energy efficient than the current housing stock in California, as shown in Table 4-16. The non-residential units are 13% more energy efficient than the average California non-residential buildings stock. Vehicular emissions from LCR residents are 43% less per dwelling unit than BAU[160]. The emission savings combined for LCR represent a 32.6% reduction from a

[158] This value does not include the annualized one-time emissions, to avoid potential inconsistencies in the period over which one-time emission are annualized for comparison purposes.

[159] Assuming a population of 24,539 residents in LCR.

[160] Taking into account emissions reductions due to the Pavley regulation.

BAU situation taking into consideration changes in emission factors due to implementation of two AB 32 scoping plan measures: the Renewables Portfolio Standard and the Pavley regulation. Differences between the vegetation change related emissions in the proposed LCR project scenario and the BAU scenario were annualized over a 40 year project lifetime for purposes of this comparison. Emissions from construction, municipal sources, and area sources were included in the total inventory for both the proposed LCR project and BAU scenarios, but no differences between the two scenarios were quantified for these categories.

The GHG emission inventory for LCR was based on several conservative assumptions. In addition, anticipated state and federal regulatory developments are expected to result in lower GHG emissions from LCR than are represented in this analysis. For example, the increased CAFE standards under the Energy Independence and Security Act of 2007 (EISA) will result in a moderate decrease in LCR's GHG inventory as tailpipe emissions would be roughly 26 - 40% lower.

Thus, while the LCR project already results in an improvement over the BAU scenario equivalent to the 28.3% improvement necessary to achieve AB 32's mandates, upon implementation of existing and anticipated legislative and regulatory mandates, actual emissions associated with the project will likely be considerably lower.

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Table 4-1
CO_2 Sequestration Change due to Land Use Change
Lytle Creek Ranch
Rialto, California

Vegetation Type[1]	IPCC Designation[2]	IPCC Sub qualification	Tons Dry Matter Carbon/Acre[3]	Sequestered CO_2 / Acre[4]	Total Impacted Area[5]	CO_2 Sequestration Capacity of Removed Vegetation
			[tonne/acre]	[tonne/acre]	[acres]	[tonne]
Scrubland	Forest Land	Scrub	3.9	14.3	1,356.3	19,400
GRAND TOTAL			3.9	14.3	1,356.3	19,400

Notes:

1. Land types shown here represent vegetation that will be potentially removed upon development.
2. Land types are mapped to generalized IPCC Land Designations (IPCC 2006).
3. Dry matter carbon per acre was determined from information contained in Table 4-2.
4. It is conservatively assumed that all carbon is eventually converted into CO_2. Multiply the mass of carbon by 3.67 to calculate the final mass of CO_2 (the molecular mass of CO_2 / the molecular mass of carbon is 44/12 or 3.67).
5. Data provided by Lytle Development Company. A positive number indicates the amount of land removed and a negative number indicates that this land type is added.

Sources:

Guidelines for National Greenhouse Gas Inventories (IPCC Guidelines). Available online at http://www.ipcc-nggip.iges.or.jp/public/2006gl/vol4.htm
Lytle Creek Ranch Specific Plan, December 2008.

Table 4-2
Carbon per Acre for IPCC Land Types
Lytle Creek Ranch
Rialto, California

IPCC Designation	Sub qualification	Above Ground Biomass[1]	Ratio of Above Ground / Below Ground Biomass[2]	Total Biomass	Total Biomass[3]	Tonnes Dry Matter Carbon/Acre[4]
		[tonne d.m./acre]		[tonne d.m./Hectare]	[tonne d.m./acre]	[tonne/acre]
Forest Land	Scrub	5.7	2.17	20.5	8.3	3.9
Forest Land	Trees	52.6	4.35	159.9	64.7	30.4

Notes:

1. Numbers listed are used in conjunction with above ground/below ground ratios to calculate total biomass per acre. Values from source converted to tonne/acre.
2. This value is used to calculate total biomass when data for the total biomass is not available for a particular land type.
3. Total biomass is either 1.) Listed directly in the IPCC protocol, or 2.) Calculated from above ground biomass and the Above Ground / Below Ground biomass ratios as follows: Total = Above + (Above / [Above:Below Ratio]). Values from source converted to tonne/acre as necessary.
4. Total biomass multiplied by carbon fraction in plant material (0.47) to calculate carbon content. From IPCC (2006), default value for Forest Land (Table 4.3 of IPCC).

Abbreviations:

d.m. - dry mass

Sources:

Guidelines for National Greenhouse Gas Inventories (IPCC Guidelines). Available online at http://www.ipcc-nggip.iges.or.jp/public/2006gl/vol4.htm

Table 4-3
CO_2 Sequestration Capacity of New Vegetation Plantings
Lytle Creek Ranch
Rialto, California

Vegetation Species[1]	IPCC Species Class Designation	Sequestered CO_2 / Unit[2] [tonne/unit/year]	Unit	Total Quantity of New Vegetation[1]	Unit	CO_2 Sequestration Capacity of New Vegetation[3] [tonne]
Pine	Pine	0.032	trees	8,000	trees	5,120
Miscellaneous	Miscellaneous Trees	0.035	trees	22,000	trees	15,400
Total	-	-		**30,000**	**trees**	**20,520**

Notes:

1. Site-specific planting data provided by Lytle Development Company.
2. Species class-specific sequestration values are provided in Table 8.2 of "2006 IPCC Guidelines for National Greenhouse Gas Inventories, Volume 4". For species that do not appear in Table 8.2, the species was classifed as "miscellaneous" and the average value of all listed data was used.
3. An active growing period of 20 years was assumed for the new trees planted.

Sources:

Guidelines for National Greenhouse Gas Inventories (IPCC Guidelines). Available online at http://www.ipcc-nggip.iges.or.jp/public/2006gl/vol4.htm

Table 4-4
Change in CO_2 Sequestration Due to Land Use Changes and New Vegetation Plantings
Lytle Creek Ranch
Rialto, California

CO_2 Sequestration Capacity of Vegetation	CO_2 Sequestration Capacity of New Vegetation	Net Change in CO_2 Sequestration Capacity[1]
[tonne]	[tonne]	[tonne]
-19,400	20,520	1,120

Notes:
1. A positive value represents an increase in sequestration capacity and thus a net reduction in CO_2.

Table 4-5
GHG Emissions from Construction Equipment
Lytle Creek Ranch

Equipment	Total Number of Equipment[1]	Total equipment hours[1]	Horsepower[3]	Load factor[3]	Emission factor[3] (g/bhp-hr)	CO_2 emissions[4,5] (tonnes)
Scrapers	48	383,829	313	0.72	568.3	49,158
Aerial Lifts	8	91,474	60	0.46	568.3	1,435
Rubber Tired Loaders	11	95,537	164	0.54	568.3	4,808
Air Compressors	7	68,874	106	0.48	568.3	1,992
Water Trucks	17	141,977	189	0.5	568.3	7,625
Forklifts	16	188,000	145	0.3	568.3	4,648
Mixers	9	111,674	10	0.56	568.3	355
Pavers	2	23,486	100	0.62	568.3	828
Rollers	10	108,526	95	0.56	568.3	3,281
Rubber Tired Dozers	19	148,943	357	0.59	568.3	17,829
Graders	40	308,377	174	0.61	568.3	18,601
Paving equipment	10	108,526	104	0.53	568.3	3,400
Tractors/Loaders/Backhoes	35	330,331	108	0.55	568.3	11,151
Cranes	5	55,651	399	0.43	568.3	5,426
Generator sets	10	115,303	49	0.74	568.3	2,376
Welders	10	115,303	45	0.45	568.3	1,327
Other General Industrial Equipment	6	63,846	238	0.51	568.3	4,404
Concrete Industrial Saws	5	64,703	10	0.73	568.3	268
Skid Steer Loaders	2	33,383	44	0.55	568.3	459
Total						**139,370**

Notes:

1. The lists of equipment during construction were provided by PCR Services as URBEMIS input files.
2. The equipment-hour of individual equipment is calculated based on the phase duration. ENVIRON assumes that all equipment operate 8 hours a day and five days a week during the corresponding phases duration indicated in the URBEMIS input files.
3. The values of Horsepower, Load Factor, and Emission Factor of each type of equipment are from URBEMIS and OFFROADS2007 defaults.
4. The CO_2 Emission calculation formula for each piece of equipment is:
   CO_2 Emission = Equipment Hours x HP x Load Factor x Emission Factor x Unit Conversion Factor
5. Assume $CO_2 = CO_2e$ because the contribution of CH_4 and N_2O to overall GHG emissions is likely small (< 1% of total CO_2e) from diesel construction equipment.

Abbreviations:

bhp - break horsepower
CH_4 - methane
CO_2 - carbon dioxide
CO_2e - carbon dioxide equivalent
g - gram
GHG - Greenhouse Gas
hr - hour

Table 4-6
GHG Emissions from Worker Commutes
Lytle Creek Ranch

Year	Number of Worker One-Way Trips[1]	Total Worker VMT[2]	$EF^{3,7}_{LDA}$		$EF_{LDT1}^{4,7}$		$EF_{LDT2}^{4,7}$		Emission factor		CO_2 emissions[5]		Total CO_2 Emissions[6]	Total CO_2e Emissions[6]
			Running	Startup	Running	Startup	Running	Startup	Running	Startup	Running	Startup		
		miles/year	(g/mile)	(g/trip)	(g/mile)	(g/trip)	(g/mile)	(g/trip)	(g/mile)	(g/start)	tonnes			
2009	152,598	1,937,995	342	210	421	247	424	259	382	232	741	35	776	817
2010	662,908	8,418,929	342	210	421	247	424	259	382	232	3,217	154	3,370	3,548
2011	805,063	10,224,306	342	210	421	247	424	259	382	232	3,907	186	4,093	4,309
2012	1,507,134	19,140,599	342	210	421	247	424	259	382	232	7,314	349	7,663	8,066
2013	1,627,697	20,671,755	342	210	421	247	424	259	382	232	7,899	377	8,276	8,711
2014	1,627,697	20,671,755	342	210	421	247	424	259	382	232	7,899	377	8,276	8,711
2015	1,548,952	19,671,693	342	210	421	247	424	259	382	232	7,517	359	7,875	8,290
2016	1,395,921	17,728,203	304	210	375	247	378	259	340	232	6,029	323	6,352	6,687
2017	1,387,856	17,625,772	304	210	375	247	378	259	340	232	5,994	321	6,315	6,648
2018	1,267,030	16,091,277	304	210	375	247	378	259	340	232	5,472	293	5,766	6,069
2019	1,104,807	14,031,049	304	210	375	247	378	259	340	232	4,772	256	5,027	5,292
2020	419,303	5,325,150	273	210	337	247	339	259	306	232	1,628	97	1,725	1,816
2021	135,584	1,721,913	273	210	337	247	339	259	306	232	526	31	558	587
2022	0	0	273	210	337	247	339	259	306	232	0	0	0	0
2023	0	0	273	210	337	247	339	259	306	232	0	0	0	0
2024	38,884	493,821	273	210	337	247	339	259	306	232	151	9	160	168
2025	48,347	614,006	273	210	337	247	339	259	306	232	188	11	199	209
Total	**13,729,781**	**174,368,222**									**63,252**	**3,180**	**66,432**	**69,928**

Notes:

1. Worker trips were calculated for all Demolition, Grading and Paving phases as follows:
   a. Operation hours for each piece of machine = 8 hr per day
   b. Number of working days for each type of equipment = total hours of operation / 8hr per day
   c. One-way trips per worker per working day = 2
   d. Worker One-way Trips = Number of working days x 1.25

   Worker one-way trips during the building construction phase are calculated based on four general land use categories: multifamily, single-family, commercial/retail/school/recreation and office/industrial. The total daily trips are the sum of the following:
   i. 0.36* # multifamily units
   ii. 0.72 * # single-family units
   iii. 0.32 *(commercial/retail/school/recreation square ft)/1000
   iv. 0.42 * (office/industrial square ft)/1000

   Worker one-way trips for Coating phase are 20% of the worker one-way trips for Building Construction Phase.
2. Vehicle Miles Traveled = Worker One-way Trips x 12.7 miles per one-way trip, based on URBEMIS default.
3. The running emission factor depends on the speed of the vehicle. The emission factor used in this calculation refers to the URBEMIS 9.2.4 default vehicle speed: 30 MPH.
   The startup emission factor depends on the settling period before driving. The startup emissions were conservatively calculated based on a 12 hour wait before each engine startup.
4. LDT1: up to 6000 GVW; LDT2: up to 8500 GVW
5. GHG Running Emission calculation formula: GHG Emission = VMT x $(0.5 \times EF_{LDA} + 0.25 \times EF_{LDT1} + 0.25 \times EF_{LDT2})_{Running}$
   GHG Startup Emission calculation formula: GHG Emission = Worker Trips x $(0.5 \times EF_{LDA} + 0.25 \times EF_{LDT1} + 0.25 \times EF_{LDT2})_{Startup}$
   URBEMIS 9.2.4 assumes that LDA and LDT have a 50:50 mixing ratio.
6. $CO_2e = CO_2 / 0.95$: The United States Environmental Protection Agency (USEPA) recommends assuming that CH_4, N_2O, and HFCs account for 5% of GHG emissions from on-road vehicles, taking into account their global warming potentials.
7. The running emission factor values have been adjusted to account for reductions resulting from the Pavley standards. No changes to the starting emission factors were made. According to ARB, CC_2e emissions from light-duty vehicles would be reduced by 11% relative to 2002 in 2016, and by 20% relative to 2002 in 2020. For this analysis, reductions were taken relative to estimated emissions for 2009 instead of 2002, which provides a conservative estimate. ENVIRON also conservatively assumed that no reductions would take place from 2009 through 2015, and that no changes in emission factors would occur between 2016 and 2019

Abbreviations:

CH_4 - methane
CO_2 - carbon dioxide
CO_2e - carbon dioxide equivalent
g - gram
GHG - Greenhouse Gas
EF - Emission Factor
GVW - Gross Vehicle Weight
HFC - hydro fluorocarbons
hr - hour
LDA - Light Duty Auto
LDT - Light Duty Truck
MPH: miles per hour
N_2O: nitrous oxide
MPH - Miles per hour
URBEMIS - Urban Emissions Model
VMT - Vehicle Miles Traveled

Table 4-7
GHG Emissions from Vendor Trips
Lytle Creek Ranch

Construction sub-phase	# Vendor trips	Total vendor VMT	EF^{3}_{HHD}		CO_2 Emissions[4]		Total CO_2	Total CO_2e
		miles/year	Running	Startup	Running	Startup	Emissions	Emissions[5,6]
			(g/mile)	(g/trip)	tonnes			
Building construction	1,803,168	23,982,140	1,905	75	45,686	135	45,821	48,232

Notes:

1. Vendor trips only occur during the building construction phase, and they are calculated based on four general land use categories: multifamily, single-family, commercial/retail/school/recreation and office/industrial. The total daily trips are the sum of the following:
   i. 0.11* # multifamily units
   ii. 0.11 * # single-family units
   iii. 0.05 *(commercial/retail/school/recreation square ft)/1000
   iv. 0.38 * (office/industrial square ft)/1000
2. Vehicle Miles Traveled = Vendor One-way Trips x 13.3 miles per one-way trip , based on URBEMIS default.
3. The running emission factor depends on the speed of the vehicle. The emission factor used in this calculation refers to the URBEMIS 9.2.4 default vehicle speed: 30 MPH.
   The startup emission factor depends on the settling period before driving. The startup emissions are conservatively calculated based on a 12 hour wait before each engine startup.
4. URBEMIS 9.2.4 assumes that all vendors drive heavy-heavy-duty trucks.
   CO_2 Running Emission calculation formula: CO_2 Emission = VMT x $EF_{HHD\text{-}Running}$
   CO_2 Startup Emission calculation formula: CO_2 Emission = Vendor Trips x $EF_{HHD\text{-}Startup}$
5. $CO_2e = CO_2 / 0.95$: The United States Environmental Protection Agency (USEPA) recommends assuming that CH_4, N_2O, and HFCs account for 5% of GHG emissions from on-road vehicles, taking into account their global warming potentials.
6. The emission factor values of 2009, the anticipated start date of the project, are used for all calculations.

Abbreviations:

CH_4 - methane
CO_2 - carbon dioxide
CO_2e - carbon dioxide equivalent
g - gram
GHG - Greenhouse Gas
EF - Emission Factor
GVW - Gross Vehicle Weight
HFC - Hydro Fluorocarbons
HHD - Heavy-Heavy Duty
hr - hour
MPH - Miles Per Hour
N_2O - nitrogen dioxide
URBEMIS - Urban Emissions Model
VMT - Vehicle Miles Traveled

Table 4-8
GHG Emissions from Demolition Hauling Trips
Lytle Creek Ranch

Construction sub-phase	Demolition Hauling Round Trips[1]	VMT[2]	EF^{3}_{HHD}		CO_2 Emissions[4]		Total CO_2 Emissions	Total CO_2e Emissions[5,6]
			Running	Startup	Running	Startup		
		(miles)	(g/mile)	(g/trip)	tonnes			
Demolition	372	11,160	1,905	75	21	0	21	22

Notes:

1. Demolition hauling trips only occur during the demolition phase, and they are calculated based on URBEMIS defaults which assume a 20 cubic yard truck driving 30 miles round trip per day. URBEMIS estimates 12 round trips per day for this phase.
2. Vehicle Miles Traveled = Demolition Hauling Trips x 30 miles per roundtrip.
3. The running emission factor depends on the speed of the vehicle. The emission factor used in this calculation refers to the URBEMIS 9.2.4 default vehicle speed: 30 MPH.
   The startup emission factor depends on the settling period before driving. The startup emissions are conservatively calculated based on a 12 hour wait before each engine startup.
4. URBEMIS 9.2.4 assumes that all demolition haulers drive heavy-heavy-duty trucks.
   CO_2 Running Emission calculation formula: CO_2 Emission = VMT x $EF_{HHD\text{-}Running}$
   CO_2 Startup Emission calculation formula: CO_2 Emission = Demolition Hauler Trips x $EF_{HHD\text{-}Startup}$
5. $CO_2e = CO_2 / 0.95$: The United States Environmental Protection Agency (USEPA) recommends assuming that CH_4, N_2O, and HFCs account for 5% of GHG emissions from on-road vehicles, taking into account their global warming potentials.
6. The emission factor values of 2009, the anticipated start date of the project, are used for all calculations.

Abbreviations:

CH_4 - methane
CO_2 - carbon dioxide
CO_2e - carbon dioxide equivalent
g - gram
GHG - Greenhouse Gas
EF - Emission Factor
GVW - Gross Vehicle Weight
HFC - Hydro Fluorocarbons
HHD - Heavy-Heavy Duty
hr - hour
MPH - Miles per hour
N_2O - nitrogen dioxide
URBEMIS - Urban Emissions model
VMT - Vehicle Miles Traveled

Table 4-9
Overall Construction GHG Emissions
Lytle Creek Ranch

Location	Construction Equipment	Worker Commuting	Vendor Commuting	Demolition Hauling	Total GHG Emissions
	(tonnes CO_2e)				
Lytle Creek	139,370	69,928	48,232	22	257,552

Notes:

1. See previous tables for calculation detail. The table includes emissions from construction equipment, worker commuting, vendor commuting, and demolition hauling.

Abbreviations:

CO_2e - carbon dioxide equivalent

GHG - Greenhouse Gas

Table 4-10
Energy Use per Residential Dwelling Unit: Title-24 Regulated Heating and Cooling
Lytle Creek Ranch
Rialto, California

			Electricity Delivered (kW-hr/DU/year)							Natural Gas Delivered (MBTU/DU/yr)						
Type	**Average Square Footage per DU[1]**	**RECs range[2]**	**Heating[3]**	**Cooling**	**RECs Total**	**% reduction due to 2005 standards relative to 2001[4,5]**	**2005 Estimated Total**	**% reduction due to 2008 vs. 2005 standards[6]**	**2008 Estimated Total**	**Heating[3]**	**Domestic Hot Water[7]**	**RECs total**	**% reduction due to 2005 standards relative to 2001[4]**	**2005 Estimated Total**	**% reduction due to 2008 vs. 2005 standards[6]**	**2008 Estimated Total**
Single-family detached	2,585	1,350 - 3,450	188	1,303	1,491	19.8%	1,196	22.7%	924	13.3	30.7	44.1	6.7%	41.1	10%	37.0
Single-family attached	1,260	700 - 2,000	393	931	1,324	19.8%	1,062	22.7%	821	4.5	14.5	19.0	6.7%	17.8	10%	16.0
Apartment in building with 5 or more units	1,250	1,000 - 1,500	555	1,177	1,731	24.3%	1,311	19.7%	1,052	3.8	16.6	20.4	15.7%	17.2	7%	16.0

Notes:
1. Based on information provided by Lytle Development Company.

2. The 2005 survey collected data from 4,382 households nationwide in housing units statistically selected to represent the 111.1 million housing units in the United States. Only RECS data tabulated for California were considered in this analysis.
3. Homes can be heated using electricity and/or natural gas. The values shown here are averages for the dataset.
4. Reductions are taken with the assumption that the RECs estimate reflects heating/cooling/hot water electricity use for homes that are minimally compliant with 2001 Title 24 Standards.
According to the RECS database, less than 4% of California homes surveyed were built in 2000 or later. Because older homes tend to use more energy, the numbers shown here may overestimate actual energy use. At the same time, the homes included in the data sets have a range of cooling degree days and heating degree days, which affects the heating and cooling-related energy use.
5. Based on report by California Energy Commission on estimated first-year electricity savings due to 2005 standards for single-family and multi-family homes, relative to 2001 standards.
6. Based on California Energy Commission report on estimated first-year electricity savings due to 2008 standards for single-family and multi-family homes, relative to 2005 standards.
7. All domestic hot water systems are assumed to use natural gas.

Abbreviations:

DU - Dwelling Unit
kW-hr - kilowatt-hour
MBTU - million british thermal units

Source:

California Energy Commission. 2003. Impact Analysis: 2005 Update to the California Energy Efficiency Standards for Residential and Nonresidential Buildings. Available at: http://www.energy.ca.gov/title24/2005standards/archive/rulemaking/documents/2003-07-11_400-03-014.PDF
California Energy Commission. 2007. Impact Analysis: 2008 Update to the California Energy Efficiency Standards for Residential and Nonresidential Buildings. Available at: http://www.energy.ca.gov/title24/2008standards/rulemaking/documents/2007-11-07_IMPACT_ANALYSIS.PDF
Energy Information Administration 2005 Residential Energy Consumption Survey (RECS). Available at: http://www.eia.doe.gov/emeu/recs/

Table 4-11
Energy Use per Residential Dwelling Unit: Appliances and Plug-ins
Lytle Creek Ranch
Rialto, California

		Dwelling Size		Electricity Delivered (kW-hr/DU/year)[2]									Natural Gas Delivered (MBTU/DU/yr)[2]		
Type	**Type**	**Average Square Footage per DU**	**Bedrooms per DU[1]**	**Refrigerator**	**Clothes Washer**	**Clothes Dryer (Electric)[3]**	**Dishwasher**	**Cooking Range (Electric)[4]**	**Total Major Appliances**	**Plug-in Lighting**	**MELs**	**Total**	**Clothes Dryer (Gas)[6]**	**Gas Cooking Range[5]**	**Total**
Standard Appliances	Single-family detached	2,585	3.8	669	120	520	235	345	1,889	505	622	3,015	3.0	2.6	5.6
	Single-family attached	1,260	2.7	669	100	435	197	289	1,690	293	479	2,461	2.5	2.1	4.7
	Apartment in building with 5 or more units	1,250	2.0	669	88	380	172	252	1,560	291	446	2,296	2.2	1.9	4.1
Energy Star Appliances[7]	Single-family detached	2,585	3.8	569	90	520	141	345	1,665	126	622	2,413	3.0	2.6	5.6
	Single-family attached	1,260	2.7	569	75	435	118	289	1,486	73	479	2,038	2.5	2.1	4.7
	Apartment in building with 5 or more units	1,250	2.0	569	66	380	103	252	1,369	73	446	1,887	2.2	1.9	4.1

Notes:
1. Based on information provided by Lytle Development Company.
2. Energy use per residential dwelling unit is based on information in BARBD Table 12.
3. Dryers may be either electric or natural-gas fueled. This value represents the average of the electricity requirements for the two dryer types.
4. Cooking ranges can be either gas or electric. This value represents 1/2 the energy required for electric stoves.
5. This value represents 1/2 the natural gas required for natural gas stoves.
6. This value represents 1/2 the natural gas required for natural gas dryers.
7. Average energy savings above standard products are applied to refrigeration (15%), clothes washer (25%), dishwasher (40%), and lighting (75%) as reported in Energy Star and Other Climate Protection Partnerships 2006 Annual Report Table 10.

Abbreviations:
BARBD - Building America Research Benchmark Definition
DU - Dwelling Unit
kW-hr - kilowatt-hour
MBTU - million british thermal units
MEL - Miscellaneous electric load

Source:
R. Hendron. Building America Research Benchmark Definition. Technical Report NREL/TP-550-4816. December 2008.
Environmental Protection Agency (USEPA). 2006 Annual Report. Energy Star and Other Climate Protection Partnerships. Available at: http://www.epa.gov/appdstar/pdf/AR%202006%20Final.pdf

Table 4-12
Energy Use per Residential Dwelling Unit
Lytle Creek Ranch
Rialto, California

	Dwelling Sizes		Electricity Delivered					Natural Gas Delivered		
			RECs	BARBD[3]	BARBD[3]	BARBD[3]		RECs	BARBD[3]	
Title 24 Compliance	**Type**	**Average Square Footage/DU[1]**	**Heating and Cooling**	**Hard Wired Lighting**	**Major Appliances[4,6]**	**Plug-ins[5]**	**Total**	**Heating and Domestic Hot Water**	**Gas Dryers and Oven Ranges[4,6]**	**Total**
			[kW-hr / DU / year]					**(MBTU natural gas / DU / year)**		
Minimally Title 24 Compliant (2005)	Single-family detached	2,585	1,196	2,368	1,889	1,126	6,579	41	6	47
	Single-family attached	1,260	1,062	1,521	1,690	772	5,044	18	5	22
	Apartment in building with 5 or more units	1,250	1,311	1,514	1,560	737	5,121	17	4	21
Minimally Title 24 Compliant (2008)	Single-family detached	2,585	924	2,368	1,889	1,126	6,308	37	6	43
	Single-family attached	1,260	821	1,521	1,690	772	4,803	16	5	21
	Apartment in building with 5 or more units	1,250	1,052	1,514	1,560	737	4,863	16	4	20
15% Better Than Title 24 and Energy Star Appliances[7]	Single-family detached	2,585	786	2,013	1,665	748	5,211	31	6	37
	Single-family attached	1,260	698	1,292	1,486	552	4,028	14	5	18
	Apartment in building with 5 or more units	1,250	894	1,287	1,369	518	4,069	14	4	18
Percentage Improvement over Title 24	Single-family detached	2,585	15%	15%	12%	34%	17.4%	15%	--	13%
	Single-family attached	1,260	15%	15%	12%	28%	16.1%	15%	--	12%
	Apartment in building with 5 or more units	1,250	15%	15%	12%	30%	16.3%	15%	--	12%

Notes:

1. Information provided by Lytle Development Company.
2. Energy use shown is from a Title 24 compliant house.
3. Estimated using guidance provided by the US Department of Energy (Table 12 of "Building America Research Benchmark Definition, Updated December 19, 2008").
4. Cooking may be performed on an electric range or a natural gas stove. The values shown in these columns are 50% of the energy/heat used for each stove type.
5. "Plug-ins" refers to electricity use associated with plug-in lighting, plug-in appliances, and miscellaneous electric loads. This energy use is calculated using guidance from BARBD. Energy use for each dwelling type is based on the number of bedrooms, total finished floor area, and a California-specific plug load multiplier. Refer to Table 4-8 for load-specific energy estimates.
6. Dryers and ovens may be electric or gas. The values presented in this table represent 50% of the electricity and/or natural gas use for each equipment type.
7. Lytle Development Company has committed to a 15% improvement in energy use in the building envelope over Title 24 standards and inclusion of energy star appliances.

Abbreviations:
BARBD - Building America Research Benchmark Definition
DU - Dwelling Unit
kW-hr - kilowatt-hour

Source:
R. Hendron. Building America Research Benchmark Definition. Technical Report NREL/TP-550-4816. December 2008.

Table 4-13
Emission Factors for Different Energy Sources for Buildings
Lytle Creek Ranch
Rialto, California

Energy Source	Scenario	lb CO_2/source unit	Source Units
Natural Gas[1]	-	117.0	(MBTU)
Electricity[2]	without RPS	0.631	(kW-hr)
	2010 RPS (20%)	0.583	
	2020 RPS (33%)	0.488	

Derivation of GHG Emissions from Renewable Power Standards

Renewable Energy Source[3]	Energy Delivered[3] [million kWh]	Percentage of Renewable Energy Delivered [%]
Wind	2,359	21%
Small hydro	449	4%
Biogas	0	0%
Solar	0	6%
Biomass	786	7%
Geothermal	6,965	62%
Total[4]	11,234	100%
% of Total Energy From Renewables[3]	13%	
% of Total Energy From Non-Renewables	87%	
Total Energy Delivery[4]	83,958,770	MWh
from renewables	11,234,288	MWh
from non-renewables	72,724,482	MWh
CO2 Emissions per Total Energy Delivered[5]	630.9	lbs CO2/MWh delivered
Total CO2 Emissions[5]	24,026,108	metric tonnes CO2
CO2 Emissions per Total Non-Renewable Energy[6]	728.34	lbs CO2/MWh delivered
Estimated Emission Factors for Total Energy Delivered[7]		
2010 RPS (20%)	582.7	lbs CO2/MWh delivered
2020 RPS (33%)	488.0	lbs CO2/MWh delivered

Notes:

1. Emission factor for natural gas was obtained from California Climate Action Registry Reporting Protocol, Table C6.

2. Emission factors as derived below.

3. The renewable energy portfolio for Southern California Edison. The renewable energy distribution is based on 2008 data available at: http://www.sce.com/PowerandEnvironment/renewables/

4. Total energy value and emission factor reported for 2007 by Southern California Edison in California Climate Action Registry. Available at: http://www.climateregistry.org/CarrotDocs/26/2007/SCEPUP07r3.xls

5. The amount of CO2 emissions is provided in Southern California Edison's Power/Utility Protocol (PUP) Report for 2007 available at: http://www.climateregistry.org/CarrotDocs/26/2007/SCEPUP07r3.xls

6. The emissions metric presented here is calculated based on the total CO2 emissions divided by the energy delivered from non-renewable sources.

7. The emission factors for total energy delivered are estimated by multiplying the percentage of energy delivered from non-renewable energy by the CO2 emissions per total non-renewable energy metric calculated above. Two emission factors are presented here for the current 20% RPS goal for 2010 and the presumed 33% RPS for 2020. The estimate provided here and the 2007 PUP report issued by Southern California Edison assume that renewable energy sources do not result in any CO2 emissions. This is not necessarily true for biogas- and biomass-sourced energy but some consider these sources to be "carbon neutral."

Abbreviations:

CO_2 = carbon dioxide
kW-hr - kilowatt-hour
lb - pound
MBTU - million British thermal units
RPS - Renewables Portfolio Standard
MWh = Megawatt-hour
PUP = Power/Utility Protocol

Sources:

California Climate Action Registry General Reporting Protocol, Version 3.1 (January 2009). Available at: http://www.climateregistry.org/resources/docs/protocols/grp/GRP_3.1_January2009.pdf

California Climate Action Registry Database: Southern California Edison Company 2007 PUP Report. 2008. Available at: https://www.climateregistry.org/CARROT/public/Reports.aspx

Table 4-14
CO_2e Emissions per Dwelling Unit
Lytle Creek Ranch
Rialto, California

Title 24[1] Compliance	Type	DU per Building	Average SF / DU[2]	Title-24 Systems[1]		Title-24 Systems and Major Appliances		Title-24 Systems and All MELs		Title-24 Systems	Title-24 Systems and Major Appliances	Title-24 Systems and All MELs
				CO_2 Electricity[3]	CO_2 Natural Gas[4]	CO_2 Electricity[3]	CO_2 Natural Gas[4]	CO_2 Electricity[3]	CO_2 Natural Gas[4]	CO_2 Total	CO_2 Total	CO_2 Total
				(lbs / DU / year)						(tonnes / DU / year)		
Minimally Title 24 Compliant (2005)	Single-family detached	1	2,585	2,249	4809	3440	5462	4151	5462	3.2	4.0	4.4
	Single-family attached	2 to 4	1,260	1,629	2077	2695	2624	3182	2624	1.7	2.4	2.6
	Apartment in building with 5 or more units	5 or more	1,250	1,782	2010	2766	2488	3231	2488	1.7	2.4	2.6
Minimally Title 24 Compliant (2008)	Single-family detached	1	2,585	2,077	4328	3269	4981	3980	4981	2.9	3.7	4.1
	Single-family attached	2 to 4	1,260	1,477	1869	2543	2416	3030	2416	1.5	2.2	2.5
	Apartment in building with 5 or more units	5 or more	1,250	1,619	1870	2603	2347	3068	2347	1.6	2.2	2.5
15% Better Than Title 24, Energy Star Appliances and Renewable Portfolio Standard[5,6]	Single-family detached	1	2,585	1,631	3679	2601	4332	3036	4332	2.4	3.1	3.3
	Single-family attached	2 to 4	1,260	1,160	1589	2025	2136	2347	2136	1.2	1.9	2.0
	Apartment in building with 5 or more units	5 or more	1,250	1,271	1589	2069	2067	2371	2067	1.3	1.9	2.0
Percentage Improvement over Title 24	Single-family detached	1	2,585	21%	15%	20%	13%	24%	13%	17%	16%	18%
	Single-family attached	2 to 4	1,260	21%	15%	20%	12%	23%	12%	18%	16%	18%
	Apartment in building with 5 or more units	5 or more	1,250	21%	15%	21%	12%	23%	12%	18%	16%	18%

Notes:
1. Title 24 - California Code of Regulations (CCR), Title 24, also known as the California Building Standards Code.
2. Information provided by Lytle Development Company.
3. Converted from kW-hr to lb CO_2 using emission factor from the California Climate Action Registry Database: Southern California Edison Company 2006 PUP Report. 2008.
4. Converted from MBTU to lb CO_2 using emission factor from California Climate Action Registry General Reporting Protocol (CCAR GRP).
5. Lytle Development Company has committed to a 15% improvement in energy use in the building envelope over Title 24 standards and inclusion of energy star appliances.
6. The project emissions take into account implementation of the Renewables Portfolio Standard.

Abbreviations:
DU - Dwelling Unit
kW-hr - kilowatt-hour
lb - pound
SF - Square Feet

Sources:
California Climate Action Registry General Reporting Protocol, Version 3.1 (June 2009). Available at: http://www.climateregistry.org/resources/docs/protocols/grp/GRP_3.1_January2009.pdf

California Climate Action Registry Database: Southern California Edison Company 2006 PUP Report. 2008. Available at: Available at: https://www.climateregistry.org/CARROT/public/Reports.aspx

Table 4-15
CO_2e Emissions per Dwelling Unit with 2020 RPS
Lytle Creek Ranch
Rialto, California

Title 24[1] Compliance	Type	DU per Building	Average SF / DU[2]	Title-24 Systems[1]		Title-24 Systems and Major Appliances		Title-24 Systems and All MELs		Title-24 Systems	Title-24 Systems and Major Appliances	Title-24 Systems and All MELs
				CO_2 Electricity[3]	CO_2 Natural Gas[4]	CO_2 Electricity[3]	CO_2 Natural Gas[4]	CO_2 Electricity[3]	CO_2 Natural Gas[4]	CO_2 Total	CO_2 Total	CO_2 Total
				(lbs / DU / year)						(tonnes / DU / year)		
Minimally Title 24 Compliant (2005)	Single-family detached	1	2,585	2,249	4809	3440	5462	4151	5462	3.2	4.0	4.4
	Single-family attached	2 to 4	1,260	1,629	2077	2695	2624	3182	2624	1.7	2.4	2.6
	Apartment in building with 5 or more units	5 or more	1,250	1,782	2010	2766	2488	3231	2488	1.7	2.4	2.6
Minimally Title 24 Compliant (2008)	Single-family detached	1	2,585	2,077	4328	3269	4981	3980	4981	2.9	3.7	4.1
	Single-family attached	2 to 4	1,260	1,477	1869	2543	2416	3030	2416	1.5	2.2	2.5
	Apartment in building with 5 or more units	5 or more	1,250	1,619	1870	2603	2347	3068	2347	1.6	2.2	2.5
15% Better Than Title 24, Energy Star Appliances and Renewable Portfolio Standard[5,6]	Single-family detached	1	2,585	1,366	3679	2178	4332	2543	4332	2.3	3.0	3.1
	Single-family attached	2 to 4	1,260	971	1589	1696	2136	1966	2136	1.2	1.7	1.9
	Apartment in building with 5 or more units	5 or more	1,250	1,064	1589	1733	2067	1985	2067	1.2	1.7	1.8
Percentage Improvement over Title 24	Single-family detached	1	2,585	34%	15%	33%	13%	36%	13%	21%	21%	23%
	Single-family attached	2 to 4	1,260	34%	15%	33%	12%	35%	12%	23%	23%	25%
	Apartment in building with 5 or more units	5 or more	1,250	34%	15%	33%	12%	35%	12%	24%	23%	25%

Notes:
1. Title 24 - California Code of Regulations (CCR), Title 24, also known as the California Building Standards Code.
2. Information provided by Lytle Development Company.
3. Converted from kW-hr to lb CO_2 using emission factor from the California Climate Action Registry Database: Southern California Edison Company 2006 PUP Report. 2008.
4. Converted from MBTU to lb CO_2 using emission factor from California Climate Action Registry General Reporting Protocol (CCAR GRP).
5. Lytle Development Company has committed to a 15% improvement in energy use in the building envelope over Title 24 standards and inclusion of energy star appliances.
6. The project emissions take into account implementation of the Renewables Portfolio Standard.

Abbreviations:
DU - Dwelling Unit
kW-hr - kilowatt-hour
lb - pound
SF - Square Feet
RPS - Renewables Portfolio Standard

Sources:
California Climate Action Registry General Reporting Protocol, Version 3.1 (June 2009). Available at: http://www.climateregistry.org/resources/docs/protocols/grp/GRP_3.1_January2009.pdf

California Climate Action Registry Database: Southern California Edison Company 2006 PUP Report. 2008. Available at: Available at: https://www.climateregistry.org/CARROT/public/Reports.aspx

Table 4-16
CO_2 Emissions from Electricity and Natural Gas Usage in Residential Dwelling Units
Lytle Creek Ranch
Rialto, California

Title 24[1] Compliance	Housing Type	# Dwelling Units[2]	Title-24 Systems			Title-24 Systems and Major Appliances			Title-24 Systems and All MELs		
			CO_2 Emission Factor (tonne CO_2 / DU / year)	Total CO_2 Emissions (tonne CO_2 / year)		CO_2 Emission Factor (tonne CO_2 / DU / year)	Total CO_2 Emissions (tonne CO_2 / year)		CO_2 Emission Factor (tonne CO_2 / DU / year)	Total CO_2 Emissions (tonne CO_2 / year)	
Minimally Title 24 Compliant (2005)	Single-family detached	3,409	3.2	10,913	**19,367**	4.0	13,766	**25,786**	4.4	14,865	**27,975**
	Single-family attached	3,673	1.7	6,175		2.4	8,862		2.6	9,673	
	Apartment in building with 5 or more units	1,325	1.7	2,279		2.4	3,158		2.6	3,437	
Minimally Title 24 Compliant (2008)	Single-family detached	3,409	2.9	9,904	**17,576**	3.7	12,758	**23,995**	4.1	13,856	**26,184**
	Single-family attached	3,673	1.5	5,575		2.2	8,262		2.5	9,073	
	Apartment in building with 5 or more units	1,325	1.6	2,097		2.2	2,975		2.5	3,254	
15% Better Than Title 24 and Energy Star Appliances	Single-family detached	3,409	2.4	8,210	**14,508**	3.1	10,721	**20,138**	3.3	11,394	**21,530**
	Single-family attached	3,673	1.2	4,579		1.9	6,933		2.0	7,468	
	Apartment in building with 5 or more units	1,325	1.3	1,719		1.9	2,485		2.0	2,667	
Percentage Improvement over Title 24 (2005)	Single-family detached	3,409	17%	17%	**17%**	16%	16%	**16%**	18%	18%	**23%**
	Single-family attached	3,673	18%	18%		16%	16%		18%	18%	
	Apartment in building with 5 or more units	1,325	18%	18%		16%	16%		18%	18%	

Notes:
1. Title 24 - California Code of Regulations (CCR), Title 24, also known as the California Building Standards Code.
2. Information provided by Lytle Development Company.

Abbreviations:
CO_2 - carbon dioxide
DU - Dwelling Units
MEL - Miscellaneous electric loads

Sources:
California Climate Action Registry General Reporting Protocol, Version 3.0 (April 2008). Available at: http://www.climateregistry.org/resources/docs/protocols/grp/GRP_V3_April2008_FINAL.pdf

California Climate Action Registry General Reporting Protocol, Version 3.1 (January 2009). Available at: http://www.climateregistry.org/resources/docs/protocols/grp/GRP_3.1_January2009.pdf

Table 4-17
CO_2 Emissions from Electricity and Natural Gas Usage in Residential Dwelling Units with 2020 RPS
Lytle Creek Ranch
Rialto, California

Title 24[1] Compliance	Housing Type	# Dwelling Units[2]	Title-24 Systems			Title-24 Systems and Major Appliances			Title-24 Systems and All MELs		
			CO_2 Emission Factor (tonne CO_2 / DU / year)	Total CO_2 Emissions (tonne CO_2 / year)		CO_2 Emission Factor (tonne CO_2 / DU / year)	Total CO_2 Emissions (tonne CO_2 / year)		CO_2 Emission Factor (tonne CO_2 / DU / year)	Total CO_2 Emissions (tonne CO_2 / year)	
Minimally Title 24 Compliant (2005)	Single-family detached	3,409	3.2	10,913	**19,367**	4.0	13,766	**25,786**	4.4	14,865	**27,975**
	Single-family attached	3,673	1.7	6,175		2.4	8,862		2.6	9,673	
	Apartment in building with 5 or more units	1,325	1.7	2,279		2.4	3,158		2.6	3,437	
Minimally Title 24 Compliant (2008)	Single-family detached	3,409	2.9	9,904	**17,576**	3.7	12,758	**23,995**	4.1	13,856	**26,184**
	Single-family attached	3,673	1.5	5,575		2.2	8,262		2.5	9,073	
	Apartment in building with 5 or more units	1,325	1.6	2,097		2.2	2,975		2.5	3,254	
15% Better Than Title 24 and Energy Star Appliances	Single-family detached	3,409	2.3	7,800	**13,660**	3.0	10,067	**18,734**	3.1	10,631	**19,900**
	Single-family attached	3,673	1.2	4,265		1.7	6,384		1.9	6,833	
	Apartment in building with 5 or more units	1,325	1.2	1,595		1.7	2,283		1.8	2,435	
Percentage Improvement over Title 24 (2005)	Single-family detached	3,409	29%	29%	**29%**	27%	27%	**27%**	28%	28%	**29%**
	Single-family attached	3,673	31%	31%		28%	28%		29%	29%	
	Apartment in building with 5 or more units	1,325	30%	30%		28%	28%		29%	29%	

Notes:
1. Title 24 - California Code of Regulations (CCR), Title 24, also known as the California Building Standards Code.
2. Information provided by Lytle Development Company.

Abbreviations:
CO_2 - carbon dioxide
DU - Dwelling Units
MEL - Miscellaneous electric loads

Sources:
California Climate Action Registry General Reporting Protocol, Version 3.0 (April 2008). Available at: http://www.climateregistry.org/resources/docs/protocols/grp/GRP_V3_April2008_FINAL.pdf
California Climate Action Registry General Reporting Protocol, Version 3.1 (January 2009). Available at: http://www.climateregistry.org/resources/docs/protocols/grp/GRP_3.1_January2009.pdf

Table 4-18
Categorization of Non-Residential Land Use
Lytle Creek Ranch
Rialto, California

Building Type[1]	CEUS Building Type[2]	Total Area[1] [SF]
Commercial	All Commercial	849,420
School	School	261,360
Grand Total Area		1,110,780

Notes:
1. Building types and areas were provided by Lytle Development Company.

2. ENVIRON selected building types from the California Commerical End-Use Survey (CEUS) that most closely matched the building types specified by Lytle Development Company. Allocation of commercial space to the "All Commercial" CEUS building type provides a conservative approach to estimating energy use.

Abbreviations:
CEUS - California Commercial End-Use Survey
SF - square feet

Table 4-19
Electricity End-Use Distribution for Non-Residential Building Types
Lytle Creek Ranch
Rialto, California

CEUS Building Type	Air Compressors	Cooking	Cooling	Exterior Lighting	Heating	Interior Lighting	Miscellaneous	Motors	Office Equipment	Process	Refrigeration	Ventilation	Water Heating
All Commercial	1.0%	4%	18%	7%	1%	30%	7%	5%	4%	0.3%	12%	11%	1%
School	---	1%	26%	9%	0.4%	38%	3%	1.0%	6%	---	4%	11%	1.0%
Included in Title 24 Building Envelope Energy Budget?[1]	No	No	Yes	No	Yes	No	No	No	No	No	No	Yes	Yes

Notes:
1. Only end uses regulated by Title 24 are included in the Title 24 building envelope energy budget. Hard-wired lighting (exterior lighting and some interior lighting) are part of Title 24, but are not considered part of the building envelope energy budget.

Abbreviations:
CEUS - California Commerical End-Use Survey

Source:
California Commercial End-Use Survey. Perofrmed by Itron, under contract to the California Energy Commission. 2006.

Table 4-20
Natural Gas End-Use Distribution for Non-Residential Building Types
Lytle Creek Ranch
Rialto, California

CEUS Building Type	Cooking	Cooling	Heating	Miscellaneous	Process	Water Heating
All Commercial	18%	1%	29%	0.7%	18%	33%
School	11%	---	47%	0.2%	7%	35%
Included in Title 24 Building Envelope Energy Budget?[a]	No	No	Yes	No	No	Yes

Notes:

a. Only end uses regulated by Title 24 are included in the Title 24 building envelope energy budget.

Abbreviations:
CEUS - California Commerical End-Use Survey

Source:
California Commercial End-Use Survey. Perofrmed by Itron, under contract to the California Energy Commission. 2006.

Table 4-21
Emission Factors by Energy Source
Lytle Creek Ranch
Rialto, California

Energy Source	Scenario	Unit	Conversion Factor [lb CO_2/Unit]	Conversion Factor [tonne CO_2/Unit]
Electricity[1]	without RPS[3]	kWh	0.631	2.86E-04
	2010 RPS (20%)		0.583	2.64E-04
	2020 RPS (33%)		0.488	2.21E-04
Natural Gas[2]	-	kBTU	0.117	5.31E-05

Notes:
1. Emission factor for electricity provided by Southern California Edison for the year 2006, obtained from the California Climate Action Registry Database.
2. Emission factor for natural gas obtained from California Climate Action Registry Reporting Protocol, Table C7.
3. Estimated emission factors for total energy delivered before and after implementation of the Renewables Portfolio Standard. See Table 6-1 for derivation of these factors.

Abbreviations:
CO_2e - carbon dioxide equivalent
kBTU - 1000 British thermal units
kWh - kilowatt-hour
lb - pound
RPS - Renewables Portfolio Standard

Sources:

1. California Climate Action Registry General Reporting Protocol, Version 3.1 (January 2009). Available at: http://www.climateregistry.org/resources/docs/protocols/grp/GRP_3.1_January2009.pdf

2. California Climate Action Registry Database: Southern California Edison Company 2007 PUP Report. 2008. Available at: https://www.climateregistry.org/CARROT/public/Reports.aspx

Table 4-22
Energy Usage and Resulting GHG Emissions for Non-Residential Building Types
Lytle Creek Ranch
Rialto, California

				Baseline						15% Improvement over Title 24 and RPS		Baseline	Annual Total (with 15% Improvement over Title 24 and RPS)	
CEUS Building Type	**Total Area [SF]**	**Energy Source**	**Unit**	**Usage Rate[1] [Unit/SF-yr]**					**CO_2e EF[5] [tonnes/SF-yr]**	**Usage Rate[6] [Unit/SF-yr]**	**CO_2e EF[5] [tonnes/SF-yr]**	**CO_2e Emissions[5] [tonnes/yr]**	**Usage[7] [Unit/yr]**	**CO_2e Emissions[5] [tonnes/yr]**
				Title 24[2,3]		**Non-Title 24[4]**		**Overall**	**Overall**	**Overall**	**Overall**	**Overall**	**Overall**	**Overall**
All Commercial	849,420	Electricity	kWh	3.58	+	9.01	=	12.59	3.60E-03	12.05	3.19E-03	3.06E+03	10,237,481	2,706
		Natural Gas	kBTU	13.43	+	9.35	=	22.78	1.21E-03	20.76	1.10E-03	1.03E+03	17,637,123	936
School	261,360	Electricity	kWh	3.40	+	6.30	=	9.70	2.78E-03	9.19	2.43E-03	7.25E+02	2,401,816	635
		Natural Gas	kBTU	7.19	+	1.79	=	8.98	4.77E-04	7.90	4.20E-04	1.25E+02	2,066,037	110
Grand Total Area	1,110,780									**Electricity Total**		3,786	12,639,297	3,341
										Natural Gas Total		1,151	19,703,160	1,046
										Grand Total				4,386

Notes:
1. Baseline usage rates were taken from the 2006 California Commercial End-Use Survey (CEUS), performed by Itron under contract to the California Energy Commission (CEC). ENVIRON used data for Southern California Edison (SCE), Zone 10, which is the sector in which the Lytle Creek Ranch development is located.
2. Baseline Title 24 usage rates shown in this table have been adjusted to reflect improvements in Title 24 building codes since their introduction in 2002. CEC discusses average savings for improvements from 2002 to 2005 ("Impact Analysis for 2005 Energy Efficiency Standards") as well as from 2005 to 2008 ("Impact Analysis 2008 Update to the California Energy Efficiency Standards for Residential and Nonresidential Buildings"). ENVIRON used these CEC average savings percentages, which are: for electricity: 7.7% reduction in 2005 and 4.9% reduction in 2008; for gas: 3.2% reduction in 2005 and 9.4% reduction in 2008.
3. Includes only Title 24-regulated building envelope uses of electricity (heating, cooling, ventilation, water heating) and gas (heating, water heating), as discussed in footnote (a) of Table 4-17.
4. Includes all other uses of electricity (cooking, refrigeration, exterior lighting, interior lighting, office equipment, miscellaneous, process, motors, air compressors) and gas (cooling, cooking, miscellaneous, process) not included in the Title 24-regulated building envelope, as discussed in footnote 3 above.
5. GHG emission factors (EF) are calculated by multiplying the corresponding usage rates or usages by the conversion factors listed in Table 4-19.
6. The usage rate with 15% improvement over Title 24 is calculated as the baseline Title 24 usage reduced by 15% plus the baseline non-Title 24 usage.
7. The total annual usage is calculated as the usage rate (with 15% improvement over Title 24) multiplied by the total area.

Abbreviations:
CEC - California Energy Commission
CEUS - California Commerical End-Use Survey
CO_2e - carbon dioxide equivalent
EF - emission factor
GHG - greenhouse gas
kBTU - kilo (1000) British thermal units
RPS = Renewables Portfolio Standard
SCE - Southern California Edison
SF - square feet
tonnes - metric tonnes
yr - year

Table 4-23
Energy Usage and Resulting GHG Emissions for Non-Residential Building Types with 2020 RPS
Lytle Creek Ranch
Rialto, California

				Baseline						15% Improvement over Title 24 and RPS		Baseline	Annual Total (with 15% Improvement over Title 24 and RPS)	
CEUS Building Type	**Total Area [SF]**	**Energy Source**	**Unit**	**Usage Rate[1] [Unit/SF-yr]**					**CO_2e EF[5] [tonnes/SF-yr]**	**Usage Rate[6] [Unit/SF-yr]**	**CO_2e EF[5] [tonnes/SF-yr]**	**CO_2e Emissions[5] [tonnes/yr]**	**Usage[7] [Unit/yr]**	**CO_2e Emissions[5] [tonnes/yr]**
				Title 24[2,3]		**Non-Title 24[4]**		**Overall**	**Overall**	**Overall**	**Overall**	**Overall**	**Overall**	**Overall**
All Commercial	849,420	Electricity	kWh	3.58	+	9.01	=	12.59	3.60E-03	12.05	2.67E-03	3.06E+03	10,237,481	2,266
		Natural Gas	kBTU	13.43	+	9.35	=	22.78	1.21E-03	20.76	1.10E-03	1.03E+03	17,637,123	936
School	261,360	Electricity	kWh	3.40	+	6.30	=	9.70	2.78E-03	9.19	2.03E-03	7.25E+02	2,401,816	532
		Natural Gas	kBTU	7.19	+	1.79	=	8.98	4.77E-04	7.90	4.20E-04	1.25E+02	2,066,037	110
Grand Total Area	1,110,780									**Electricity Total**		3,786	12,639,297	2,798
										Natural Gas Total		1,151	19,703,160	1,046
										Grand Total				3,843

Notes:
1. Baseline usage rates were taken from the 2006 California Commercial End-Use Survey (CEUS), performed by Itron under contract to the California Energy Commission (CEC). ENVIRON used data for Southern California Edison (SCE), Zone 10, which is the sector in which the Lytle Creek Ranch development is located.
2. Baseline Title 24 usage rates shown in this table have been adjusted to reflect improvements in Title 24 building codes since their introduction in 2002. CEC discusses average savings for improvements from 2002 to 2005 ("Impact Analysis for 2005 Energy Efficiency Standards") as well as from 2005 to 2008 ("Impact Analysis 2008 Update to the California Energy Efficiency Standards for Residential and Nonresidential Buildings"). ENVIRON used these CEC average savings percentages, which are: for electricity: 7.7% reduction in 2005 and 4.9% reduction in 2008; for gas: 3.2% reduction in 2005 and 9.4% reduction in 2008.
3. Includes only Title 24-regulated building envelope uses of electricity (heating, cooling, ventilation, water heating) and gas (heating, water heating), as discussed in footnote (a) of Table 4-17.
4. Includes all other uses of electricity (cooking, refrigeration, exterior lighting, interior lighting, office equipment, miscellaneous, process, motors, air compressors) and gas (cooling, cooking, miscellaneous, process) not included in the Title 24-regulated building envelope, as discussed in footnote 3 above.
5. GHG emission factors (EF) are calculated by multiplying the corresponding usage rates or usages by the conversion factors listed in Table 4-19.
6. The usage rate with 15% improvement over Title 24 is calculated as the baseline Title 24 usage reduced by 15% plus the baseline non-Title 24 usage.
7. The total annual usage is calculated as the usage rate (with 15% improvement over Title 24) multiplied by the total area.

Abbreviations:
CEC - California Energy Commission
CEUS - California Commerical End-Use Survey
CO_2e - carbon dioxide equivalent
EF - emission factor
GHG - greenhouse gas
kBTU - kilo (1000) British thermal units
RPS = Renewables Portfolio Standard
SCE - Southern California Edison
SF - square feet
tonnes - metric tonnes
yr - year

Table 4-24

Mitigated Trip Generation Rates and Vehicle Miles Based on Traffic Modeling[1]
Lytle Creek Ranch
Rialto, California

Zone	Neighborhood	Total Daily Trip Ends[2]	Percent Production Ends (%)	Production (Added Daily Trips)[3]	Average Trip Length (miles)	Added Daily Vehicle Miles of Travel (VMT)
80	I	7,533	68.1%	5,130	14.5	74,385
81	I	2,697	72.1%	1,945	14.4	28,008
82	II	24,225	54.6%	13,227	9.2	121,688
83	III	46,614	46.3%	21,582	9.3	200,713
84	IV	10,444	54.2%	5,661	13	73,593
				47,545		**498,387**

Notes:

1. The data in this table was provided to ENVIRON by Crain and Associates in their memorandum dated September 15, 2009 re: Lytle Creek Development Mobile Emission Analysis Input. The analysis was conducted using the East Valley Transportation Model (EVTM). The EVTM model accounts for "physical design" mitigation measures inherent in the project plan, such as high residential density and local serving retail.
2. Daily trip ends per weekday.
3. "Production" refers to the origin of the trip (rather than the destination).

Abbreviations:

EVTM - East Valley Transportation Model
VMT - Vehicle Miles Traveled

Sources:

Crain and Associates. 2009. Re: Lytle Creek Development Mobile Emission Analysis Input.

Table 4-25
Mitigated Greenhouse Gas Emissions from Vehicles for the Year 2030
Lytle Creek Ranch
Rialto, California

Neighborhood	Annual Products (Added Annual Trips)[1]	Added Annual Vehicle Miles of Travel (VMT)[1]	Emission Factor Running (g/mile)[2]	Emission Factor Starts (g/start)[3]	Annual CO_2 Emissions Running (tonne)	Annual CO_2 Emissions Starts (tonne)	Total Annual CO_2 Emissions (tonne)	Total Annual Adjusted CO_2 Emissions (tonne)[4]	Total Annual CO_2e Emissions (tonne)[5]
I	1,872,450	27,150,525			9,960	194	10,155	10,010	10,536
I	709,925	10,222,920			3,750	74	3,824	3,769	3,968
II	4,827,855	44,416,120			16,294	501	16,796	16,556	17,427
III	7,877,430	73,260,245	**367**	**104**	26,876	818	27,694	27,298	28,735
IV	2,066,265	26,861,445			9,854	215	10,069	9,925	10,447
Total	**17,353,925**	**181,911,255**			**66,735**	**1,802**	**68,537**	**67,558**	**71,114**

Notes:
1. Daily trips and VMT were modeled for weekday activity, consequently these estimates assume 365 weekdays.
2. Emission factors for vehicles based on EMFAC files for 2030, based on LDA, LDT1, LDT2, and motorcycle for San Bernardino at 30 mph (URBEMIS default).
3. Starting emission factors are based on the weighted average distribution of time between trip starts based on URBEMIS defaults.
4. Weekend traffic is approximately 95% of weekday traffic. Overall CO_2 emissions are consequently 98.6% of those calculated based on weekday activity only (1.0*5/7 + 0.95*2/7).
5. $CO_2e=CO_2/0.95$: The United States Environmental Protection Agency (USEPA) recommends assuming that CH_4, N_2O, and HFCs are 5% of emissions on a CO_2e basis.

Abbreviations:
CH_4 - Methane
CO_2 - Carbon Dioxide
CO_2e - Carbon Dioxide Equivalent
g - gram
GHG - Greenhouse Gas
HFC - Hydro fluorocarbon
mph - miles per hour
N_2O - Nitrous oxide
USEPA - United States Environmental Protection Agency
VMT - Vehicle Miles Traveled

Table 4-26
Mitigated Greenhouse Gas Emissions from Vehicles for the Year 2030 with Pavley Standards
Lytle Creek Ranch
Rialto, California

Neighborhood	Annual Products (Added Annual Trips)[1]	Added Annual Vehicle Miles of Travel (VMT)[1]	Emission Factor Running (g/mile)[2]	Emission Factor Starts (g/start)[3]	Annual CO_2 Emissions Running (tonne)	Annual CO_2 Emissions Starts (tonne)	Total Annual CO_2 Emissions (tonne)	Total Annual Adjusted CO_2 Emissions (tonne)[4]	Total Annual CO_2e Emissions (tonne)[5]
I	1,872,450	27,150,525			**7,968**	194	8,163	8,046	8,470
I	709,925	10,222,920			3,000	74	3,074	3,030	3,190
II	4,827,855	44,416,120			13,035	501	13,537	13,343	14,046
III	7,877,430	73,260,245	**293**	**104**	21,501	818	22,319	22,000	23,158
IV	2,066,265	26,861,445			7,883	215	8,098	7,982	8,402
Total	**17,353,925**	**181,911,255**			**53,388**	**1,802**	**55,190**	**54,402**	**57,265**

Notes:
1. Daily trips and VMT were modeled for weekday activity, consequently these estimates assume 365 weekdays.
2. Emission factors for vehicles based on EMFAC files for 2030, based on LDA, LDT1, LDT2, and motorcycle for San Bernardino at 30 mph (URBEMIS default).
3. Starting emission factors are based on the weighted average distribution of time between trip starts based on URBEMIS defaults.
4. Weekend traffic is approximately 95% of weekday traffic. Overall CO_2 emissions are consequently 98.6% of those calculated based on weekday activity only (1.0*5/7 + 0.95*2/7).
5. $CO_2e=CO_2/0.95$: The United States Environmental Protection Agency (USEPA) recommends assuming that CH_4, N_2O, and HFCs are 5% of emissions on a CO_2e basis.

Abbreviations:
CH_4 - Methane
CO_2 - Carbon Dioxide
CO_2e - Carbon Dioxide Equivalent
g - gram
GHG - Greenhouse Gas
HFC - Hydro fluorocarbon
mph - miles per hour
N_2O - Nitrous oxide
USEPA - United States Environmental Protection Agency
VMT - Vehicle Miles Traveled

Table 4-27
GHG Emissions from Area Sources-Hearth Fuel Combustion
Lytle Creek Ranch
Rialto, CA

Wood-burning Source	Quantity[1]	Amount of Wood per Fireplace[1]		Total Wood Burned Annually	CO_2 Emission Rate	Annual CO_2 Emission
		(lbs/year/unit)		(tonne/year)	(lbs CO_2/tonne wood)	(tonne/year)
Wood stoves	0	--		--	--	0
Wood fireplaces	0	--		--	--	0
					Wood Stoves and Fireplaces Total:	**0**
Natural Gas Fireplace Dwelling Unit Type	**Quantity[2]**	**Average Energy Use[3]**	**Usage Rate[4]**	**Energy Use per Year**	**CO_2 Emission[5]**	**Annual CO_2 Emission**
		(Btu/hour/unit)	(hours/year)	(Mbtu/year)	(lb CO_2/Mbtu)	(tonne/year)
Single-family	5,254	30,000	200	31,524	117	1,671
Multi-family	3,153	20,000	200	12,612	117	668
					Natural Gas Fireplaces Total:	**2,339**
					Hearth Fuel Combustion Total:	**2,339**

Notes:

1. There will be no wood-burning stoves or fireplaces at Lytle Creek Ranch.
2. For a conversative estimate, all single-family and multi-family residences were assumed to each have a natural gas fireplace. In addition, all dwelling units in the SFR-1, SFR-2, and SFR-3 land use categories were conservatively treated as single-family dwellings, regardless of the number of units per building.
3. Average energy use values are URBEMIS default values.
4. Usage rate of 200 hours/year is the URBEMIS default value.
5. Emission factor based on AP-42 value for natural gas combustion.

Abbreviations:
SFR = Single-Family Residential

Sources:
USEPA. 1995. AP-42, Fifth Edition. Compilation of Air Pollutant Emission Factors, Volume 1: Stationary Point and Area Sources. January. Available at: http://www.epa.gov/ttn/chief/ap42/
South Coast Air Quality Management District. Software User's Guide: URBEMIS2007 for Windows. Prepared by Jones & Stockes Associates. November.

Table 4-28
GHG Emission Factors for Lytle Creek Ranch Municipal Sources
Rialto, California

Source[1]	Energy Requirements	Units	Emission Factor	Units	Source Quantity	Units	Total CO_2e Emissions [Tonne CO_2e per year]
Lighting							
Public Lighting[2]	149	kW-hr/capita/yr	0.043	tonne CO_2e/capita/year	24,539	residents (capita)	1,061
						Public Lighting Total:	**1,061**
Municipal Vehicles							
Municipal Vehicles[3]	--	--	0.05	tonne CO_2e/capita/year	24,539	residents (capita)	1,227
						Municipal Vehicles Total:	**1,227**
Water and Wastewater [12]							
Groundwater Supply and Conveyance (Potable)[4,5]	950	kW-hr/acre-foot	0.28	tonne CO_2e/acre-foot	7,020	acre-feet/yr	1,940
State Water Project Supply and Conveyance (Potable)[4,6]	3,236	kW-hr/acre-foot	0.94	tonne CO_2e/acre-foot	1,119	acre-feet/yr	1,053
Surface Water[4,6]	370	kW-hr/acre-foot	0.11	tonne CO_2e/acre-foot	2,035	acre-feet/yr	219
Water Treatment (Potable)[7]	463	kW-hr/acre-foot	0.13	tonne CO_2e/acre-foot	10,174	acre-feet/yr	1,371
Water Distribution (Potable)[8]	391	kW-hr/acre-foot	0.11	tonne CO_2e/acre-foot	10,174	acre-feet/yr	1,157
Wastewater Treatment (Indirect Emissions)[9]	815	kW-hr/acre-foot	0.24	tonne CO_2e/acre-foot	10,174	acre-feet/yr	2,411
Wastewater Treament Plant (Direct Emissions)[10]	--	--	0.084	tonne CO_2e/capita/year	24,539	residents (capita)	2,070
Recycled Water Distribution (Non-Potable)[11]	400	kW-hr/acre-foot	0.12	tonne CO_2e/acre-foot	0	acre-feet/yr	0
						Water and Wastewater Total:	**10,221**
						Municipal Sources Total:	**12,509**

Notes:

1. Public Lighting includes streetlights, traffic signals, area lighting and lighting municipal buildings. Emissions from the Water and Wastewater category are primarily due to the energy required for supply, treatment and distribution. GHG emissions attributed to electricity use are calculated using the Southern California Edison carbon-intensity factor.

2. Emission factor for public lighting is based on a study of energy usage and GHG emissions from Duluth, MN (Skoog, 2001) and the electricity generation emission factor from Southern California Edison. Lytle Development Company plans to incorporate energy-saving light fixtures where feasible (Lytle Creek Ranch Specific Plan, 2008). Energy savings from this potential measure were not quantified for this analysis.

3. Emission factors for municipal vehicles are based on the most conservative number from studies of GHG emissions for four cities of different sizes: Medford, MA; Duluth, MN; Northampton, MA; and Santa Rosa, CA. Population data provided by the US Census (2000).

4. Water supply and conveyance is based on three different sources: groundwater, water purchased from the State Water Project, and surface water. According to the Urban Water Management Plan for West Valley Water District, 69% of the water supply is from groundwater pumping, 11% is from the State Water Project, and 20% is from surface water.

5. Emission factor for groundwater supply and conveyance is based on information provided in CEC 2005 for Chino Basin and the electricity generation emission factor from Southern California Edison. This factor is applied to potable water demand.

6. Emission factors for the State Water Project and surface water supply and conveyance are based on information provided by Wilkinson 2000 and CEC 2005. The electricity generation emission factor is based on information from Southern California Edison.

7. Emission factor for water treatment is based on information provided in CEC 2005 and the electricity generation emission factor from Southern California Edison. This factor is applied to potable water demand.

8. Emission factor for water distribution is based on a Navigant Consulting refinement of a CEC study on the energy necessary to distribute 1 million gallons of treated water and the Southern California-specific electricity generation emission factor from Southern California Edison. This factor is applied to potable water demand.

9. Emission factor for wastewater treatment is based information provided in CEC 2005 and the electricity generation emission factor from Southern California Edison.

10. Emission factor for the wastewater treatment plant accounts for direct methane and nitrous oxide emissions from wastewater. The value used here is based on the 2005 US inventory of GHG emissions for domestic wastewater treatment plants (USEPA) divided by the 2005 US population. (25 Tg CO_2e/year/296,410,404 people = 0.084 tonne CO_2e/capita/year)

11. Emission factor for recycled water distribution is based on information provided in CEC 2005 and the electricity generation emission factor from Southern California Edison.This factor is applied to non-potable water demand.

Abbreviations:

CEC - California Energy Commission
CO_2e - carbon dioxide equivalent
EMWD - Eastern Municipal Water District
GHG - greenhouse gas
kW-hr - kilowatt hour
MW-hr - megawatt hour
NYSERDA - New York State Energy Research and Development Authority
USEPA - United States Environmental Protection Agency

Sources:

California Climate Action Registry (CCAR) Database. Southern California Edison PUP Report. 2006.

California Energy Commission. 2005. *California's Water-Energy Relationship*. Final Staff Report. CEC-700-2005-011-SF.

California Energy Commission. 2006. *Refining Estimates of Water-Related Energy Use in California.* PIER Final Project Report. Prepared by Navigant Consulting, Inc. CEC-500-2006-118. December.

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Skoog., C. 2001. Greenhouse Gas Inventory and Forecast Report. City of Duluth Facilities Management and The International Council for Local Environmental Initiatives. October.http://www.ci.duluth.mn.us/city/information/ccp/GHGE

USEPA. 2007. Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2005. #430-R-07-002. April. http://epa.gov/climatechange/emissions/downloads06/07Waste.pdf

Wilkinson, Robert. 2000. Methodology for Analysis of the Energy Intensity of California's Water Systems, and An Assessment of Multiple Potential Benefits through Integrated Water-Energy Efficiency Measures.

Table 4-29
GHG Emissions from Area Sources-Landscape Equipment Fuel Combustion
Lytle Creek Ranch
Rialto, CA

Land Use Type	Quantity[1]	CO_2 emission factor[2]	Equipment Use Period[3]	Annual CO_2 emission
	(units)	(lbs/unit/day)	(days/year)	(tonne/year)
Single-family residential (DU)[4]	5,254	0.07	180	31
Landscape Equipment Fuel Combustion Total				**31**

Notes:

1. Land use information provided by Lytle Creek Ranch Specific Plan. All dwelling units in the SFR-1, SFR-2, and SFR-3 land use categories were conservatively treated as single-family dwellings, regardless of the number of units per building.
2. Emission factors provided by URBEMIS, based on estimates using CARB's OFFROAD2007 model.
3. Use period is assumed to be equal to the summer period of 180 days.
4. Based on estimates using the URBEMIS model, emissions from landscaping are mainly attributed to single-family residential land uses; the total acreage of non-residential land uses did not significantly impact the total landscaping CO_2 emissions. Thus, only landscaping emissions associated with single-family residences are calculated here.

Abbreviations:
BU = business unit
DU = dwelling unit
SFR = Single-Family Residential

Sources:

South Coast Air Quality Management District. Software User's Guide: URBEMIS 2007 9.2.4 for Windows. Prepared by Jones & Stockes Associates. November. Available at: http://www.aqmd.gov/CEQA/urbemis.html

Table 4-30
Summary of Greenhouse Gas Emissions for Lytle Creek Ranch Excluding Pavley Standards
Lytle Creek Ranch
Rialto, California

Source	GHG Emissions		Percentage of Annual CO_2e Emissions[7] (%)
Vegetation[1]	tonnes CO_2e total	-1,120	NA
Construction (Non-Building)[2]		118,160	NA
Construction (Buildings)[2]		139,392	NA
Total (one time emissions)		**256,432**	NA
Residential[3]	tonnes CO_2e / year	21,530	19%
Non-Residential[4]		4,386	4%
Mobile[5]		71,114	64%
Municipal[6]		12,509	11%
Area		2,370	2%
Total (annual emissions)		**111,908**	NA
Annualized Total[8]	**tonnes CO_2e / year**	**118,319**	**NA**

Notes:

1. Vegetation emissions are one-time emissions resulting from the removal of existing vegetation and planting of new vegetation in Lytle Creek Ranch. The emissions are estimated assuming that all carbon currently sequestered in the biomass of the vegetation is released to the atmosphere upon removal of the vegetation. A total of 1356.3 acres of existing vegetation is considered to be removed for development purposes. Data for emissions calculations are primarily from the Intergovernmental Panel on Climate Change (IPCC) Guildelines for National Greenhouse Gas Inventories.
2. Construction emissions are one-time emissions reported in total metric tonnes during the construction period 2009-2011. Emissions are calculated using URBEMIS default values, EMFAC2007 and model inputs prepared by PCR Services . Sources of emissions include construction equipment (building-related emissions) and vehicles associated with worker commuting and vendor trips (non-building emissions).

3. Residential emissions for single family and apartment dwelling units include emissions associated with electricity and natural gas use. Emissions estimates were developed from Residential Energy Consumption Survey (RECS)database and the Building America Research Benchmark. As specified in the report "Lytle Creek Ranch DEIR No. 471", a total of 8407 dwelling units are considered.
4. Non-Residential emissions for grocery, misc. retail/commercial/office, hotel, public safety, and institutional buildings account for electricity and natural gas use. Emissions estimates for non-residential buildings were developed from the 2003 Commercial Buildings Energy Consumption Survey (CBECS), published by the US EIA.

5. Mobile source emissions were calculated using EMFAC emission factors with trip rates and VMT prepared by Crain and Associates. Mobile source emissions account for residential trips. CO2 emissions were scaled to reflect CO2e emissions based on data from the US Environmental Protection Agency (USEPA).

6. Municipal emissions account for emissions due to energy production associated with water supply, public/street lighting, and municipal vehicles. Energy use estimates for water supply are based primarily on CEC's 2005 "California's Water-Energy Relationship" report Emissions from street lighting and municipal vehicles were based upon studies of other cities.
7. Percentages only apply to annual CO_2e emissions; annual and one-time CO_2e emissions cannot be directly compared.

8. One-time emissions (vegetation and construction) are "annualized" in this Total row. This is done by dividing by an annualization factor, 40 years, effectively converting the one-time emission into an annual emission rate. One-time emissions are not annualized in their respective rows above.

Abbreviations:
CH_4 - methane
CO_2 - carbon dioxide
CO_2e - carbon dioxide equivalent
EIA - Energy Information Administration
EIR - Environmental Impact Report
EMFAC - Emission Factors Database
GHG - Greenhouse Gas
N_2O - nitrous oxide
TBD - to be determined
VMT - Vehicle Miles Traveled

Table 4-31
Summary of Greenhouse Gas Emissions for Lytle Creek Ranch including Pavley Standards
Lytle Creek Ranch
Rialto, California

Source	GHG Emissions		Percentage of Annual CO_2e Emissions[7] (%)
Vegetation[1]	tonnes CO_2e total	-1,120	NA
Construction (Non-Building)[2]		118,160	NA
Construction (Buildings)[2]		139,392	NA
Total (one time emissions)		**256,432**	NA
Residential[3]	tonnes CO_2e / year	21,530	22%
Non-Residential[4]		4,386	4%
Mobile[5]		57,265	58%
Municipal[6]		12,509	13%
Area		2,370	2%
Total (annual emissions)		**98,059**	NA
Annualized Total[8]	**tonnes CO_2e / year**	**104,470**	**NA**

Notes:

1. Vegetation emissions are one-time emissions resulting from the removal of existing vegetation and planting of new vegetation in Lytle Creek Ranch. The emissions are estimated assuming that all carbon currently sequestered in the biomass of the vegetation is released to the atmosphere upon removal of the vegetation. A total of 1356.3 acres of existing vegetation is considered to be removed for development purposes. Data for emissions calculations are primarily from the Intergovernmental Panel on Climate Change (IPCC) Guildelines for National Greenhouse Gas Inventories.
2. Construction emissions are one-time emissions reported in total metric tonnes during the construction period 2009-2011. Emissions are calculated using URBEMIS default values, EMFAC2007 and model inputs prepared by PCR Services . Sources of emissions include construction equipment (building-related emissions) and vehicles associated with worker commuting and vendor trips (non-building emissions).

3. Residential emissions for single family and apartment dwelling units include emissions associated with electricity and natural gas use. Emissions estimates were developed from Residential Energy Consumption Survey (RECS)database and the Building America Research Benchmark. As specified in the report "Lytle Creek Ranch DEIR No. 471", a total of 8407 dwelling units are considered.
4. Non-Residential emissions for grocery, misc. retail/commercial/office, hotel, public safety, and institutional buildings account for electricity and natural gas use. Emissions estimates for non-residential buildings were developed from the 2003 Commercial Buildings Energy Consumption Survey (CBECS), published by the US EIA.

5. Mobile source emissions were calculated using EMFAC emission factors with trip rates and VMT prepared by Crain and Associates. Mobile source emissions account for residential trips. CO2 emissions were scaled to reflect CO2e emissions based on data from the US Environmental Protection Agency (USEPA).

6. Municipal emissions account for emissions due to energy production associated with water supply, public/street lighting, and municipal vehicles. Energy use estimates for water supply are based primarily on CEC's 2005 "California's Water-Energy Relationship" report Emissions from street lighting and municipal vehicles were based upon studies of other cities.
7. Percentages only apply to annual CO_2e emissions; annual and one-time CO_2e emissions cannot be directly compared.
8. One-time emissions (vegetation and construction) are "annualized" in this Total row. This is done by dividing by an annualization factor, 40 years, effectively converting the one-time emission into an annual emission rate. One-time emissions are not annualized in their respective rows above.

Abbreviations:
CH_4 - methane
CO_2 - carbon dioxide
CO_2e - carbon dioxide equivalent
EIA - Energy Information Administration
EIR - Environmental Impact Report
EMFAC - Emission Factors Database
GHG - Greenhouse Gas
N_2O - nitrous oxide
TBD - to be determined
VMT - Vehicle Miles Traveled

Table 5-1
Lytle Creek Ranch Context Supporting Calculations
Lytle Creek Ranch
Rialto, California

	Tonnes / Year	%
2004 World Emissions	2.68E+10	0.00039%
2004 USA Emissions	7.00E+09	0.00149%
2004 CA Emissions	4.80E+08	0.0218%
Total Project Annual Emissions	1.04E+05	

BAU Projected 2020 CO_2e emissions	5.96E+08	tonnes
CA 1990 CO_2e emissions	4.27E+08	tonnes
Difference	1.69E+08	tonnes
% reduction / increase	28%	%
CA 2020 population	4.22E+07	people
1990 emissions / 2020 population	10.1	tonnes / capita

Lytle Creek Ranch Population	24,539

	Tonnes CO_2 / year	Tonnes / capita / year
Lytle Creek Ranch Mobile Emissions	57,265	2.3
Lytle Creek Ranch Residential Emissions	21,530	0.9
Lytle Creek Ranch Mobile + Residential	78,794	3.2

Table 5-2
BAU CO_2 Sequestration Change due to Land Use Change
The Villages of Lakeview
Rialto, California

Vegetation Type[1]	IPCC Designation[2]	IPCC Sub qualification	Tons Dry Matter Carbon/Acre[3]	Sequestered CO_2 / Acre[4]	Total Impacted Area[5]	CO_2 Sequestration Capacity of Removed Vegetation
			[tonne/acre]	[tonne/acre]	[acres]	[tonne]
Scrubland	Forest Land	Scrub	3.9	14.3	908.0	12,988
GRAND TOTAL			3.9	14.3	908.0	12,988

Notes:

1. Land types shown here represent vegetation that will be potentially removed upon development.
2. Land types are mapped to generalized IPCC Land Designations (IPCC 2006).
3. Dry matter carbon per acre was determined from information contained in Table 5-3.
4. It is conservatively assumed that all carbon is eventually converted into CO_2. Multiply the mass of carbon by 3.67 to calculate the final mass of CO_2 (the molecular mass of CO_2 / the molecular mass of carbon is 44/12 or 3.67).
5. Data provided by Lytle Development Company. A positive number indicates the amount of land removed and a negative number indicates that this land type is added. For the business as usual scenario, approximately 908 additional acres of shrublands are converted to settlements.

Abbreviations:

BAU - business as usual

Sources:

Guidelines for National Greenhouse Gas Inventories (IPCC Guidelines). Available online at http://www.ipcc-nggip.iges.or.jp/public/2006gl/vol4.htm
The Villages of Lakeview Hydromodification Technical Report (Final). August 2008.

Table 5-3
BAU Carbon per Acre for IPCC Land Types
Lytle Creek Ranch
Rialto, California

IPCC Designation	Sub qualification	Above Ground Biomass[1]	Ratio of Above Ground / Below Ground Biomass[2]	Total Biomass	Total Biomass[3]	Tonnes Dry Matter Carbon/Acre[4]
		[tonne d.m./acre]		[tonne d.m./Hectare]	[tonne d.m./acre]	[tonne/acre]
Forest Land	Scrub	5.7	2.17	20.5	8.3	3.9
Forest Land	Trees	52.6	4.35	159.9	64.7	30.4

Notes:

1. Numbers listed are used in conjunction with above ground/below ground ratios to calculate total biomass per acre. Values from source converted to tonne/acre.
2. This value is used to calculate total biomass when data for the total biomass is not available for a particular land type.
3. Total biomass is either 1.) Listed directly in the IPCC protocol, or 2.) Calculated from above ground biomass and the Above Ground / Below Ground biomass ratios as follows: Total = Above + (Above / [Above:Below Ratio]). Values from source converted to tonne/acre as necessary.
4. Total biomass multiplied by carbon fraction in plant material (0.47) to calculate carbon content. From IPCC (2006), default value for Forest Land (Table 4.3 of IPCC). Here, it is assumed that agricultural vegetation has the same carbon fraction as other vegetation types.

Abbreviations:

BAU - business as usual

d.m. - dry mass

Sources:

Guidelines for National Greenhouse Gas Inventories (IPCC Guidelines). Available online at http://www.ipcc-nggip.iges.or.jp/public/2006gl/vol4.htm

Table 5-4
BAU CO_2 Sequestration Capacity of New Vegetation Plantings
Lytle Creek Ranch
Rialto, California

Vegetation Species[1]	IPCC Species Class Designation	Sequestered CO_2 / Unit[2] [tonne/unit/year]	Unit	Total Quantity of New Vegetation[1]	Unit	CO_2 Sequestration Capacity of New Vegetation[3] [tonne]
Pine	Pine	0.032	trees	0	trees	0
Miscellaneous	Miscellaneous Trees	0.035	trees	0	trees	0
Total				**0**	**trees**	**0**

Notes:
1. Site-specific planting data provided by Lytle Development Company.

2. Species class-specific sequestration values are provided in Table 8.2 of "2006 IPCC Guidelines for National Greenhouse Gas Inventories, Volume 4". For species that do not appear in Table 8.2, the species was classifed as "miscellaneous" and the average value of all listed data was used.
3. An active growing period of 20 years was assumed for the new trees planted.

Abbreviations:
BAU - business as usual

Sources:

Guidelines for National Greenhouse Gas Inventories (IPCC Guidelines). Available online at http://www.ipcc-nggip.iges.or.jp/public/2006gl/vol4.htm

Table 5-5
BAU Change in CO_2 Sequestration due to Land Use Changes and New Vegetation Plantings
Lytle Creek Ranch
Rialto, California

CO_2 Sequestration Capacity of Vegetation	CO_2 Sequestration Capacity of New Vegetation	Net Change in CO_2 Sequestration Capacity[1]
[tonne]	[tonne]	[tonne]
-12,988	0	-12,988

Notes:
1. A positive value represents an increase in sequestration capacity and thus a net reduction in CO_2.

Abbreviations:
BAU - business as usual

Table 5-6
URBEMIS Operational Mitigation Component Inputs for Mitigated Scenario
Lytle Creek Ranch
Rialto, California

Category	URBEMIS Operational Mitigation Parameter	Value
Residential and Nonresidential Mix of Uses	Number of Housing Units within 1/2 mile radius[1]	11723
	Study Area Employment	3596
Local Serving Retail	Presence of Local Serving Retail	Present
Transit Enhancing Infrastructure[2]	Number of Daily Weekday Buses	34
	Number of Daily Rail or Rapid Transit Buses	19
	Number of Dedicated Daily Shuttles	0
Bicycle and Pedestrian[3]	Number Intersections per Square Mile	0
	Percent of Streets with Sidewalks on One Side	100%
	Percent of Streets with Sidewalks on Both Sides	70%
	Percent of Arterials/Collectors with Bike Lanes	100%

Notes:

1. Number of Housing Units within a 1/2 mile radius and Study Area Employment were provided by PCR Services. URBEMIS files provided on 6/5/2009.

2. Number of daily buses, rail, and rapid transit buses were provided by Lytle Development Company

3. Bike and pedestrian physical design features were provided by Lytle Development Company

Sources:

Software User's Guide: URBEMIS2007 for Windows. November 2007. Appendix D. URBEMIS2007 Mobile Source Mitigation Component

Table 5-7
Trip Generation Rates Based on URBEMIS
Lytle Creek Ranch
Rialto, California

Residential Housing Type	Number of Units[1]	URBEMIS Trip Rate[4] (trips per day per unit)	URBEMIS based Unadjusted Daily Production Trips[2]
Mitigated Scenario[2]			
Single Family House	3,409	6.86	23,401
Condo/townhouse General	4,998	5.31	26,562
		Total Trips:	**49,964**
Unmitigated Low-Density Scenario[3]			
Single Family House	6,759	8.73	59,006
Condo/townhouse General	1,648	6.90	11,371
		Total Trips:	**70,377**
Ratio of low-density unmitigated scenario trips to mitigated scenario trips:			**141%**

Notes:

1. Number of units and housing type for each phase for the mitigated scenario are based on the Lytle Creek Ranch Specific Plan. Numbers of units and housing types for the low-density scenario are based on the City of Rialto. Proportions are derived from the 2005-2007 American Community Survey Housing Units data.

2. The mitigated scenario takes into account housing density, mixed of uses, local serving retail, mass transit, and pedestrian and bicycle friendliness.

3. The unmitigated low-density scenario takes into account the average density of the nearby section of the City of Rialto and does not account for any mitigation measures.

4. Based on numbers from URBEMIS file output. Unadjusted Daily Trips = No. Units x Trip Rate

Sources:

United States Census Bureau. Selected Housing Characteristics: 2005-2007. American Community Survey.
http://factfinder.census.gov/servlet/ADPTable?_bm=y&-geo_id=16000US0660466&-qr_name=ACS_2007_3YR_G00_DP3YR4&-ds_name=ACS_2007_3YR_G00_&-_lang=en&-_sse=on

Table 5-8
BAU Generation Rates and Vehicle Miles Based on Scaled Traffic Modeling
Lytle Creek Ranch
Rialto, California

EVTM Mitigated Project Scenario[1]			URBEMIS based Ratio of Mitigated Trips to Unmitigated Low Density Trips[2]	Unmitigated Low-Density Scenario	
Total Daily Trip Ends	Product (Added Daily Trips)	Added Daily Vehicle Miles of Travel (VMT)		Equavalent Unmitigated Low-Density Daily Added Trip Productions	Equavalent Unmitigated Low-Density Daily VMT[3]
91,513	47,545	498,387	141%	66,970	702,010

Notes:

1. The data for this scenario was provided to ENVIRON by Crain and Associates in their memorandum dated September 15, 2009 re: Lytle Creek Development Mobile Emission Analysis Input. The analysis was conducted using the East Valley Transportation Model (EVTM). The EVTM model accounts for "physical design" mitigation measures inherent in the project plan, such as high residential density and local serving retail.

2. URBEMIS was used to quantify the relative difference in trip generation rates between the mitigated scenario and the unmitigated low-density scenario (see Table 4-27). The ratio of added trips in the two scenarios and the results of the EVTM model for the mitigated scenario were used to estimate the added daily trips and VMT for a unmitigated low-density scenario.

3. The two scenarios are assumed to have the same trip lengths, resulting in an increase in VMT proportional to the increase in trips.

Abbreviations:

BAU - business as usual
EVTM - East Valley Transportation Model
VMT - Vehicle Miles Traveled

Sources:

Crain and Associates. 2009. Re: Lytle Creek Development Mobile Emission Analysis Input.

Table 5-9
Mitigated Greenhouse Gas Emissions from Vehicles for the Year 2030 for BAU Scenario
Lytle Creek Ranch
Rialto, California

Neighborhood	Annual Products (Added Annual Trips)[1]	Added Annual Vehicle Miles of Travel (VMT)[1]	Emission Factor Running (g/mile)[2]	Emission Factor Starts (g/start)[3]	Annual CO_2 Emissions Running (tonne)	Annual CO_2 Emissions Starts (tonne)	Total Annual CO_2 Emissions (tonne)	Total Annual Adjusted CO_2 Emissions (tonne)[4]	Total Annual CO_2e Emissions (tonne)[5]
Total	**24,444,125**	**256,233,761**	**367**	**104**	**94,001**	**2,538**	**96,539**	**95,160**	**100,168**

Notes:
1. Daily trips and VMT were modeled for weekday activity, consequently these estimates assume 365 weekdays.
2. Emission factors for vehicles based on EMFAC files for , .
3. Starting emission factors are based on the weighted average distribution of time between trip starts based on URBEMIS defaults.
4. Weekend traffic is approximately 95% of weekday traffic. Overall CO_2 emissions are consequently 98.6% of those calculated based on weekday activity only (1.0*5/7 + 0.95*2/7).
5. $CO_2e=CO_2/0.95$: The United States Environmental Protection Agency (USEPA) recommends assuming that CH_4, N_2O, and HFCs are 5% of emissions on a CO_2e basis.

Abbreviations:
CH_4 - Methane
CO_2 - Carbon Dioxide
CO_2e - Carbon Dioxide Equivalent
g - gram
GHG - Greenhouse Gas
HFC - Hydro fluorocarbon
mph - miles per hour
N_2O - Nitrous oxide
USEPA - United States Environmental Protection Agency
VMT - Vehicle Miles Traveled

Table 5-10
Lytle Creek Ranch Mobile Emissions in Context
Lytle Creek Ranch
Rialto, California

	Annual Vehicle Miles Traveled		Annual Mobile CO_2e Emissions		Comparison to BAU % Reduction (VMT)	Comparison to BAU % Reduction (CO_2e)
	Total Miles[1,2]	Miles per Dwelling Unit[3]	Total Tonnes	Tonnes per Dwelling Unit[3]		
Lytle Creek Ranch	181,911,255	21,638	71,114	8	29%	29%
Lytle Creek Ranch with Pavley	181,911,255	21,638	57,265	7	29%	43%
BAU	256,233,761	30,479	100,168	12		

Notes:
1. Lytle Creek Ranch vehicle miles as developed in mobile sources section.
2. "Business as usual" VMT assumes that no mitigation measures are taken and that the housing stock of Lytle Creek Ranch (8407 units) were built out at the same density as the nearby section of the City of Rialto.
3. Assumes Lytle Creek Ranch number of dwelling units is 8407.

Abbreviations:
BAU - business as usual
CO_2e - Carbon Dioxide Equivalent
LCR - Lytle Creek Ranch
VMT - Vehicle miles travelled

Table 5-11
Municipal Sources Comparison of Business as Usual to Lytle Creek Ranch
Lytle Creek Ranch
Rialto, California

Scenario	Water/Wastewater Energy Use	Public Lighting	Municipal Vehicles	Total Municipal[1]
	kW-hr/yr	Tonne CO_2e/yr		
BAU	8,151	1,061	1,227	12,509
Lytle Creek Ranch	8,151	1,061	1,227	12,509
Percent Reduction	0%	0%	0%	0%

Notes:
1. Total municipal includes water/wastewater treatment, public lighting, and municipal vehicles. The direct wastewater emissions and municipal vehicle calculations are based on per capita usage and there are no emission factors available to reflect improvements over BAU.

Abbreviations:
BAU - business as usual
CO_2e - Carbon Dioxide equivalents
kW-hr - kilowatt-hour
yr - year

Table 5-12
GHG Emissions Comparison of BAU to Lytle Creek Ranch including Pavley Standards
Lytle Creek Ranch
Rialto, California

Source	GHG Emissions (tonnes CO_2e / year)		Percentage Improvement over BAU [1]
	BAU	Lytle Creek Ranch	(%)
Vegetation[2]	12,988	-1,120	108.6%
Construction	257,552	257,552	0.0%
Total (one-time emissions)	**270,540**	**256,432**	**5.2%**
Residential[3]	27,975	21,530	23.0%
Non-Residential[4]	5,068	4,386	13.5%
Mobile[5]	100,168	57,265	42.8%
Municipal[6]	12,509	12,509	0.0%
Area	2,370	2,370	0.0%
Total (annual emissions)	**148,090**	**98,059**	**33.8%**
Annualized Total[7]	**154,853**	**104,470**	**32.5%**

Notes:

1. The percentage improvement over BAU is an estimate. There are some source categories where appropriate comparisons are not available. It is estimated that this value is on the conservative side.

2. BAU vegetation emissions are based on 908 acres of native habitat being turned into settlements and no trees being planted.

3. BAU residential emissions reflect minimally Title-24 compliant homes without Energy Star appliances.

4. BAU non-residential emissions reflect minimally Title-24 compliant buildings with no renewable credits.

5. BAU mobile emissions is based on a comparison of trip rates adjusted for a less dense development (comparable to nearby City of Rialto) and no traffic mitigation measures.

6. Municipal emissions included here are related to water treatment, waste water treatment, street lighting, and municipal vehicles. This is a very conservative estimate since appropriate emission factors to adjust wastewater direct emissions are unavailable.

7. One-time emissions are annualized over 40 years and then added to the total annual emissions.

Abbreviations:
BAU - business as usual

Table 5-13
GHG Emissions Comparison of BAU to Lytle Creek Ranch including Pavley Standards and 33% RPS
Lytle Creek Ranch
Rialto, California

Source	GHG Emissions (tonnes CO_2e / year)		Percentage Improvement over BAU [1]
	BAU	Lytle Creek Ranch	(%)
Vegetation[2]	12,988	-1,120	109%
Construction	257,552	257,552	0%
Total (one-time emissions)	**270,540**	**256,432**	**5%**
Residential[3]	27,975	19,900	29%
Non-Residential[4]	5,068	3,843	24%
Mobile[5]	100,168	57,265	43%
Municipal[6]	12,509	12,509	0%
Area	2,370	2,370	0%
Total (annual emissions)	**148,090**	**95,887**	**35%**
Annualized Total[7]	**154,853**	**102,297**	**34%**

Notes:

1. The percentage improvement over BAU is an estimate. There are some source categories where appropriate comparisons are not available. It is estimated that this value is on the conservative side.

2. BAU vegetation emissions are based on 908 acres of native habitat being turned into settlements and no trees being planted.

3. BAU residential emissions reflect minimally Title-24 compliant homes without Energy Star appliances.

4. BAU non-residential emissions reflect minimally Title-24 compliant buildings with no renewable credits.

5. BAU mobile emissions is based on a comparison of trip rates adjusted for a less dense development (comparable to nearby City of Rialto) and no traffic mitigation measures.

6. Municipal emissions included here are related to water treatment, waste water treatment, street lighting, and municipal vehicles. This is a very conservative estimate since appropriate emission factors to adjust wastewater direct emissions are unavailable.

7. One-time emissions are annualized over 40 years and then added to the total annual emissions.

Abbreviations:

BAU - business as usual
RPS - Renewable Portfolio Standard

Appendix A:

URBEMIS files for Construction Emissions
(Excerpt from Air Quality Technical Report)

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Urbemis 2007 Version 9.2.4

Detail Report for Summer Construction Mitigated Emissions (Pounds/Day)

File Name: V:\AQNOISE DIVISION\Active Projects\Rialto Specific Plan\Construction\URBEMIS\Phase I.urb924

Project Name: Lytle Creek Rialto Construction - Phase I

Project Location: San Bernadino County

On-Road Vehicle Emissions Based on: Version : Emfac2007 V2.3 Nov 1 2006

Off-Road Vehicle Emissions Based on: OFFROAD2007

CONSTRUCTION EMISSION ESTIMATES (Summer Pounds Per Day, Mitigated)

	ROG	NOx	CO	SO2	PM10 Dust	PM10 Exhaust	PM10 Total	PM2.5 Dust	PM2.5 Exhaust	PM2.5 Total	CO2
Time Slice 1/1/2009-5/29/2009 Active	32.50	288.92	143.45	0.01	859.53	12.96	872.49	179.51	11.92	191.43	25,911.05
Mass Grading 01/01/2009-	32.50	288.92	143.45	0.01	859.53	12.96	872.49	179.51	11.92	191.43	25,911.05
Mass Grading Dust	0.00	0.00	0.00	0.00	859.50	0.00	859.50	179.50	0.00	179.50	0.00
Mass Grading Off Road Diesel	32.28	288.50	136.57	0.00	0.00	12.94	12.94	0.00	11.90	11.90	25,197.84
Mass Grading On Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Mass Grading Worker Trips	0.22	0.41	6.88	0.01	0.03	0.02	0.06	0.01	0.02	0.03	713.21
Time Slice 6/1/2009-6/30/2009 Active	45.29	361.45	342.43	0.22	860.48	16.80	877.28	179.85	15.41	195.26	50,668.21
Building 06/01/2009-08/31/2015	12.79	72.53	198.98	0.22	0.94	3.84	4.78	0.34	3.49	3.83	24,757.15
Building Off Road Diesel	5.47	37.09	18.48	0.00	0.00	2.27	2.27	0.00	2.09	2.09	3,719.82
Building Vendor Trips	2.12	25.78	19.74	0.04	0.15	1.06	1.21	0.05	0.97	1.02	4,382.61
Building Worker Trips	5.21	9.66	160.76	0.17	0.79	0.52	1.31	0.28	0.44	0.72	16,654.72
Mass Grading 01/01/2009-	32.50	288.92	143.45	0.01	859.53	12.96	872.49	179.51	11.92	191.43	25,911.05
Mass Grading Dust	0.00	0.00	0.00	0.00	859.50	0.00	859.50	179.50	0.00	179.50	0.00
Mass Grading Off Road Diesel	32.28	288.50	136.57	0.00	0.00	12.94	12.94	0.00	11.90	11.90	25,197.84
Mass Grading On Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Mass Grading Worker Trips	0.22	0.41	6.88	0.01	0.03	0.02	0.06	0.01	0.02	0.03	713.21
Time Slice 7/1/2009-9/30/2009 Active	53.15	361.47	342.86	0.22	860.48	16.80	877.28	179.85	15.41	195.26	50,711.85
Building 06/01/2009-08/31/2015	12.79	72.53	198.98	0.22	0.94	3.84	4.78	0.34	3.49	3.83	24,757.15
Building Off Road Diesel	5.47	37.09	18.48	0.00	0.00	2.27	2.27	0.00	2.09	2.09	3,719.82
Building Vendor Trips	2.12	25.78	19.74	0.04	0.15	1.06	1.21	0.05	0.97	1.02	4,382.61
Building Worker Trips	5.21	9.66	160.76	0.17	0.79	0.52	1.31	0.28	0.44	0.72	16,654.72
Coating 07/01/2009-08/31/2015	7.86	0.03	0.42	0.00	0.00	0.00	0.00	0.00	0.00	0.00	43.64
Architectural Coating	7.85	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Coating Worker Trips	0.01	0.03	0.42	0.00	0.00	0.00	0.00	0.00	0.00	0.00	43.64

	ROG	NOx	CO	SO2	PM10 Dust	PM10 Exhaust	PM10 Total	PM2.5 Dust	PM2.5 Exhaust	PM2.5 Total	CO2
Mass Grading 01/01/2009-	32.50	288.92	143.45	0.01	859.53	12.96	872.49	179.51	11.92	191.43	25,911.05
Mass Grading Dust	0.00	0.00	0.00	0.00	859.50	0.00	859.50	179.50	0.00	179.50	0.00
Mass Grading Off Road Diesel	32.28	288.50	136.57	0.00	0.00	12.94	12.94	0.00	11.90	11.90	25,197.84
Mass Grading On Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Mass Grading Worker Trips	0.22	0.41	6.88	0.01	0.03	0.02	0.06	0.01	0.02	0.03	713.21
Time Slice 10/1/2009-12/31/2009	**55.79**	**376.63**	**351.93**	**0.23**	860.49	**18.08**	878.56	179.85	**16.58**	196.44	**51,945.55**
Asphalt 10/01/2009-08/31/2015	2.64	15.15	9.07	0.00	0.01	1.27	1.28	0.00	1.17	1.17	1,233.71
Paving Off-Gas	0.13	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Paving Off Road Diesel	2.43	14.47	7.65	0.00	0.00	1.24	1.24	0.00	1.14	1.14	1,033.53
Paving On Road Diesel	0.04	0.61	0.22	0.00	0.00	0.02	0.03	0.00	0.02	0.02	76.14
Paving Worker Trips	0.04	0.07	1.20	0.00	0.01	0.00	0.01	0.00	0.00	0.01	124.04
Building 06/01/2009-08/31/2015	12.79	72.53	198.98	0.22	0.94	3.84	4.78	0.34	3.49	3.83	24,757.15
Building Off Road Diesel	5.47	37.09	18.48	0.00	0.00	2.27	2.27	0.00	2.09	2.09	3,719.82
Building Vendor Trips	2.12	25.78	19.74	0.04	0.15	1.06	1.21	0.05	0.97	1.02	4,382.61
Building Worker Trips	5.21	9.66	160.76	0.17	0.79	0.52	1.31	0.28	0.44	0.72	16,654.72
Coating 07/01/2009-08/31/2015	7.86	0.03	0.42	0.00	0.00	0.00	0.00	0.00	0.00	0.00	43.64
Architectural Coating	7.85	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Coating Worker Trips	0.01	0.03	0.42	0.00	0.00	0.00	0.00	0.00	0.00	0.00	43.64
Mass Grading 01/01/2009-	32.50	288.92	143.45	0.01	859.53	12.96	872.49	179.51	11.92	191.43	25,911.05
Mass Grading Dust	0.00	0.00	0.00	0.00	859.50	0.00	859.50	179.50	0.00	179.50	0.00
Mass Grading Off Road Diesel	32.28	288.50	136.57	0.00	0.00	12.94	12.94	0.00	11.90	11.90	25,197.84
Mass Grading On Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Mass Grading Worker Trips	0.22	0.41	6.88	0.01	0.03	0.02	0.06	0.01	0.02	0.03	713.21
Time Slice 1/1/2010-7/30/2010 Active	53.15	355.10	327.69	**0.23**	860.49	17.03	877.51	179.85	15.62	195.47	51,928.94
Asphalt 10/01/2009-08/31/2015	2.50	14.39	8.87	0.00	0.01	1.24	1.24	0.00	1.14	1.14	1,233.59
Paving Off-Gas	0.13	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Paving Off Road Diesel	2.29	13.77	7.57	0.00	0.00	1.21	1.21	0.00	1.11	1.11	1,033.53
Paving On Road Diesel	0.04	0.55	0.20	0.00	0.00	0.02	0.02	0.00	0.02	0.02	76.14
Paving Worker Trips	0.04	0.07	1.10	0.00	0.01	0.00	0.01	0.00	0.00	0.01	123.92
Building 06/01/2009-08/31/2015	11.81	67.16	184.28	0.22	0.94	3.56	4.50	0.34	3.23	3.56	24,741.39
Building Off Road Diesel	5.14	34.93	17.86	0.00	0.00	2.09	2.09	0.00	1.92	1.92	3,719.82
Building Vendor Trips	1.97	23.48	18.35	0.04	0.15	0.95	1.10	0.05	0.87	0.92	4,382.83
Building Worker Trips	4.71	8.75	148.07	0.17	0.79	0.52	1.31	0.28	0.44	0.72	16,638.74
Coating 07/01/2009-08/31/2015	7.86	0.02	0.39	0.00	0.00	0.00	0.00	0.00	0.00	0.00	43.60
Architectural Coating	7.85	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Coating Worker Trips	0.01	0.02	0.39	0.00	0.00	0.00	0.00	0.00	0.00	0.00	43.60
Mass Grading 01/01/2009-	30.98	273.53	134.15	0.01	859.53	12.23	871.77	179.51	11.25	190.76	25,910.37
Mass Grading Dust	0.00	0.00	0.00	0.00	859.50	0.00	859.50	179.50	0.00	179.50	0.00

	ROG	NOx	CO	SO2	PM10 Dust	PM10 Exhaust	PM10 Total	PM2.5 Dust	PM2.5 Exhaust	PM2.5 Total	CO2
Mass Grading Off Road Diesel	30.78	273.16	127.81	0.00	0.00	12.21	12.21	0.00	11.23	11.23	25,197.84
Mass Grading On Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Mass Grading Worker Trips	0.20	0.37	6.34	0.01	0.03	0.02	0.06	0.01	0.02	0.03	712.53
Time Slice 8/2/2010-12/31/2010 Active	22.17	81.57	193.54	0.22	0.95	4.79	5.75	0.34	4.37	4.71	26,018.57
Asphalt 10/01/2009-08/31/2015	2.50	14.39	8.87	0.00	0.01	1.24	1.24	0.00	1.14	1.14	1,233.59
Paving Off-Gas	0.13	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Paving Off Road Diesel	2.29	13.77	7.57	0.00	0.00	1.21	1.21	0.00	1.11	1.11	1,033.53
Paving On Road Diesel	0.04	0.55	0.20	0.00	0.00	0.02	0.02	0.00	0.02	0.02	76.14
Paving Worker Trips	0.04	0.07	1.10	0.00	0.01	0.00	0.01	0.00	0.00	0.01	123.92
Building 06/01/2009-08/31/2015	11.81	67.16	184.28	0.22	0.94	3.56	4.50	0.34	3.23	3.56	24,741.39
Building Off Road Diesel	5.14	34.93	17.86	0.00	0.00	2.09	2.09	0.00	1.92	1.92	3,719.82
Building Vendor Trips	1.97	23.48	18.35	0.04	0.15	0.95	1.10	0.05	0.87	0.92	4,382.83
Building Worker Trips	4.71	8.75	148.07	0.17	0.79	0.52	1.31	0.28	0.44	0.72	16,638.74
Coating 07/01/2009-08/31/2015	7.86	0.02	0.39	0.00	0.00	0.00	0.00	0.00	0.00	0.00	43.60
Architectural Coating	7.85	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Coating Worker Trips	0.01	0.02	0.39	0.00	0.00	0.00	0.00	0.00	0.00	0.00	43.60
Time Slice 1/3/2011-12/30/2011 Active	21.05	75.27	180.08	0.22	0.95	4.50	5.46	0.34	4.10	4.44	26,005.77
Asphalt 10/01/2009-08/31/2015	2.36	13.66	8.67	0.00	0.01	1.19	1.19	0.00	1.09	1.09	1,233.49
Paving Off-Gas	0.13	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Paving Off Road Diesel	2.16	13.10	7.47	0.00	0.00	1.16	1.16	0.00	1.07	1.07	1,033.53
Paving On Road Diesel	0.04	0.50	0.18	0.00	0.00	0.02	0.02	0.00	0.02	0.02	76.14
Paving Worker Trips	0.03	0.06	1.02	0.00	0.01	0.00	0.01	0.00	0.00	0.01	123.82
Building 06/01/2009-08/31/2015	10.83	61.59	171.05	0.22	0.94	3.32	4.26	0.34	3.01	3.34	24,728.71
Building Off Road Diesel	4.73	32.50	17.29	0.00	0.00	1.95	1.95	0.00	1.79	1.79	3,719.82
Building Vendor Trips	1.81	21.14	16.96	0.04	0.15	0.85	1.00	0.05	0.78	0.83	4,383.13
Building Worker Trips	4.28	7.95	136.81	0.17	0.79	0.52	1.31	0.28	0.44	0.72	16,625.76
Coating 07/01/2009-08/31/2015	7.86	0.02	0.36	0.00	0.00	0.00	0.00	0.00	0.00	0.00	43.56
Architectural Coating	7.85	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Coating Worker Trips	0.01	0.02	0.36	0.00	0.00	0.00	0.00	0.00	0.00	0.00	43.56
Time Slice 1/2/2012-3/30/2012 Active	20.03	69.26	167.57	0.22	0.95	4.19	5.14	0.34	3.81	4.15	25,987.84
Asphalt 10/01/2009-08/31/2015	2.24	12.94	8.50	0.00	0.01	1.12	1.13	0.00	1.03	1.03	1,233.36
Paving Off-Gas	0.13	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Paving Off Road Diesel	2.04	12.44	7.40	0.00	0.00	1.10	1.10	0.00	1.01	1.01	1,033.53
Paving On Road Diesel	0.03	0.44	0.16	0.00	0.00	0.02	0.02	0.00	0.02	0.02	76.14
Paving Worker Trips	0.03	0.05	0.94	0.00	0.01	0.00	0.01	0.00	0.00	0.01	123.69
Building 06/01/2009-08/31/2015	9.94	56.30	158.74	0.22	0.94	3.07	4.01	0.34	2.78	3.12	24,710.97
Building Off Road Diesel	4.40	30.22	16.79	0.00	0.00	1.80	1.80	0.00	1.66	1.66	3,719.82
Building Vendor Trips	1.66	18.85	15.60	0.04	0.15	0.75	0.90	0.05	0.69	0.74	4,383.47
Building Worker Trips	3.87	7.24	126.34	0.17	0.79	0.52	1.31	0.28	0.44	0.72	16,607.68

	ROG	NOx	CO	SO2	PM10 Dust	PM10 Exhaust	PM10 Total	PM2.5 Dust	PM2.5 Exhaust	PM2.5 Total	CO2
Coating 07/01/2009-08/31/2015	7.86	0.02	0.33	0.00	0.00	0.00	0.00	0.00	0.00	0.00	43.52
Architectural Coating	7.85	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Coating Worker Trips	0.01	0.02	0.33	0.00	0.00	0.00	0.00	0.00	0.00	0.00	43.52
Time Slice 4/2/2012-10/31/2012 Active	47.74	310.15	286.40	**0.23**	280.20	14.52	294.73	58.66	13.32	71.98	51,896.88
Asphalt 10/01/2009-08/31/2015	2.24	12.94	8.50	0.00	0.01	1.12	1.13	0.00	1.03	1.03	1,233.36
Paving Off-Gas	0.13	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Paving Off Road Diesel	2.04	12.44	7.40	0.00	0.00	1.10	1.10	0.00	1.01	1.01	1,033.53
Paving On Road Diesel	0.03	0.44	0.16	0.00	0.00	0.02	0.02	0.00	0.02	0.02	76.14
Paving Worker Trips	0.03	0.05	0.94	0.00	0.01	0.00	0.01	0.00	0.00	0.01	123.69
Building 06/01/2009-08/31/2015	9.94	56.30	158.74	0.22	0.94	3.07	4.01	0.34	2.78	3.12	24,710.97
Building Off Road Diesel	4.40	30.22	16.79	0.00	0.00	1.80	1.80	0.00	1.66	1.66	3,719.82
Building Vendor Trips	1.66	18.85	15.60	0.04	0.15	0.75	0.90	0.05	0.69	0.74	4,383.47
Building Worker Trips	3.87	7.24	126.34	0.17	0.79	0.52	1.31	0.28	0.44	0.72	16,607.68
Coating 07/01/2009-08/31/2015	7.86	0.02	0.33	0.00	0.00	0.00	0.00	0.00	0.00	0.00	43.52
Architectural Coating	7.85	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Coating Worker Trips	0.01	0.02	0.33	0.00	0.00	0.00	0.00	0.00	0.00	0.00	43.52
Mass Grading 04/01/2012-	27.71	240.89	118.83	0.01	279.25	10.34	289.59	58.32	9.51	67.83	25,909.04
Mass Grading Dust	0.00	0.00	0.00	0.00	279.22	0.00	279.22	58.31	0.00	58.31	0.00
Mass Grading Off Road Diesel	27.54	240.58	113.42	0.00	0.00	10.31	10.31	0.00	9.49	9.49	25,197.84
Mass Grading On Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Mass Grading Worker Trips	0.17	0.31	5.41	0.01	0.03	0.02	0.06	0.01	0.02	0.03	711.20
Time Slice 11/1/2012-12/31/2012	20.03	69.26	167.57	0.22	0.95	4.19	5.14	0.34	3.81	4.15	25,987.84
Asphalt 10/01/2009-08/31/2015	2.24	12.94	8.50	0.00	0.01	1.12	1.13	0.00	1.03	1.03	1,233.36
Paving Off-Gas	0.13	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Paving Off Road Diesel	2.04	12.44	7.40	0.00	0.00	1.10	1.10	0.00	1.01	1.01	1,033.53
Paving On Road Diesel	0.03	0.44	0.16	0.00	0.00	0.02	0.02	0.00	0.02	0.02	76.14
Paving Worker Trips	0.03	0.05	0.94	0.00	0.01	0.00	0.01	0.00	0.00	0.01	123.69
Building 06/01/2009-08/31/2015	9.94	56.30	158.74	0.22	0.94	3.07	4.01	0.34	2.78	3.12	24,710.97
Building Off Road Diesel	4.40	30.22	16.79	0.00	0.00	1.80	1.80	0.00	1.66	1.66	3,719.82
Building Vendor Trips	1.66	18.85	15.60	0.04	0.15	0.75	0.90	0.05	0.69	0.74	4,383.47
Building Worker Trips	3.87	7.24	126.34	0.17	0.79	0.52	1.31	0.28	0.44	0.72	16,607.68
Coating 07/01/2009-08/31/2015	7.86	0.02	0.33	0.00	0.00	0.00	0.00	0.00	0.00	0.00	43.52
Architectural Coating	7.85	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Coating Worker Trips	0.01	0.02	0.33	0.00	0.00	0.00	0.00	0.00	0.00	0.00	43.52
Time Slice 1/1/2013-12/31/2013 Active	19.03	63.55	155.84	0.22	0.95	3.85	4.80	0.34	3.49	3.83	25,972.19
Asphalt 10/01/2009-08/31/2015	2.10	12.24	8.35	0.00	0.01	1.05	1.06	0.00	0.96	0.97	1,233.24
Paving Off-Gas	0.13	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Paving Off Road Diesel	1.91	11.80	7.33	0.00	0.00	1.03	1.03	0.00	0.95	0.95	1,033.53
Paving On Road Diesel	0.03	0.39	0.14	0.00	0.00	0.01	0.02	0.00	0.01	0.01	76.14

	ROG	NOx	CO	SO2	PM10 Dust	PM10 Exhaust	PM10 Total	PM2.5 Dust	PM2.5 Exhaust	PM2.5 Total	CO2
Paving Worker Trips	0.03	0.05	0.87	0.00	0.01	0.00	0.01	0.00	0.00	0.01	123.57
Building 06/01/2009-08/31/2015	9.08	51.29	147.19	0.22	0.94	2.80	3.74	0.34	2.53	2.86	24,695.48
Building Off Road Diesel	4.07	28.05	16.40	0.00	0.00	1.60	1.60	0.00	1.47	1.47	3,719.82
Building Vendor Trips	1.51	16.65	14.30	0.04	0.15	0.66	0.81	0.05	0.60	0.66	4,383.84
Building Worker Trips	3.49	6.60	116.48	0.17	0.79	0.54	1.33	0.28	0.45	0.74	16,591.82
Coating 07/01/2009-08/31/2015	7.86	0.02	0.31	0.00	0.00	0.00	0.00	0.00	0.00	0.00	43.47
Architectural Coating	7.85	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Coating Worker Trips	0.01	0.02	0.31	0.00	0.00	0.00	0.00	0.00	0.00	0.00	43.47
Time Slice 1/1/2014-12/31/2014 Active	18.14	57.88	145.08	0.22	0.95	3.50	4.45	0.34	3.17	3.51	25,958.42
Asphalt 10/01/2009-08/31/2015	1.99	11.57	8.21	0.00	0.01	0.98	0.99	0.00	0.90	0.90	1,233.14
Paving Off-Gas	0.13	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Paving Off Road Diesel	1.81	11.19	7.28	0.00	0.00	0.96	0.96	0.00	0.89	0.89	1,033.53
Paving On Road Diesel	0.03	0.34	0.13	0.00	0.00	0.01	0.02	0.00	0.01	0.01	76.14
Paving Worker Trips	0.02	0.04	0.80	0.00	0.01	0.00	0.01	0.00	0.00	0.01	123.47
Building 06/01/2009-08/31/2015	8.29	46.29	136.59	0.22	0.94	2.52	3.46	0.34	2.27	2.60	24,681.85
Building Off Road Diesel	3.76	25.68	16.00	0.00	0.00	1.40	1.40	0.00	1.29	1.29	3,719.82
Building Vendor Trips	1.37	14.59	13.12	0.04	0.15	0.58	0.73	0.05	0.53	0.58	4,384.10
Building Worker Trips	3.16	6.01	107.47	0.17	0.79	0.54	1.33	0.28	0.45	0.74	16,577.93
Coating 07/01/2009-08/31/2015	7.86	0.02	0.28	0.00	0.00	0.00	0.00	0.00	0.00	0.00	43.44
Architectural Coating	7.85	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Coating Worker Trips	0.01	0.02	0.28	0.00	0.00	0.00	0.00	0.00	0.00	0.00	43.44
Time Slice 1/1/2015-8/31/2015 Active	17.29	52.36	135.15	0.22	0.95	3.22	4.18	0.34	2.92	3.26	25,937.26
Asphalt 10/01/2009-08/31/2015	1.87	10.83	8.06	0.00	0.01	0.91	0.92	0.00	0.84	0.84	1,232.98
Paving Off-Gas	0.13	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Paving Off Road Diesel	1.70	10.49	7.21	0.00	0.00	0.90	0.90	0.00	0.82	0.82	1,033.53
Paving On Road Diesel	0.03	0.30	0.11	0.00	0.00	0.01	0.01	0.00	0.01	0.01	76.14
Paving Worker Trips	0.02	0.04	0.74	0.00	0.01	0.00	0.01	0.00	0.00	0.01	123.31
Building 06/01/2009-08/31/2015	7.56	41.52	126.83	0.22	0.94	2.31	3.25	0.34	2.08	2.42	24,660.90
Building Off Road Diesel	3.47	23.31	15.68	0.00	0.00	1.27	1.27	0.00	1.17	1.17	3,719.82
Building Vendor Trips	1.24	12.75	12.04	0.04	0.15	0.50	0.66	0.05	0.46	0.51	4,384.37
Building Worker Trips	2.85	5.47	99.10	0.17	0.79	0.54	1.33	0.28	0.45	0.74	16,556.71
Coating 07/01/2009-08/31/2015	7.85	0.01	0.26	0.00	0.00	0.00	0.00	0.00	0.00	0.00	43.38
Architectural Coating	7.85	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Coating Worker Trips	0.01	0.01	0.26	0.00	0.00	0.00	0.00	0.00	0.00	0.00	43.38

Construction Related Mitigation Measures

The following mitigation measures apply to Phase: Mass Grading 1/1/2009 - 7/31/2010 - Site Grading Phase 1A

For Soil Stablizing Measures, the Water exposed surfaces 2x daily watering mitigation reduces emissions by:

PM10: 55% PM25: 55%

	ROG	NOx	CO	SO2	PM10 Dust	PM10 Exhaust	PM10 Total	PM2.5 Dust	PM2.5 Exhaust	PM2.5 Total	CO2

For Unpaved Roads Measures, the Manage haul road dust 2x daily watering mitigation reduces emissions by:
PM10: 55% PM25: 55%
The following mitigation measures apply to Phase: Mass Grading 4/1/2012 - 10/31/2012 - Site Grading Phase 1B
For Soil Stablizing Measures, the Water exposed surfaces 2x daily watering mitigation reduces emissions by:
PM10: 55% PM25: 55%
For Unpaved Roads Measures, the Manage haul road dust 2x daily watering mitigation reduces emissions by:
PM10: 55% PM25: 55%

Phase Assumptions

Phase: Mass Grading 1/1/2009 - 7/31/2010 - Site Grading Phase 1A
Total Acres Disturbed: 271
Maximum Daily Acreage Disturbed: 50
Fugitive Dust Level of Detail: Default
38.2 lbs per acre-day
On Road Truck Travel (VMT): 0
Off-Road Equipment:
4 Graders (174 hp) operating at a 0.61 load factor for 8 hours per day
3 Rubber Tired Dozers (357 hp) operating at a 0.59 load factor for 8 hours per day
10 Scrapers (313 hp) operating at a 0.72 load factor for 8 hours per day
3 Tractors/Loaders/Backhoes (108 hp) operating at a 0.55 load factor for 8 hours per day
3 Water Trucks (189 hp) operating at a 0.5 load factor for 8 hours per day

Phase: Mass Grading 4/1/2012 - 10/31/2012 - Site Grading Phase 1B
Total Acres Disturbed: 100
Maximum Daily Acreage Disturbed: 50
Fugitive Dust Level of Detail: Low
Onsite Cut/Fill: 1021 cubic yards/day; Offsite Cut/Fill: 0 cubic yards/day
On Road Truck Travel (VMT): 0
Off-Road Equipment:
4 Graders (174 hp) operating at a 0.61 load factor for 8 hours per day
3 Rubber Tired Dozers (357 hp) operating at a 0.59 load factor for 8 hours per day
10 Scrapers (313 hp) operating at a 0.72 load factor for 8 hours per day
3 Tractors/Loaders/Backhoes (108 hp) operating at a 0.55 load factor for 8 hours per day
3 Water Trucks (189 hp) operating at a 0.5 load factor for 8 hours per day

Phase: Paving 10/1/2009 - 8/31/2015 - Asphalt Paving

	ROG	NOx	CO	SO2	PM10 Dust	PM10 Exhaust	PM10 Total	PM2.5 Dust	PM2.5 Exhaust	PM2.5 Total	CO2

Acres to be Paved: 77.22

Off-Road Equipment:

2 Paving Equipment (104 hp) operating at a 0.53 load factor for 8 hours per day

2 Rollers (95 hp) operating at a 0.56 load factor for 6 hours per day

Phase: Building Construction 6/1/2009 - 8/31/2015 - Building Construction

Off-Road Equipment:

1 Aerial Lifts (60 hp) operating at a 0.46 load factor for 8 hours per day

1 Cranes (399 hp) operating at a 0.43 load factor for 7 hours per day

2 Forklifts (145 hp) operating at a 0.3 load factor for 8 hours per day

1 Generator Sets (49 hp) operating at a 0.74 load factor for 8 hours per day

2 Other Equipment (190 hp) operating at a 0.62 load factor for 8 hours per day

3 Tractors/Loaders/Backhoes (108 hp) operating at a 0.55 load factor for 7 hours per day

1 Welders (45 hp) operating at a 0.45 load factor for 8 hours per day

Phase: Architectural Coating 7/1/2009 - 8/31/2015 - Arch Coatings

Rule: Residential Interior Coatings begins 1/1/2005 ends 6/30/2008 specifies a VOC of 100

Rule: Residential Interior Coatings begins 7/1/2008 ends 12/31/2040 specifies a VOC of 50

Rule: Residential Exterior Coatings begins 1/1/2005 ends 6/30/2008 specifies a VOC of 250

Rule: Residential Exterior Coatings begins 7/1/2008 ends 12/31/2040 specifies a VOC of 100

Rule: Nonresidential Interior Coatings begins 1/1/2005 ends 12/31/2040 specifies a VOC of 250

Rule: Nonresidential Exterior Coatings begins 1/1/2005 ends 12/31/2040 specifies a VOC of 250

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Urbemis 2007 Version 9.2.4

Detail Report for Summer Construction Mitigated Emissions (Pounds/Day)

File Name: V:\AQNOISE DIVISION\Active Projects\Rialto Specific Plan\Construction\URBEMIS\Phase II.urb924

Project Name: Lytle Creek Phase 2

Project Location: South Coast AQMD

On-Road Vehicle Emissions Based on: Version : Emfac2007 V2.3 Nov 1 2006

Off-Road Vehicle Emissions Based on: OFFROAD2007

CONSTRUCTION EMISSION ESTIMATES (Summer Pounds Per Day, Mitigated)

	ROG	NOx	CO	SO2	PM10 Dust	PM10 Exhaust	PM10 Total	PM2.5 Dust	PM2.5 Exhaust	PM2.5 Total	CO2
Time Slice 5/1/2009-5/29/2009 Active	4.52	41.97	21.14	0.02	10.98	2.11	13.08	2.29	1.94	4.23	4,287.52
Demolition 05/01/2009-05/31/2009	4.52	41.97	21.14	0.02	10.98	2.11	13.08	2.29	1.94	4.23	4,287.52
Fugitive Dust	0.00	0.00	0.00	0.00	10.92	0.00	10.92	2.27	0.00	2.27	0.00
Demo Off Road Diesel	3.56	29.56	15.27	0.00	0.00	1.59	1.59	0.00	1.46	1.46	2,632.55
Demo On Road Diesel	0.93	12.35	4.74	0.01	0.05	0.52	0.57	0.02	0.47	0.49	1,530.53
Demo Worker Trips	0.04	0.07	1.13	0.00	0.01	0.00	0.01	0.00	0.00	0.00	124.43
Time Slice 6/1/2009-12/31/2009 Active	45.86	403.89	202.22	0.01	859.55	18.36	877.92	179.52	16.89	196.41	36,173.57
Fine Grading 06/01/2009-	45.86	403.89	202.22	0.01	859.55	18.36	877.92	179.52	16.89	196.41	36,173.57
Fine Grading Dust	0.00	0.00	0.00	0.00	859.50	0.00	859.50	179.50	0.00	179.50	0.00
Fine Grading Off Road Diesel	45.54	403.30	192.36	0.00	0.00	18.33	18.33	0.00	16.87	16.87	35,084.80
Fine Grading On Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fine Grading Worker Trips	0.32	0.59	9.86	0.01	0.05	0.03	0.08	0.02	0.02	0.04	1,088.77
Time Slice 1/1/2010-3/31/2010 Active	43.70	382.28	190.11	0.01	859.55	17.33	876.89	179.52	15.95	195.46	36,173.25
Fine Grading 06/01/2009-	43.70	382.28	190.11	0.01	859.55	17.33	876.89	179.52	15.95	195.46	36,173.25
Fine Grading Dust	0.00	0.00	0.00	0.00	859.50	0.00	859.50	179.50	0.00	179.50	0.00
Fine Grading Off Road Diesel	43.41	381.74	180.94	0.00	0.00	17.30	17.30	0.00	15.92	15.92	35,084.80
Fine Grading On Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fine Grading Worker Trips	0.29	0.54	9.17	0.01	0.05	0.03	0.08	0.02	0.02	0.04	1,088.45
Time Slice 4/1/2010-4/30/2010 Active	83.22	542.50	1,022.56	1.05	864.15	26.62	890.78	181.17	24.30	205.47	141,641.03
Building 04/01/2010-05/31/2018	39.52	160.22	832.44	1.04	4.60	9.29	13.89	1.65	8.35	10.01	105,467.78
Building Off Road Diesel	10.56	53.72	35.18	0.00	0.00	4.27	4.27	0.00	3.93	3.93	5,057.89
Building Vendor Trips	5.40	62.31	48.11	0.11	0.40	2.60	3.00	0.14	2.38	2.52	11,505.87
Building Worker Trips	23.56	44.19	749.15	0.93	4.20	2.42	6.62	1.51	2.04	3.56	88,904.01
Fine Grading 06/01/2009-	43.70	382.28	190.11	0.01	859.55	17.33	876.89	179.52	15.95	195.46	36,173.25
Fine Grading Dust	0.00	0.00	0.00	0.00	859.50	0.00	859.50	179.50	0.00	179.50	0.00

	ROG	NOx	CO	SO2	PM10 Dust	PM10 Exhaust	PM10 Total	PM2.5 Dust	PM2.5 Exhaust	PM2.5 Total	CO2
Fine Grading Off Road Diesel	43.41	381.74	180.94	0.00	0.00	17.30	17.30	0.00	15.92	15.92	35,084.80
Fine Grading On Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fine Grading Worker Trips	0.29	0.54	9.17	0.01	0.05	0.03	0.08	0.02	0.02	0.04	1,088.45
Time Slice 5/3/2010-12/31/2010 Active	**102.55**	**563.15**	**1,036.11**	**1.06**	864.17	**28.37**	892.54	181.18	**25.90**	207.08	**143,546.85**
Asphalt 05/01/2010-05/31/2018	3.67	20.61	12.82	0.00	0.02	1.74	1.76	0.01	1.60	1.61	1,818.21
Paving Off-Gas	0.31	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Paving Off Road Diesel	3.20	19.17	10.47	0.00	0.00	1.68	1.68	0.00	1.55	1.55	1,418.81
Paving On Road Diesel	0.10	1.34	0.51	0.00	0.01	0.05	0.06	0.00	0.05	0.05	181.71
Paving Worker Trips	0.06	0.11	1.83	0.00	0.01	0.01	0.02	0.00	0.00	0.01	217.69
Building 04/01/2010-05/31/2018	39.52	160.22	832.44	1.04	4.60	9.29	13.89	1.65	8.35	10.01	105,467.78
Building Off Road Diesel	10.56	53.72	35.18	0.00	0.00	4.27	4.27	0.00	3.93	3.93	5,057.89
Building Vendor Trips	5.40	62.31	48.11	0.11	0.40	2.60	3.00	0.14	2.38	2.52	11,505.87
Building Worker Trips	23.56	44.19	749.15	0.93	4.20	2.42	6.62	1.51	2.04	3.56	88,904.01
Coating 05/01/2010-05/31/2018	15.65	0.04	0.74	0.00	0.00	0.00	0.01	0.00	0.00	0.00	87.61
Architectural Coating	15.63	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Coating Worker Trips	0.02	0.04	0.74	0.00	0.00	0.00	0.01	0.00	0.00	0.00	87.61
Fine Grading 06/01/2009-	43.70	382.28	190.11	0.01	859.55	17.33	876.89	179.52	15.95	195.46	36,173.25
Fine Grading Dust	0.00	0.00	0.00	0.00	859.50	0.00	859.50	179.50	0.00	179.50	0.00
Fine Grading Off Road Diesel	43.41	381.74	180.94	0.00	0.00	17.30	17.30	0.00	15.92	15.92	35,084.80
Fine Grading On Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fine Grading Worker Trips	0.29	0.54	9.17	0.01	0.05	0.03	0.08	0.02	0.02	0.04	1,088.45
Time Slice 1/3/2011-12/30/2011 Active	96.44	526.22	969.09	**1.06**	864.17	26.32	890.49	181.18	24.02	205.19	143,527.42
Asphalt 05/01/2010-05/31/2018	3.48	19.55	12.51	0.00	0.02	1.68	1.69	0.01	1.54	1.55	1,818.16
Paving Off-Gas	0.31	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Paving Off Road Diesel	3.02	18.25	10.34	0.00	0.00	1.62	1.62	0.00	1.49	1.49	1,418.81
Paving On Road Diesel	0.09	1.20	0.46	0.00	0.01	0.05	0.05	0.00	0.04	0.05	181.71
Paving Worker Trips	0.05	0.10	1.71	0.00	0.01	0.01	0.02	0.00	0.00	0.01	217.64
Building 04/01/2010-05/31/2018	36.28	147.38	776.33	1.04	4.60	8.77	13.37	1.65	7.88	9.53	105,448.65
Building Off Road Diesel	9.82	50.82	34.48	0.00	0.00	4.03	4.03	0.00	3.71	3.71	5,057.89
Building Vendor Trips	4.97	56.15	44.59	0.11	0.40	2.32	2.72	0.14	2.13	2.26	11,506.05
Building Worker Trips	21.49	40.41	697.26	0.93	4.20	2.42	6.62	1.51	2.04	3.56	88,884.70
Coating 05/01/2010-05/31/2018	15.65	0.04	0.69	0.00	0.00	0.00	0.01	0.00	0.00	0.00	87.59
Architectural Coating	15.63	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Coating Worker Trips	0.02	0.04	0.69	0.00	0.00	0.00	0.01	0.00	0.00	0.00	87.59
Fine Grading 06/01/2009-	41.02	359.25	179.56	0.01	859.55	15.87	875.42	179.52	14.60	194.11	36,173.01
Fine Grading Dust	0.00	0.00	0.00	0.00	859.50	0.00	859.50	179.50	0.00	179.50	0.00
Fine Grading Off Road Diesel	40.76	358.76	171.02	0.00	0.00	15.84	15.84	0.00	14.57	14.57	35,084.80
Fine Grading On Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fine Grading Worker Trips	0.26	0.49	8.54	0.01	0.05	0.03	0.08	0.02	0.02	0.04	1,088.22
Time Slice 1/2/2012-12/31/2012 Active	91.27	490.30	906.49	**1.06**	864.17	24.49	888.67	181.18	22.33	203.50	143,511.96

	ROG	NOx	CO	SO2	PM10 Dust	PM10 Exhaust	PM10 Total	PM2.5 Dust	PM2.5 Exhaust	PM2.5 Total	CO2
Asphalt 05/01/2010-05/31/2018	3.31	18.50	12.24	0.00	0.02	1.58	1.60	0.01	1.45	1.46	1,818.13
Paving Off-Gas	0.31	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Paving Off Road Diesel	2.86	17.34	10.24	0.00	0.00	1.53	1.53	0.00	1.41	1.41	1,418.81
Paving On Road Diesel	0.09	1.07	0.41	0.00	0.01	0.04	0.05	0.00	0.04	0.04	181.71
Paving Worker Trips	0.05	0.09	1.59	0.00	0.01	0.01	0.02	0.00	0.00	0.01	217.61
Building 04/01/2010-05/31/2018	33.21	135.06	723.70	1.04	4.60	8.18	12.78	1.65	7.33	8.98	105,433.43
Building Off Road Diesel	9.08	47.91	33.83	0.00	0.00	3.70	3.70	0.00	3.40	3.40	5,057.89
Building Vendor Trips	4.56	50.11	41.23	0.11	0.40	2.05	2.46	0.14	1.88	2.02	11,506.25
Building Worker Trips	19.57	37.04	648.64	0.93	4.20	2.43	6.63	1.51	2.04	3.56	88,869.29
Coating 05/01/2010-05/31/2018	15.65	0.04	0.64	0.00	0.00	0.00	0.01	0.00	0.00	0.00	87.58
Architectural Coating	15.63	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Coating Worker Trips	0.02	0.04	0.64	0.00	0.00	0.00	0.01	0.00	0.00	0.00	87.58
Fine Grading 06/01/2009-	39.11	336.71	169.91	0.01	859.55	14.73	874.28	179.52	13.55	193.06	36,172.82
Fine Grading Dust	0.00	0.00	0.00	0.00	859.50	0.00	859.50	179.50	0.00	179.50	0.00
Fine Grading Off Road Diesel	38.87	336.25	161.97	0.00	0.00	14.70	14.70	0.00	13.52	13.52	35,084.80
Fine Grading On Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fine Grading Worker Trips	0.24	0.45	7.94	0.01	0.05	0.03	0.08	0.02	0.02	0.04	1,088.03
Time Slice 1/1/2013-12/31/2013 Active	86.73	456.37	847.50	**1.06**	864.17	22.71	886.88	181.18	20.67	201.85	143,501.63
Asphalt 05/01/2010-05/31/2018	3.12	17.49	11.99	0.00	0.02	1.48	1.49	0.01	1.36	1.36	1,818.10
Paving Off-Gas	0.31	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Paving Off Road Diesel	2.69	16.46	10.15	0.00	0.00	1.43	1.43	0.00	1.32	1.32	1,418.81
Paving On Road Diesel	0.08	0.94	0.37	0.00	0.01	0.04	0.04	0.00	0.03	0.04	181.71
Paving Worker Trips	0.04	0.08	1.48	0.00	0.01	0.01	0.02	0.00	0.00	0.01	217.58
Building 04/01/2010-05/31/2018	30.30	123.06	673.99	1.04	4.60	7.58	12.18	1.65	6.76	8.41	105,423.26
Building Off Road Diesel	8.33	44.95	33.22	0.00	0.00	3.34	3.34	0.00	3.07	3.07	5,057.89
Building Vendor Trips	4.14	44.30	37.94	0.11	0.40	1.80	2.20	0.14	1.65	1.78	11,506.67
Building Worker Trips	17.83	33.80	602.84	0.93	4.20	2.44	6.64	1.51	2.04	3.56	88,858.71
Coating 05/01/2010-05/31/2018	15.65	0.03	0.59	0.00	0.00	0.00	0.01	0.00	0.00	0.00	87.57
Architectural Coating	15.63	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Coating Worker Trips	0.02	0.03	0.59	0.00	0.00	0.00	0.01	0.00	0.00	0.00	87.57
Fine Grading 06/01/2009-	37.66	315.79	160.92	0.01	859.55	13.65	873.20	179.52	12.56	192.07	36,172.69
Fine Grading Dust	0.00	0.00	0.00	0.00	859.50	0.00	859.50	179.50	0.00	179.50	0.00
Fine Grading Off Road Diesel	37.44	315.38	153.54	0.00	0.00	13.62	13.62	0.00	12.53	12.53	35,084.80
Fine Grading On Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fine Grading Worker Trips	0.22	0.41	7.38	0.01	0.05	0.03	0.08	0.02	0.02	0.04	1,087.90
Time Slice 1/1/2014-12/31/2014 Active	81.99	421.58	795.19	**1.06**	864.17	21.09	885.27	181.18	19.19	200.36	143,493.01
Asphalt 05/01/2010-05/31/2018	2.97	16.51	11.76	0.00	0.02	1.38	1.40	0.01	1.27	1.28	1,818.08
Paving Off-Gas	0.31	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Paving Off Road Diesel	2.54	15.61	10.07	0.00	0.00	1.34	1.34	0.00	1.24	1.24	1,418.81
Paving On Road Diesel	0.07	0.83	0.32	0.00	0.01	0.03	0.04	0.00	0.03	0.03	181.71

	ROG	NOx	CO	SO2	PM10 Dust	PM10 Exhaust	PM10 Total	PM2.5 Dust	PM2.5 Exhaust	PM2.5 Total	CO2
Paving Worker Trips	0.04	0.08	1.38	0.00	0.01	0.01	0.02	0.00	0.01	0.01	217.56
Building 04/01/2010-05/31/2018	27.64	112.11	629.10	1.04	4.60	7.20	11.80	1.65	6.41	8.06	105,414.79
Building Off Road Diesel	7.62	42.12	32.62	0.00	0.00	2.98	2.98	0.00	2.74	2.74	5,057.89
Building Vendor Trips	3.75	38.90	34.92	0.11	0.40	1.57	1.98	0.14	1.44	1.57	11,506.98
Building Worker Trips	16.26	31.09	561.57	0.93	4.20	2.64	6.84	1.51	2.23	3.74	88,849.92
Coating 05/01/2010-05/31/2018	15.65	0.03	0.55	0.00	0.00	0.00	0.01	0.00	0.00	0.00	87.56
Architectural Coating	15.63	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Coating Worker Trips	0.02	0.03	0.55	0.00	0.00	0.00	0.01	0.00	0.00	0.00	87.56
Fine Grading 06/01/2009-	35.75	292.92	153.77	0.01	859.55	12.51	872.06	179.52	11.51	191.02	36,172.59
Fine Grading Dust	0.00	0.00	0.00	0.00	859.50	0.00	859.50	179.50	0.00	179.50	0.00
Fine Grading Off Road Diesel	35.55	292.54	146.89	0.00	0.00	12.48	12.48	0.00	11.48	11.48	35,084.80
Fine Grading On Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fine Grading Worker Trips	0.20	0.38	6.88	0.01	0.05	0.03	0.08	0.02	0.03	0.05	1,087.79
Time Slice 1/1/2015-8/31/2015 Active	77.33	386.52	745.93	**1.06**	864.17	19.54	883.71	181.18	17.76	198.93	143,485.76
Asphalt 05/01/2010-05/31/2018	2.80	15.44	11.54	0.00	0.02	1.28	1.29	0.01	1.18	1.18	1,818.06
Paving Off-Gas	0.31	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Paving Off Road Diesel	2.38	14.65	9.98	0.00	0.00	1.25	1.25	0.00	1.15	1.15	1,418.81
Paving On Road Diesel	0.06	0.72	0.28	0.00	0.01	0.03	0.03	0.00	0.02	0.03	181.71
Paving Worker Trips	0.04	0.07	1.28	0.00	0.01	0.01	0.02	0.00	0.01	0.01	217.54
Building 04/01/2010-05/31/2018	25.21	101.60	587.08	1.04	4.60	6.73	11.34	1.65	5.98	7.63	105,407.66
Building Off Road Diesel	6.98	39.07	32.08	0.00	0.00	2.72	2.72	0.00	2.50	2.50	5,057.89
Building Vendor Trips	3.39	34.04	32.13	0.11	0.40	1.37	1.77	0.14	1.25	1.39	11,507.42
Building Worker Trips	14.84	28.50	522.87	0.93	4.20	2.64	6.84	1.51	2.23	3.74	88,842.34
Coating 05/01/2010-05/31/2018	15.65	0.03	0.52	0.00	0.00	0.00	0.01	0.00	0.00	0.00	87.55
Architectural Coating	15.63	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Coating Worker Trips	0.01	0.03	0.52	0.00	0.00	0.00	0.01	0.00	0.00	0.00	87.55
Fine Grading 06/01/2009-	33.68	269.44	146.80	0.01	859.55	11.52	871.07	179.52	10.60	190.11	36,172.49
Fine Grading Dust	0.00	0.00	0.00	0.00	859.50	0.00	859.50	179.50	0.00	179.50	0.00
Fine Grading Off Road Diesel	33.50	269.10	140.39	0.00	0.00	11.49	11.49	0.00	10.57	10.57	35,084.80
Fine Grading On Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fine Grading Worker Trips	0.18	0.35	6.40	0.01	0.05	0.03	0.08	0.02	0.03	0.05	1,087.70
Time Slice 9/1/2015-12/31/2015 Active	43.65	117.08	599.13	1.05	4.62	8.01	12.64	1.66	7.16	8.82	107,313.27
Asphalt 05/01/2010-05/31/2018	2.80	15.44	11.54	0.00	0.02	1.28	1.29	0.01	1.18	1.18	1,818.06
Paving Off-Gas	0.31	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Paving Off Road Diesel	2.38	14.65	9.98	0.00	0.00	1.25	1.25	0.00	1.15	1.15	1,418.81
Paving On Road Diesel	0.06	0.72	0.28	0.00	0.01	0.03	0.03	0.00	0.02	0.03	181.71
Paving Worker Trips	0.04	0.07	1.28	0.00	0.01	0.01	0.02	0.00	0.01	0.01	217.54
Building 04/01/2010-05/31/2018	25.21	101.60	587.08	1.04	4.60	6.73	11.34	1.65	5.98	7.63	105,407.66
Building Off Road Diesel	6.98	39.07	32.08	0.00	0.00	2.72	2.72	0.00	2.50	2.50	5,057.89
Building Vendor Trips	3.39	34.04	32.13	0.11	0.40	1.37	1.77	0.14	1.25	1.39	11,507.42

	ROG	NOx	CO	SO2	PM10 Dust	PM10 Exhaust	PM10 Total	PM2.5 Dust	PM2.5 Exhaust	PM2.5 Total	CO2
Building Worker Trips	14.84	28.50	522.87	0.93	4.20	2.64	6.84	1.51	2.23	3.74	88,842.34
Coating 05/01/2010-05/31/2018	15.65	0.03	0.52	0.00	0.00	0.00	0.01	0.00	0.00	0.00	87.55
Architectural Coating	15.63	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Coating Worker Trips	0.01	0.03	0.52	0.00	0.00	0.00	0.01	0.00	0.00	0.00	87.55
Time Slice 1/1/2016-12/30/2016 Active	41.36	107.11	561.70	1.05	4.62	7.42	12.04	1.66	6.61	8.27	107,302.95
Asphalt 05/01/2010-05/31/2018	2.62	14.42	11.36	0.00	0.02	1.17	1.19	0.01	1.08	1.08	1,818.04
Paving Off-Gas	0.31	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Paving Off Road Diesel	2.22	13.72	9.91	0.00	0.00	1.14	1.14	0.00	1.05	1.05	1,418.81
Paving On Road Diesel	0.06	0.63	0.25	0.00	0.01	0.02	0.03	0.00	0.02	0.02	181.71
Paving Worker Trips	0.03	0.06	1.20	0.00	0.01	0.01	0.02	0.00	0.01	0.01	217.51
Building 04/01/2010-05/31/2018	23.09	92.66	549.86	1.04	4.60	6.25	10.85	1.65	5.53	7.19	105,397.37
Building Off Road Diesel	6.39	36.26	31.63	0.00	0.00	2.39	2.39	0.00	2.20	2.20	5,057.89
Building Vendor Trips	3.09	30.06	29.79	0.11	0.40	1.21	1.62	0.14	1.11	1.24	11,507.68
Building Worker Trips	13.61	26.34	488.44	0.93	4.20	2.64	6.84	1.51	2.23	3.74	88,831.81
Coating 05/01/2010-05/31/2018	15.64	0.03	0.48	0.00	0.00	0.00	0.01	0.00	0.00	0.00	87.54
Architectural Coating	15.63	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Coating Worker Trips	0.01	0.03	0.48	0.00	0.00	0.00	0.01	0.00	0.00	0.00	87.54
Time Slice 1/2/2017-12/29/2017 Active	39.25	98.27	525.95	1.05	4.62	6.91	11.54	1.66	6.15	7.80	107,295.97
Asphalt 05/01/2010-05/31/2018	2.48	13.48	11.17	0.00	0.02	1.08	1.10	0.01	0.99	1.00	1,818.02
Paving Off-Gas	0.31	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Paving Off Road Diesel	2.09	12.86	9.83	0.00	0.00	1.05	1.05	0.00	0.97	0.97	1,418.81
Paving On Road Diesel	0.05	0.56	0.22	0.00	0.01	0.02	0.03	0.00	0.02	0.02	181.71
Paving Worker Trips	0.03	0.06	1.12	0.00	0.01	0.01	0.02	0.00	0.01	0.01	217.50
Building 04/01/2010-05/31/2018	21.13	84.76	514.33	1.04	4.60	5.83	10.43	1.65	5.15	6.80	105,390.41
Building Off Road Diesel	5.78	33.70	31.21	0.00	0.00	2.11	2.11	0.00	1.94	1.94	5,057.89
Building Vendor Trips	2.83	26.75	27.72	0.11	0.40	1.08	1.48	0.14	0.98	1.12	11,508.04
Building Worker Trips	12.52	24.31	455.39	0.93	4.20	2.64	6.84	1.51	2.23	3.74	88,824.48
Coating 05/01/2010-05/31/2018	15.64	0.02	0.45	0.00	0.00	0.00	0.01	0.00	0.00	0.00	87.53
Architectural Coating	15.63	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Coating Worker Trips	0.01	0.02	0.45	0.00	0.00	0.00	0.01	0.00	0.00	0.00	87.53
Time Slice 1/1/2018-5/31/2018 Active	37.30	90.24	492.72	1.05	4.62	6.47	11.09	1.66	5.73	7.39	107,291.16
Asphalt 05/01/2010-05/31/2018	2.36	12.58	11.03	0.00	0.02	0.99	1.00	0.01	0.91	0.91	1,818.00
Paving Off-Gas	0.31	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Paving Off Road Diesel	1.97	12.02	9.79	0.00	0.00	0.96	0.96	0.00	0.89	0.89	1,418.81
Paving On Road Diesel	0.05	0.50	0.20	0.00	0.01	0.02	0.02	0.00	0.02	0.02	181.71
Paving Worker Trips	0.03	0.05	1.04	0.00	0.01	0.01	0.02	0.00	0.01	0.01	217.48
Building 04/01/2010-05/31/2018	19.30	77.63	481.28	1.04	4.60	5.48	10.08	1.65	4.82	6.47	105,385.63
Building Off Road Diesel	5.22	31.25	30.82	0.00	0.00	1.86	1.86	0.00	1.71	1.71	5,057.89
Building Vendor Trips	2.60	23.98	25.89	0.11	0.40	0.97	1.37	0.14	0.88	1.02	11,508.46
Building Worker Trips	11.47	22.41	424.57	0.93	4.20	2.65	6.85	1.51	2.23	3.74	88,819.27

	ROG	NOx	CO	SO2	PM10 Dust	PM10 Exhaust	PM10 Total	PM2.5 Dust	PM2.5 Exhaust	PM2.5 Total	CO2
Coating 05/01/2010-05/31/2018	15.64	0.02	0.42	0.00	0.00	0.00	0.01	0.00	0.00	0.00	87.53
Architectural Coating	15.63	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Coating Worker Trips	0.01	0.02	0.42	0.00	0.00	0.00	0.01	0.00	0.00	0.00	87.53

Construction Related Mitigation Measures

The following mitigation measures apply to Phase: Fine Grading 6/1/2009 - 8/31/2015 - Default Fine Site Grading/Excavation Description

For Soil Stablizing Measures, the Water exposed surfaces 2x daily watering mitigation reduces emissions by:

PM10: 55% PM25: 55%

For Unpaved Roads Measures, the Manage haul road dust 2x daily watering mitigation reduces emissions by:

PM10: 55% PM25: 55%

Phase Assumptions

Phase: Demolition 5/1/2009 - 5/31/2009 - Type Your Description Here

Building Volume Total (cubic feet): 320000

Building Volume Daily (cubic feet): 26000

On Road Truck Travel (VMT): 361.11

Off-Road Equipment:

1 Other Equipment (190 hp) operating at a 0.62 load factor for 8 hours per day

1 Rubber Tired Dozers (357 hp) operating at a 0.59 load factor for 8 hours per day

2 Tractors/Loaders/Backhoes (108 hp) operating at a 0.55 load factor for 8 hours per day

Phase: Fine Grading 6/1/2009 - 8/31/2015 - Default Fine Site Grading/Excavation Description

Total Acres Disturbed: 761

Maximum Daily Acreage Disturbed: 50

Fugitive Dust Level of Detail: Default

38.2 lbs per acre-day

On Road Truck Travel (VMT): 0

Off-Road Equipment:

6 Graders (174 hp) operating at a 0.61 load factor for 8 hours per day

5 Rubber Tired Dozers (357 hp) operating at a 0.59 load factor for 8 hours per day

3 Rubber Tired Loaders (164 hp) operating at a 0.54 load factor for 8 hours per day

12 Scrapers (313 hp) operating at a 0.72 load factor for 8 hours per day

4 Tractors/Loaders/Backhoes (108 hp) operating at a 0.55 load factor for 8 hours per day

5 Water Trucks (189 hp) operating at a 0.5 load factor for 8 hours per day

Phase: Paving 5/1/2010 - 5/31/2018 - Default Paving Description

	ROG	NOx	CO	SO2	PM10 Dust	PM10 Exhaust	PM10 Total	PM2.5 Dust	PM2.5 Exhaust	PM2.5 Total	CO2

Acres to be Paved: 252
Off-Road Equipment:
2 Cement and Mortar Mixers (10 hp) operating at a 0.56 load factor for 0 hours per day
1 Pavers (100 hp) operating at a 0.62 load factor for 8 hours per day
2 Paving Equipment (104 hp) operating at a 0.53 load factor for 8 hours per day
2 Rollers (95 hp) operating at a 0.56 load factor for 6 hours per day

Phase: Building Construction 4/1/2010 - 5/31/2018 - Default Building Construction Description
Off-Road Equipment:
2 Aerial Lifts (60 hp) operating at a 0.46 load factor for 8 hours per day
3 Air Compressors (106 hp) operating at a 0.48 load factor for 8 hours per day
3 Cement and Mortar Mixers (10 hp) operating at a 0.56 load factor for 8 hours per day
3 Concrete/Industrial Saws (10 hp) operating at a 0.73 load factor for 8 hours per day
1 Cranes (399 hp) operating at a 0.43 load factor for 7 hours per day
5 Forklifts (145 hp) operating at a 0.3 load factor for 8 hours per day
3 Generator Sets (49 hp) operating at a 0.74 load factor for 8 hours per day
5 Tractors/Loaders/Backhoes (108 hp) operating at a 0.55 load factor for 7 hours per day
3 Welders (45 hp) operating at a 0.45 load factor for 8 hours per day

Phase: Architectural Coating 5/1/2010 - 5/31/2018 - Default Architectural Coating Description
Rule: Residential Interior Coatings begins 1/1/2005 ends 6/30/2008 specifies a VOC of 100
Rule: Residential Interior Coatings begins 7/1/2008 ends 12/31/2040 specifies a VOC of 50
Rule: Residential Exterior Coatings begins 1/1/2005 ends 6/30/2008 specifies a VOC of 250
Rule: Residential Exterior Coatings begins 7/1/2008 ends 12/31/2040 specifies a VOC of 100
Rule: Nonresidential Interior Coatings begins 1/1/2005 ends 12/31/2040 specifies a VOC of 250
Rule: Nonresidential Exterior Coatings begins 1/1/2005 ends 12/31/2040 specifies a VOC of 250

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Urbemis 2007 Version 9.2.4

Detail Report for Summer Construction Mitigated Emissions (Pounds/Day)

File Name: V:\AQNOISE DIVISION\Active Projects\Rialto Specific Plan\Construction\URBEMIS\Phase IIIa.urb924

Project Name: Lytle Creek Rialto - Construction - Phase IIIa

Project Location: San Bernadino County

On-Road Vehicle Emissions Based on: Version : Emfac2007 V2.3 Nov 1 2006

Off-Road Vehicle Emissions Based on: OFFROAD2007

CONSTRUCTION EMISSION ESTIMATES (Summer Pounds Per Day, Mitigated)

	ROG	NOx	CO	SO2	PM10 Dust	PM10 Exhaust	PM10 Total	PM2.5 Dust	PM2.5 Exhaust	PM2.5 Total	CO2
Time Slice 6/1/2011-12/30/2011 Active	35.79	308.21	159.43	0.01	859.55	14.36	873.91	179.52	13.21	192.73	31,854.28
Mass Grading 06/01/2011-	35.79	308.21	159.43	0.01	859.55	14.36	873.91	179.52	13.21	192.73	31,854.28
Mass Grading Dust	0.00	0.00	0.00	0.00	859.50	0.00	859.50	179.50	0.00	179.50	0.00
Mass Grading Off Road Diesel	35.51	307.69	150.51	0.00	0.00	14.33	14.33	0.00	13.18	13.18	30,770.84
Mass Grading On Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Mass Grading Worker Trips	0.28	0.52	8.92	0.01	0.05	0.03	0.09	0.02	0.03	0.05	1,083.44
Time Slice 1/2/2012-2/29/2012 Active	34.13	288.57	152.48	0.01	859.55	13.29	872.85	179.52	12.23	191.74	31,853.10
Mass Grading 06/01/2011-	34.13	288.57	152.48	0.01	859.55	13.29	872.85	179.52	12.23	191.74	31,853.10
Mass Grading Dust	0.00	0.00	0.00	0.00	859.50	0.00	859.50	179.50	0.00	179.50	0.00
Mass Grading Off Road Diesel	33.87	288.10	144.25	0.00	0.00	13.26	13.26	0.00	12.20	12.20	30,770.84
Mass Grading On Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Mass Grading Worker Trips	0.25	0.47	8.23	0.01	0.05	0.03	0.09	0.02	0.03	0.05	1,082.26
Time Slice 3/1/2012-3/30/2012 Active	56.08	392.50	598.86	0.66	862.38	19.11	881.49	180.53	17.44	197.97	97,636.03
Building 03/01/2012-02/28/2020	21.96	103.93	446.38	0.65	2.83	5.81	8.64	1.01	5.22	6.23	65,782.93
Building Off Road Diesel	5.36	25.96	19.91	0.00	0.00	2.02	2.02	0.00	1.86	1.86	2,771.15
Building Vendor Trips	4.97	56.23	46.99	0.13	0.46	2.24	2.70	0.16	2.05	2.21	13,130.56
Building Worker Trips	11.63	21.74	379.48	0.53	2.37	1.56	3.93	0.85	1.31	2.16	49,881.22
Mass Grading 06/01/2011-	34.13	288.57	152.48	0.01	859.55	13.29	872.85	179.52	12.23	191.74	31,853.10
Mass Grading Dust	0.00	0.00	0.00	0.00	859.50	0.00	859.50	179.50	0.00	179.50	0.00
Mass Grading Off Road Diesel	33.87	288.10	144.25	0.00	0.00	13.26	13.26	0.00	12.20	12.20	30,770.84
Mass Grading On Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Mass Grading Worker Trips	0.25	0.47	8.23	0.01	0.05	0.03	0.09	0.02	0.03	0.05	1,082.26
Time Slice 4/2/2012-12/31/2012 Active	**83.36**	**405.93**	**608.30**	**0.67**	862.40	**20.25**	882.64	180.53	**18.49**	199.02	**99,048.56**
Asphalt 04/01/2012-02/28/2020	2.41	13.39	8.67	0.00	0.01	1.13	1.15	0.00	1.04	1.05	1,311.78
Paving Off-Gas	0.27	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

	ROG	NOx	CO	SO2	PM10 Dust	PM10 Exhaust	PM10 Total	PM2.5 Dust	PM2.5 Exhaust	PM2.5 Total	CO2
Paving Off Road Diesel	2.04	12.44	7.40	0.00	0.00	1.10	1.10	0.00	1.01	1.01	1,033.53
Paving On Road Diesel	0.07	0.90	0.33	0.00	0.01	0.03	0.04	0.00	0.03	0.03	154.56
Paving Worker Trips	0.03	0.05	0.94	0.00	0.01	0.00	0.01	0.00	0.00	0.01	123.69
Building 03/01/2012-02/28/2020	21.96	103.93	446.38	0.65	2.83	5.81	8.64	1.01	5.22	6.23	65,782.93
Building Off Road Diesel	5.36	25.96	19.91	0.00	0.00	2.02	2.02	0.00	1.86	1.86	2,771.15
Building Vendor Trips	4.97	56.23	46.99	0.13	0.46	2.24	2.70	0.16	2.05	2.21	13,130.56
Building Worker Trips	11.63	21.74	379.48	0.53	2.37	1.56	3.93	0.85	1.31	2.16	49,881.22
Coating 04/01/2012-02/28/2020	24.87	0.04	0.77	0.00	0.00	0.00	0.01	0.00	0.00	0.00	100.76
Architectural Coating	24.84	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Coating Worker Trips	0.02	0.04	0.77	0.00	0.00	0.00	0.01	0.00	0.00	0.00	100.76
Mass Grading 06/01/2011-	34.13	288.57	152.48	0.01	859.55	13.29	872.85	179.52	12.23	191.74	31,853.10
Mass Grading Dust	0.00	0.00	0.00	0.00	859.50	0.00	859.50	179.50	0.00	179.50	0.00
Mass Grading Off Road Diesel	33.87	288.10	144.25	0.00	0.00	13.26	13.26	0.00	12.20	12.20	30,770.84
Mass Grading On Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Mass Grading Worker Trips	0.25	0.47	8.23	0.01	0.05	0.03	0.09	0.02	0.03	0.05	1,082.26
Time Slice 1/1/2013-12/31/2013 Active	79.62	376.83	567.87	**0.67**	862.40	18.80	881.20	180.53	17.15	197.69	99,000.80
Asphalt 04/01/2012-02/28/2020	2.27	12.64	8.49	0.00	0.01	1.06	1.07	0.00	0.98	0.98	1,311.66
Paving Off-Gas	0.27	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Paving Off Road Diesel	1.91	11.80	7.33	0.00	0.00	1.03	1.03	0.00	0.95	0.95	1,033.53
Paving On Road Diesel	0.06	0.79	0.29	0.00	0.01	0.03	0.03	0.00	0.03	0.03	154.56
Paving Worker Trips	0.03	0.05	0.87	0.00	0.01	0.00	0.01	0.00	0.00	0.01	123.57
Building 03/01/2012-02/28/2020	19.87	93.85	412.43	0.65	2.83	5.39	8.22	1.01	4.82	5.83	65,736.42
Building Off Road Diesel	4.86	24.36	19.49	0.00	0.00	1.80	1.80	0.00	1.66	1.66	2,771.15
Building Vendor Trips	4.52	49.67	43.08	0.13	0.46	1.97	2.43	0.16	1.80	1.96	13,131.68
Building Worker Trips	10.49	19.83	349.85	0.53	2.37	1.62	3.99	0.85	1.36	2.22	49,833.59
Coating 04/01/2012-02/28/2020	24.86	0.04	0.71	0.00	0.00	0.00	0.01	0.00	0.00	0.00	100.66
Architectural Coating	24.84	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Coating Worker Trips	0.02	0.04	0.71	0.00	0.00	0.00	0.01	0.00	0.00	0.00	100.66
Mass Grading 06/01/2011-	32.62	270.29	146.25	0.01	859.55	12.34	871.89	179.52	11.35	190.87	31,852.07
Mass Grading Dust	0.00	0.00	0.00	0.00	859.50	0.00	859.50	179.50	0.00	179.50	0.00
Mass Grading Off Road Diesel	32.39	269.86	138.66	0.00	0.00	12.31	12.31	0.00	11.32	11.32	30,770.84
Mass Grading On Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Mass Grading Worker Trips	0.23	0.43	7.59	0.01	0.05	0.04	0.09	0.02	0.03	0.05	1,081.23
Time Slice 1/1/2014-12/31/2014 Active	75.97	347.16	531.44	**0.67**	862.40	17.14	879.54	180.53	15.63	196.16	98,958.80
Asphalt 04/01/2012-02/28/2020	2.16	11.92	8.34	0.00	0.01	0.99	1.00	0.00	0.91	0.92	1,311.55
Paving Off-Gas	0.27	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Paving Off Road Diesel	1.81	11.19	7.28	0.00	0.00	0.96	0.96	0.00	0.89	0.89	1,033.53
Paving On Road Diesel	0.06	0.69	0.26	0.00	0.01	0.03	0.03	0.00	0.02	0.03	154.56
Paving Worker Trips	0.02	0.04	0.80	0.00	0.01	0.00	0.01	0.00	0.00	0.01	123.47
Building 03/01/2012-02/28/2020	17.99	84.43	381.42	0.65	2.83	4.94	7.77	1.01	4.40	5.41	65,695.51

	ROG	NOx	CO	SO2	PM10 Dust	PM10 Exhaust	PM10 Total	PM2.5 Dust	PM2.5 Exhaust	PM2.5 Total	CO2
Building Off Road Diesel	4.40	22.83	19.09	0.00	0.00	1.59	1.59	0.00	1.46	1.46	2,771.15
Building Vendor Trips	4.09	43.54	39.54	0.13	0.46	1.73	2.19	0.16	1.58	1.74	13,132.48
Building Worker Trips	9.50	18.06	322.79	0.53	2.37	1.62	3.99	0.85	1.36	2.22	49,791.87
Coating 04/01/2012-02/28/2020	24.86	0.04	0.65	0.00	0.00	0.00	0.01	0.00	0.00	0.00	100.58
Architectural Coating	24.84	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Coating Worker Trips	0.02	0.04	0.65	0.00	0.00	0.00	0.01	0.00	0.00	0.00	100.58
Mass Grading 06/01/2011-	30.96	250.78	141.03	0.01	859.55	11.21	870.76	179.52	10.31	189.83	31,851.16
Mass Grading Dust	0.00	0.00	0.00	0.00	859.50	0.00	859.50	179.50	0.00	179.50	0.00
Mass Grading Off Road Diesel	30.75	250.38	134.03	0.00	0.00	11.18	11.18	0.00	10.28	10.28	30,770.84
Mass Grading On Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Mass Grading Worker Trips	0.21	0.39	7.00	0.01	0.05	0.04	0.09	0.02	0.03	0.05	1,080.32
Time Slice 1/1/2015-12/31/2015 Active	72.18	316.43	497.66	**0.67**	862.40	15.84	878.23	180.53	14.43	194.96	98,894.23
Asphalt 04/01/2012-02/28/2020	2.03	11.13	8.18	0.00	0.01	0.92	0.93	0.00	0.85	0.85	1,311.40
Paving Off-Gas	0.27	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Paving Off Road Diesel	1.70	10.49	7.21	0.00	0.00	0.90	0.90	0.00	0.82	0.82	1,033.53
Paving On Road Diesel	0.05	0.60	0.23	0.00	0.01	0.02	0.03	0.00	0.02	0.02	154.56
Paving Worker Trips	0.02	0.04	0.74	0.00	0.01	0.00	0.01	0.00	0.00	0.01	123.31
Building 03/01/2012-02/28/2020	16.23	75.64	352.65	0.65	2.83	4.58	7.41	1.01	4.07	5.09	65,632.61
Building Off Road Diesel	3.98	21.19	18.71	0.00	0.00	1.45	1.45	0.00	1.34	1.34	2,771.15
Building Vendor Trips	3.69	38.04	36.28	0.13	0.46	1.51	1.97	0.16	1.38	1.53	13,133.31
Building Worker Trips	8.55	16.41	297.66	0.53	2.37	1.62	3.99	0.85	1.36	2.22	49,728.15
Coating 04/01/2012-02/28/2020	24.86	0.03	0.60	0.00	0.00	0.00	0.01	0.00	0.00	0.00	100.45
Architectural Coating	24.84	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Coating Worker Trips	0.02	0.03	0.60	0.00	0.00	0.00	0.01	0.00	0.00	0.00	100.45
Mass Grading 06/01/2011-	29.06	229.62	136.23	0.01	859.55	10.33	869.89	179.52	9.51	189.02	31,849.78
Mass Grading Dust	0.00	0.00	0.00	0.00	859.50	0.00	859.50	179.50	0.00	179.50	0.00
Mass Grading Off Road Diesel	28.87	229.27	129.77	0.00	0.00	10.30	10.30	0.00	9.48	9.48	30,770.84
Mass Grading On Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Mass Grading Worker Trips	0.19	0.36	6.46	0.01	0.05	0.04	0.09	0.02	0.03	0.05	1,078.94
Time Slice 1/1/2016-12/30/2016 Active	68.98	288.73	467.73	**0.67**	862.40	14.49	876.88	180.53	13.19	193.72	98,835.88
Asphalt 04/01/2012-02/28/2020	1.91	10.37	8.05	0.00	0.01	0.84	0.85	0.00	0.77	0.77	1,311.25
Paving Off-Gas	0.27	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Paving Off Road Diesel	1.58	9.81	7.17	0.00	0.00	0.81	0.81	0.00	0.75	0.75	1,033.53
Paving On Road Diesel	0.05	0.53	0.20	0.00	0.01	0.02	0.02	0.00	0.02	0.02	154.56
Paving Worker Trips	0.02	0.04	0.68	0.00	0.01	0.00	0.01	0.00	0.00	0.01	123.16
Building 03/01/2012-02/28/2020	14.78	68.18	326.92	0.65	2.83	4.22	7.05	1.01	3.75	4.76	65,575.77
Building Off Road Diesel	3.60	19.67	18.42	0.00	0.00	1.27	1.27	0.00	1.17	1.17	2,771.15
Building Vendor Trips	3.36	33.55	33.53	0.13	0.46	1.34	1.80	0.16	1.22	1.37	13,133.93
Building Worker Trips	7.81	14.96	274.98	0.53	2.37	1.62	3.99	0.85	1.36	2.22	49,670.69
Coating 04/01/2012-02/28/2020	24.86	0.03	0.56	0.00	0.00	0.00	0.01	0.00	0.00	0.00	100.33

	ROG	NOx	CO	SO2	PM10 Dust	PM10 Exhaust	PM10 Total	PM2.5 Dust	PM2.5 Exhaust	PM2.5 Total	CO2
Architectural Coating	24.84	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Coating Worker Trips	0.02	0.03	0.56	0.00	0.00	0.00	0.01	0.00	0.00	0.00	100.33
Mass Grading 06/01/2011-	27.43	210.14	132.21	0.01	859.55	9.43	868.98	179.52	8.67	188.19	31,848.53
Mass Grading Dust	0.00	0.00	0.00	0.00	859.50	0.00	859.50	179.50	0.00	179.50	0.00
Mass Grading Off Road Diesel	27.26	209.82	126.24	0.00	0.00	9.39	9.39	0.00	8.64	8.64	30,770.84
Mass Grading On Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Mass Grading Worker Trips	0.17	0.32	5.97	0.01	0.05	0.04	0.09	0.02	0.03	0.05	1,077.69
Time Slice 1/2/2017-5/31/2017 Active	65.95	263.19	439.82	**0.67**	862.40	13.19	875.58	180.53	11.99	192.53	98,783.07
Asphalt 04/01/2012-02/28/2020	1.80	9.68	7.92	0.00	0.01	0.77	0.78	0.00	0.71	0.71	1,311.12
Paving Off-Gas	0.27	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Paving Off Road Diesel	1.48	9.17	7.11	0.00	0.00	0.75	0.75	0.00	0.69	0.69	1,033.53
Paving On Road Diesel	0.04	0.47	0.18	0.00	0.01	0.02	0.02	0.00	0.02	0.02	154.56
Paving Worker Trips	0.02	0.03	0.63	0.00	0.01	0.00	0.01	0.00	0.00	0.01	123.04
Building 03/01/2012-02/28/2020	13.37	61.83	303.23	0.65	2.83	3.91	6.74	1.01	3.46	4.47	65,524.32
Building Off Road Diesel	3.23	18.32	18.15	0.00	0.00	1.10	1.10	0.00	1.01	1.01	2,771.15
Building Vendor Trips	3.08	29.77	31.09	0.13	0.46	1.19	1.65	0.16	1.09	1.24	13,134.55
Building Worker Trips	7.06	13.74	253.99	0.53	2.37	1.62	3.99	0.85	1.36	2.22	49,618.62
Coating 04/01/2012-02/28/2020	24.86	0.03	0.51	0.00	0.00	0.00	0.01	0.00	0.00	0.00	100.23
Architectural Coating	24.84	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Coating Worker Trips	0.01	0.03	0.51	0.00	0.00	0.00	0.01	0.00	0.00	0.00	100.23
Mass Grading 06/01/2011-	25.92	191.65	128.16	0.01	859.55	8.51	868.06	179.52	7.82	187.34	31,847.40
Mass Grading Dust	0.00	0.00	0.00	0.00	859.50	0.00	859.50	179.50	0.00	179.50	0.00
Mass Grading Off Road Diesel	25.77	191.35	122.65	0.00	0.00	8.47	8.47	0.00	7.79	7.79	30,770.84
Mass Grading On Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Mass Grading Worker Trips	0.15	0.30	5.51	0.01	0.05	0.04	0.09	0.02	0.03	0.05	1,076.56
Time Slice 6/1/2017-12/29/2017 Active	40.03	71.54	311.66	0.66	2.85	4.68	7.53	1.02	4.17	5.19	66,935.67
Asphalt 04/01/2012-02/28/2020	1.80	9.68	7.92	0.00	0.01	0.77	0.78	0.00	0.71	0.71	1,311.12
Paving Off-Gas	0.27	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Paving Off Road Diesel	1.48	9.17	7.11	0.00	0.00	0.75	0.75	0.00	0.69	0.69	1,033.53
Paving On Road Diesel	0.04	0.47	0.18	0.00	0.01	0.02	0.02	0.00	0.02	0.02	154.56
Paving Worker Trips	0.02	0.03	0.63	0.00	0.01	0.00	0.01	0.00	0.00	0.01	123.04
Building 03/01/2012-02/28/2020	13.37	61.83	303.23	0.65	2.83	3.91	6.74	1.01	3.46	4.47	65,524.32
Building Off Road Diesel	3.23	18.32	18.15	0.00	0.00	1.10	1.10	0.00	1.01	1.01	2,771.15
Building Vendor Trips	3.08	29.77	31.09	0.13	0.46	1.19	1.65	0.16	1.09	1.24	13,134.55
Building Worker Trips	7.06	13.74	253.99	0.53	2.37	1.62	3.99	0.85	1.36	2.22	49,618.62
Coating 04/01/2012-02/28/2020	24.86	0.03	0.51	0.00	0.00	0.00	0.01	0.00	0.00	0.00	100.23
Architectural Coating	24.84	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Coating Worker Trips	0.01	0.03	0.51	0.00	0.00	0.00	0.01	0.00	0.00	0.00	100.23
Time Slice 1/1/2018-12/31/2018 Active	38.70	65.21	290.01	0.66	2.85	4.35	7.19	1.02	3.86	4.88	66,862.56
Asphalt 04/01/2012-02/28/2020	1.72	9.02	7.83	0.00	0.01	0.70	0.71	0.00	0.64	0.65	1,310.94

	ROG	NOx	CO	SO2	PM10 Dust	PM10 Exhaust	PM10 Total	PM2.5 Dust	PM2.5 Exhaust	PM2.5 Total	CO2
Paving Off-Gas	0.27	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Paving Off Road Diesel	1.39	8.57	7.08	0.00	0.00	0.68	0.68	0.00	0.63	0.63	1,033.53
Paving On Road Diesel	0.04	0.42	0.16	0.00	0.01	0.01	0.02	0.00	0.01	0.01	154.56
Paving Worker Trips	0.02	0.03	0.58	0.00	0.01	0.00	0.01	0.00	0.00	0.01	122.85
Building 03/01/2012-02/28/2020	12.13	56.16	281.71	0.65	2.83	3.64	6.47	1.01	3.22	4.23	65,451.54
Building Off Road Diesel	2.89	17.02	17.90	0.00	0.00	0.96	0.96	0.00	0.88	0.88	2,771.15
Building Vendor Trips	2.84	26.59	28.94	0.13	0.46	1.07	1.53	0.16	0.97	1.13	13,135.11
Building Worker Trips	6.39	12.54	234.87	0.53	2.37	1.62	3.99	0.85	1.36	2.22	49,545.28
Coating 04/01/2012-02/28/2020	24.86	0.03	0.47	0.00	0.00	0.00	0.01	0.00	0.00	0.00	100.08
Architectural Coating	24.84	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Coating Worker Trips	0.01	0.03	0.47	0.00	0.00	0.00	0.01	0.00	0.00	0.00	100.08
Time Slice 1/1/2019-12/31/2019 Active	37.53	59.72	270.40	0.66	2.85	4.03	6.87	1.02	3.57	4.58	66,797.81
Asphalt 04/01/2012-02/28/2020	1.61	8.43	7.70	0.00	0.01	0.63	0.64	0.00	0.58	0.58	1,310.78
Paving Off-Gas	0.27	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Paving Off Road Diesel	1.29	8.02	7.01	0.00	0.00	0.61	0.61	0.00	0.56	0.56	1,033.53
Paving On Road Diesel	0.04	0.38	0.15	0.00	0.01	0.01	0.02	0.00	0.01	0.01	154.56
Paving Worker Trips	0.01	0.03	0.54	0.00	0.01	0.00	0.01	0.00	0.00	0.01	122.69
Building 03/01/2012-02/28/2020	11.06	51.27	262.26	0.65	2.83	3.40	6.22	1.01	2.99	4.00	65,387.09
Building Off Road Diesel	2.62	15.83	17.69	0.00	0.00	0.81	0.81	0.00	0.74	0.74	2,771.15
Building Vendor Trips	2.62	23.91	27.03	0.13	0.46	0.97	1.43	0.16	0.88	1.04	13,135.62
Building Worker Trips	5.82	11.53	217.54	0.53	2.37	1.62	3.99	0.85	1.36	2.22	49,480.32
Coating 04/01/2012-02/28/2020	24.86	0.02	0.44	0.00	0.00	0.00	0.01	0.00	0.00	0.00	99.95
Architectural Coating	24.84	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Coating Worker Trips	0.01	0.02	0.44	0.00	0.00	0.00	0.01	0.00	0.00	0.00	99.95
Time Slice 1/1/2020-2/28/2020 Active	36.42	54.90	252.00	0.66	2.85	3.81	6.65	1.02	3.37	4.38	66,739.47
Asphalt 04/01/2012-02/28/2020	1.51	7.85	7.61	0.00	0.01	0.60	0.61	0.00	0.55	0.55	1,310.64
Paving Off-Gas	0.27	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Paving Off Road Diesel	1.19	7.49	6.98	0.00	0.00	0.58	0.58	0.00	0.53	0.53	1,033.53
Paving On Road Diesel	0.03	0.34	0.14	0.00	0.01	0.01	0.02	0.00	0.01	0.01	154.56
Paving Worker Trips	0.01	0.03	0.50	0.00	0.01	0.00	0.01	0.00	0.00	0.01	122.55
Building 03/01/2012-02/28/2020	10.06	47.03	243.98	0.65	2.83	3.21	6.04	1.01	2.82	3.83	65,329.01
Building Off Road Diesel	2.36	14.83	17.54	0.00	0.00	0.71	0.71	0.00	0.65	0.65	2,771.15
Building Vendor Trips	2.44	21.66	25.32	0.13	0.46	0.88	1.34	0.16	0.80	0.96	13,136.09
Building Worker Trips	5.27	10.54	201.12	0.53	2.37	1.62	3.99	0.85	1.36	2.22	49,421.76
Coating 04/01/2012-02/28/2020	24.85	0.02	0.41	0.00	0.00	0.00	0.01	0.00	0.00	0.00	99.83
Architectural Coating	24.84	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Coating Worker Trips	0.01	0.02	0.41	0.00	0.00	0.00	0.01	0.00	0.00	0.00	99.83

Construction Related Mitigation Measures

	ROG	NOx	CO	SO2	PM10 Dust	PM10 Exhaust	PM10 Total	PM2.5 Dust	PM2.5 Exhaust	PM2.5 Total	CO2
2 Welders (45 hp) operating at a 0.45 load factor for 8 hours per day											

Phase: Architectural Coating 4/1/2012 - 2/28/2020 - Default Architectural Coating Description

Rule: Residential Interior Coatings begins 1/1/2005 ends 6/30/2008 specifies a VOC of 100

Rule: Residential Interior Coatings begins 7/1/2008 ends 12/31/2040 specifies a VOC of 50

Rule: Residential Exterior Coatings begins 1/1/2005 ends 6/30/2008 specifies a VOC of 250

Rule: Residential Exterior Coatings begins 7/1/2008 ends 12/31/2040 specifies a VOC of 100

Rule: Nonresidential Interior Coatings begins 1/1/2005 ends 12/31/2040 specifies a VOC of 250

Rule: Nonresidential Exterior Coatings begins 1/1/2005 ends 12/31/2040 specifies a VOC of 250

	ROG	NOx	CO	SO2	PM10 Dust	PM10 Exhaust	PM10 Total	PM2.5 Dust	PM2.5 Exhaust	PM2.5 Total	CO2

The following mitigation measures apply to Phase: Mass Grading 6/1/2011 - 5/31/2017 - Default Mass Site Grading/Excavation Description

For Soil Stablizing Measures, the Water exposed surfaces 2x daily watering mitigation reduces emissions by:

PM10: 55% PM25: 55%

For Unpaved Roads Measures, the Manage haul road dust 2x daily watering mitigation reduces emissions by:

PM10: 55% PM25: 55%

Phase Assumptions

Phase: Mass Grading 6/1/2011 - 5/31/2017 - Default Mass Site Grading/Excavation Description

Total Acres Disturbed: 816

Maximum Daily Acreage Disturbed: 50

Fugitive Dust Level of Detail: Default

38.2 lbs per acre-day

On Road Truck Travel (VMT): 0

Off-Road Equipment:

12 Graders (174 hp) operating at a 0.61 load factor for 8 hours per day

3 Other Equipment (190 hp) operating at a 0.62 load factor for 8 hours per day

3 Rubber Tired Dozers (357 hp) operating at a 0.59 load factor for 8 hours per day

3 Rubber Tired Loaders (164 hp) operating at a 0.54 load factor for 8 hours per day

8 Scrapers (313 hp) operating at a 0.72 load factor for 8 hours per day

3 Tractors/Loaders/Backhoes (108 hp) operating at a 0.55 load factor for 8 hours per day

3 Water Trucks (189 hp) operating at a 0.5 load factor for 8 hours per day

Phase: Paving 4/1/2012 - 2/28/2020 - Default Paving Description

Acres to be Paved: 209.88

Off-Road Equipment:

2 Paving Equipment (104 hp) operating at a 0.53 load factor for 8 hours per day

2 Rollers (95 hp) operating at a 0.56 load factor for 6 hours per day

Phase: Building Construction 3/1/2012 - 2/28/2020 - Default Building Construction Description

Off-Road Equipment:

2 Aerial Lifts (60 hp) operating at a 0.46 load factor for 8 hours per day

1 Cranes (399 hp) operating at a 0.43 load factor for 3 hours per day

3 Forklifts (145 hp) operating at a 0.3 load factor for 8 hours per day

2 Generator Sets (49 hp) operating at a 0.74 load factor for 8 hours per day

2 Skid Steer Loaders (44 hp) operating at a 0.55 load factor for 8 hours per day

3 Tractors/Loaders/Backhoes (108 hp) operating at a 0.55 load factor for 7 hours per day

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Urbemis 2007 Version 9.2.4

Detail Report for Summer Construction Mitigated Emissions (Pounds/Day)

File Name: V:\AQNOISE DIVISION\Active Projects\Rialto Specific Plan\Construction\URBEMIS\Phase IIIb.urb9

Project Name: Lytle Creek Rialto Construction - Phase IIIb

Project Location: San Bernadino County

On-Road Vehicle Emissions Based on: Version : Emfac2007 V2.3 Nov 1 2006

Off-Road Vehicle Emissions Based on: OFFROAD2007

CONSTRUCTION EMISSION ESTIMATES (Summer Pounds Per Day, Mitigated)

	ROG	NOx	CO	SO2	PM10 Dust	PM10 Exhaust	PM10 Total	PM2.5 Dust	PM2.5 Exhaust	PM2.5 Total	CO2
Time Slice 4/1/2024-8/30/2024 Active	20.65	138.37	114.34	0.01	859.55	5.78	865.33	179.51	5.32	184.83	29,550.75
Mass Grading 04/01/2024-	20.65	138.37	114.34	0.01	859.55	5.78	865.33	179.51	5.32	184.83	29,550.75
Mass Grading Dust	0.00	0.00	0.00	0.00	859.50	0.00	859.50	179.50	0.00	179.50	0.00
Mass Grading Off Road Diesel	20.58	138.23	111.53	0.00	0.00	5.75	5.75	0.00	5.29	5.29	28,574.71
Mass Grading On Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Mass Grading Worker Trips	0.07	0.14	2.81	0.01	0.05	0.03	0.08	0.02	0.03	0.04	976.03
Time Slice 9/2/2024-9/30/2024 Active	23.67	156.35	149.97	0.08	859.85	6.88	866.73	179.62	6.31	185.93	39,111.85
Building 09/01/2024-08/31/2025	3.02	17.98	35.63	0.07	0.30	1.09	1.40	0.11	0.99	1.10	9,561.10
Building Off Road Diesel	2.48	15.66	18.43	0.00	0.00	0.85	0.85	0.00	0.79	0.79	2,901.48
Building Vendor Trips	0.19	1.57	2.07	0.01	0.05	0.07	0.12	0.02	0.06	0.08	1,406.62
Building Worker Trips	0.35	0.76	15.13	0.06	0.25	0.17	0.43	0.09	0.15	0.24	5,253.01
Mass Grading 04/01/2024-	20.65	138.37	114.34	0.01	859.55	5.78	865.33	179.51	5.32	184.83	29,550.75
Mass Grading Dust	0.00	0.00	0.00	0.00	859.50	0.00	859.50	179.50	0.00	179.50	0.00
Mass Grading Off Road Diesel	20.58	138.23	111.53	0.00	0.00	5.75	5.75	0.00	5.29	5.29	28,574.71
Mass Grading On Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Mass Grading Worker Trips	0.07	0.14	2.81	0.01	0.05	0.03	0.08	0.02	0.03	0.04	976.03
Time Slice 10/1/2024-12/31/2024	**41.53**	**162.95**	**156.66**	**0.08**	859.86	**7.38**	867.24	179.63	**6.77**	186.40	**40,372.34**
Asphalt 10/01/2024-08/31/2025	1.31	6.59	6.42	0.00	0.01	0.50	0.51	0.00	0.46	0.46	1,167.76
Paving Off-Gas	0.27	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Paving Off Road Diesel	1.00	6.34	5.97	0.00	0.00	0.49	0.49	0.00	0.45	0.45	887.12
Paving On Road Diesel	0.03	0.23	0.10	0.00	0.01	0.01	0.01	0.00	0.01	0.01	158.64
Paving Worker Trips	0.01	0.02	0.35	0.00	0.01	0.00	0.01	0.00	0.00	0.01	122.00
Building 09/01/2024-08/31/2025	3.02	17.98	35.63	0.07	0.30	1.09	1.40	0.11	0.99	1.10	9,561.10
Building Off Road Diesel	2.48	15.66	18.43	0.00	0.00	0.85	0.85	0.00	0.79	0.79	2,901.48
Building Vendor Trips	0.19	1.57	2.07	0.01	0.05	0.07	0.12	0.02	0.06	0.08	1,406.62

	ROG	NOx	CO	SO2	PM10 Dust	PM10 Exhaust	PM10 Total	PM2.5 Dust	PM2.5 Exhaust	PM2.5 Total	CO2
Building Worker Trips	0.35	0.76	15.13	0.06	0.25	0.17	0.43	0.09	0.15	0.24	5,253.01
Coating 10/01/2024-08/31/2025	16.55	0.01	0.27	0.00	0.00	0.00	0.01	0.00	0.00	0.00	92.72
Architectural Coating	16.54	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Coating Worker Trips	0.01	0.01	0.27	0.00	0.00	0.00	0.01	0.00	0.00	0.00	92.72
Mass Grading 04/01/2024-	20.65	138.37	114.34	0.01	859.55	5.78	865.33	179.51	5.32	184.83	29,550.75
Mass Grading Dust	0.00	0.00	0.00	0.00	859.50	0.00	859.50	179.50	0.00	179.50	0.00
Mass Grading Off Road Diesel	20.58	138.23	111.53	0.00	0.00	5.75	5.75	0.00	5.29	5.29	28,574.71
Mass Grading On Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Mass Grading Worker Trips	0.07	0.14	2.81	0.01	0.05	0.03	0.08	0.02	0.03	0.04	976.03
Time Slice 1/1/2025-1/31/2025 Active	41.53	**162.95**	**156.66**	**0.08**	859.86	**7.38**	867.24	179.63	**6.77**	186.40	**40,372.34**
Asphalt 10/01/2024-08/31/2025	1.31	6.59	6.42	0.00	0.01	0.50	0.51	0.00	0.46	0.46	1,167.76
Paving Off-Gas	0.27	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Paving Off Road Diesel	1.00	6.34	5.97	0.00	0.00	0.49	0.49	0.00	0.45	0.45	887.12
Paving On Road Diesel	0.03	0.23	0.10	0.00	0.01	0.01	0.01	0.00	0.01	0.01	158.64
Paving Worker Trips	0.01	0.02	0.35	0.00	0.01	0.00	0.01	0.00	0.00	0.01	122.00
Building 09/01/2024-08/31/2025	3.02	17.98	35.63	0.07	0.30	1.09	1.40	0.11	0.99	1.10	9,561.10
Building Off Road Diesel	2.48	15.66	18.43	0.00	0.00	0.85	0.85	0.00	0.79	0.79	2,901.48
Building Vendor Trips	0.19	1.57	2.07	0.01	0.05	0.07	0.12	0.02	0.06	0.08	1,406.62
Building Worker Trips	0.35	0.76	15.13	0.06	0.25	0.17	0.43	0.09	0.15	0.24	5,253.01
Coating 10/01/2024-08/31/2025	16.55	0.01	0.27	0.00	0.00	0.00	0.01	0.00	0.00	0.00	92.72
Architectural Coating	16.54	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Coating Worker Trips	0.01	0.01	0.27	0.00	0.00	0.00	0.01	0.00	0.00	0.00	92.72
Mass Grading 04/01/2024-	20.65	138.37	114.34	0.01	859.55	5.78	865.33	179.51	5.32	184.83	29,550.75
Mass Grading Dust	0.00	0.00	0.00	0.00	859.50	0.00	859.50	179.50	0.00	179.50	0.00
Mass Grading Off Road Diesel	20.58	138.23	111.53	0.00	0.00	5.75	5.75	0.00	5.29	5.29	28,574.71
Mass Grading On Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Mass Grading Worker Trips	0.07	0.14	2.81	0.01	0.05	0.03	0.08	0.02	0.03	0.04	976.03
Time Slice 2/3/2025-8/29/2025 Active	20.89	24.58	42.32	0.07	0.32	1.60	1.91	0.11	1.45	1.57	10,821.59
Asphalt 10/01/2024-08/31/2025	1.31	6.59	6.42	0.00	0.01	0.50	0.51	0.00	0.46	0.46	1,167.76
Paving Off-Gas	0.27	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Paving Off Road Diesel	1.00	6.34	5.97	0.00	0.00	0.49	0.49	0.00	0.45	0.45	887.12
Paving On Road Diesel	0.03	0.23	0.10	0.00	0.01	0.01	0.01	0.00	0.01	0.01	158.64
Paving Worker Trips	0.01	0.02	0.35	0.00	0.01	0.00	0.01	0.00	0.00	0.01	122.00
Building 09/01/2024-08/31/2025	3.02	17.98	35.63	0.07	0.30	1.09	1.40	0.11	0.99	1.10	9,561.10
Building Off Road Diesel	2.48	15.66	18.43	0.00	0.00	0.85	0.85	0.00	0.79	0.79	2,901.48
Building Vendor Trips	0.19	1.57	2.07	0.01	0.05	0.07	0.12	0.02	0.06	0.08	1,406.62
Building Worker Trips	0.35	0.76	15.13	0.06	0.25	0.17	0.43	0.09	0.15	0.24	5,253.01
Coating 10/01/2024-08/31/2025	16.55	0.01	0.27	0.00	0.00	0.00	0.01	0.00	0.00	0.00	92.72
Architectural Coating	16.54	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Coating Worker Trips	0.01	0.01	0.27	0.00	0.00	0.00	0.01	0.00	0.00	0.00	92.72

	ROG	NOx	CO	SO2	PM10 Dust	PM10 Exhaust	PM10 Total	PM2.5 Dust	PM2.5 Exhaust	PM2.5 Total	CO2

Construction Related Mitigation Measures

The following mitigation measures apply to Phase: Mass Grading 4/1/2024 - 1/31/2025 - Default Mass Site Grading/Excavation Description

For Soil Stablizing Measures, the Water exposed surfaces 2x daily watering mitigation reduces emissions by:

PM10: 55% PM25: 55%

For Unpaved Roads Measures, the Manage haul road dust 2x daily watering mitigation reduces emissions by:

PM10: 55% PM25: 55%

Phase Assumptions

Phase: Mass Grading 4/1/2024 - 1/31/2025 - Default Mass Site Grading/Excavation Description

Total Acres Disturbed: 113

Maximum Daily Acreage Disturbed: 50

Fugitive Dust Level of Detail: Default

38.2 lbs per acre-day

On Road Truck Travel (VMT): 0

Off-Road Equipment:

12 Graders (174 hp) operating at a 0.61 load factor for 8 hours per day

3 Rubber Tired Dozers (357 hp) operating at a 0.59 load factor for 8 hours per day

3 Rubber Tired Loaders (164 hp) operating at a 0.54 load factor for 8 hours per day

8 Scrapers (313 hp) operating at a 0.72 load factor for 8 hours per day

3 Tractors/Loaders/Backhoes (108 hp) operating at a 0.55 load factor for 8 hours per day

3 Water Trucks (189 hp) operating at a 0.5 load factor for 8 hours per day

Phase: Paving 10/1/2024 - 8/31/2025 - Default Paving Description

Acres to be Paved: 24.92

Off-Road Equipment:

2 Paving Equipment (104 hp) operating at a 0.53 load factor for 6 hours per day

2 Rollers (95 hp) operating at a 0.56 load factor for 6 hours per day

Phase: Building Construction 9/1/2024 - 8/31/2025 - Default Building Construction Description

Off-Road Equipment:

2 Aerial Lifts (60 hp) operating at a 0.46 load factor for 8 hours per day

2 Air Compressors (106 hp) operating at a 0.48 load factor for 8 hours per day

1 Cranes (399 hp) operating at a 0.43 load factor for 2 hours per day

3 Forklifts (145 hp) operating at a 0.3 load factor for 8 hours per day

2 Generator Sets (49 hp) operating at a 0.74 load factor for 8 hours per day

	ROG	NOx	CO	SO2	PM10 Dust	PM10 Exhaust	PM10 Total	PM2.5 Dust	PM2.5 Exhaust	PM2.5 Total	CO2
3 Tractors/Loaders/Backhoes (108 hp) operating at a 0.55 load factor for 7 hours per day											
2 Welders (45 hp) operating at a 0.45 load factor for 8 hours per day											

Phase: Architectural Coating 10/1/2024 - 8/31/2025 - Default Architectural Coating Description
Rule: Residential Interior Coatings begins 1/1/2005 ends 6/30/2008 specifies a VOC of 100
Rule: Residential Interior Coatings begins 7/1/2008 ends 12/31/2040 specifies a VOC of 50
Rule: Residential Exterior Coatings begins 1/1/2005 ends 6/30/2008 specifies a VOC of 250
Rule: Residential Exterior Coatings begins 7/1/2008 ends 12/31/2040 specifies a VOC of 100
Rule: Nonresidential Interior Coatings begins 1/1/2005 ends 12/31/2040 specifies a VOC of 250
Rule: Nonresidential Exterior Coatings begins 1/1/2005 ends 12/31/2040 specifies a VOC of 250

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Urbemis 2007 Version 9.2.4

Detail Report for Summer Construction Mitigated Emissions (Pounds/Day)

File Name: V:\AQNOISE DIVISION\Active Projects\Rialto Specific Plan\Construction\URBEMIS\Phase IV.urb9

Project Name: Lytle Creek Phase 4

Project Location: South Coast AQMD

On-Road Vehicle Emissions Based on: Version : Emfac2007 V2.3 Nov 1 2006

Off-Road Vehicle Emissions Based on: OFFROAD2007

CONSTRUCTION EMISSION ESTIMATES (Summer Pounds Per Day, Mitigated)

	ROG	NOx	CO	SO2	PM10 Dust	PM10 Exhaust	PM10 Total	PM2.5 Dust	PM2.5 Exhaust	PM2.5 Total	CO2
Time Slice 7/3/2017-12/29/2017 Active	24.75	186.74	112.08	0.01	859.54	7.95	867.49	179.51	7.31	186.82	29,569.96
Fine Grading 07/01/2017-	24.75	186.74	112.08	0.01	859.54	7.95	867.49	179.51	7.31	186.82	29,569.96
Fine Grading Dust	0.00	0.00	0.00	0.00	859.50	0.00	859.50	179.50	0.00	179.50	0.00
Fine Grading Off Road Diesel	24.63	186.50	107.62	0.00	0.00	7.92	7.92	0.00	7.29	7.29	28,699.98
Fine Grading On Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fine Grading Worker Trips	0.12	0.24	4.46	0.01	0.04	0.03	0.07	0.01	0.02	0.04	869.98
Time Slice 1/1/2018-3/30/2018 Active	23.17	170.82	108.58	0.01	859.54	7.15	866.69	179.51	6.57	186.08	29,569.91
Fine Grading 07/01/2017-	23.17	170.82	108.58	0.01	859.54	7.15	866.69	179.51	6.57	186.08	29,569.91
Fine Grading Dust	0.00	0.00	0.00	0.00	859.50	0.00	859.50	179.50	0.00	179.50	0.00
Fine Grading Off Road Diesel	23.05	170.60	104.42	0.00	0.00	7.12	7.12	0.00	6.55	6.55	28,699.98
Fine Grading On Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fine Grading Worker Trips	0.11	0.22	4.16	0.01	0.04	0.03	0.07	0.01	0.02	0.04	869.93
Time Slice 4/2/2018-4/30/2018 Active	31.93	220.34	255.62	0.34	860.94	9.94	870.88	180.01	9.08	189.09	65,487.70
Building 04/01/2018-06/30/2021	8.76	49.52	147.04	0.33	1.40	2.79	4.19	0.50	2.51	3.01	35,917.79
Building Off Road Diesel	3.48	20.88	19.88	0.00	0.00	1.21	1.21	0.00	1.12	1.12	3,406.08
Building Vendor Trips	2.52	23.26	25.11	0.11	0.39	0.94	1.33	0.13	0.86	0.99	11,162.86
Building Worker Trips	2.76	5.39	102.05	0.22	1.01	0.64	1.65	0.36	0.54	0.90	21,348.85
Fine Grading 07/01/2017-	23.17	170.82	108.58	0.01	859.54	7.15	866.69	179.51	6.57	186.08	29,569.91
Fine Grading Dust	0.00	0.00	0.00	0.00	859.50	0.00	859.50	179.50	0.00	179.50	0.00
Fine Grading Off Road Diesel	23.05	170.60	104.42	0.00	0.00	7.12	7.12	0.00	6.55	6.55	28,699.98
Fine Grading On Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fine Grading Worker Trips	0.11	0.22	4.16	0.01	0.04	0.03	0.07	0.01	0.02	0.04	869.93
Time Slice 5/1/2018-12/31/2018 Active	**52.35**	**231.26**	**265.97**	**0.34**	860.96	**10.81**	871.77	180.02	**9.88**	189.90	**67,126.42**
Asphalt 05/01/2018-06/30/2021	1.87	10.90	9.86	0.00	0.01	0.87	0.88	0.00	0.80	0.80	1,535.88
Paving Off-Gas	0.08	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

	ROG	NOx	CO	SO2	PM10 Dust	PM10 Exhaust	PM10 Total	PM2.5 Dust	PM2.5 Exhaust	PM2.5 Total	CO2
Paving Off Road Diesel	1.75	10.72	8.76	0.00	0.00	0.86	0.86	0.00	0.79	0.79	1,272.41
Paving On Road Diesel	0.01	0.13	0.05	0.00	0.00	0.00	0.01	0.00	0.00	0.00	45.99
Paving Worker Trips	0.03	0.05	1.04	0.00	0.01	0.01	0.02	0.00	0.01	0.01	217.48
Building 04/01/2018-06/30/2021	8.76	49.52	147.04	0.33	1.40	2.79	4.19	0.50	2.51	3.01	35,917.79
Building Off Road Diesel	3.48	20.88	19.88	0.00	0.00	1.21	1.21	0.00	1.12	1.12	3,406.08
Building Vendor Trips	2.52	23.26	25.11	0.11	0.39	0.94	1.33	0.13	0.86	0.99	11,162.86
Building Worker Trips	2.76	5.39	102.05	0.22	1.01	0.64	1.65	0.36	0.54	0.90	21,348.85
Coating 05/01/2018-06/30/2021	18.55	0.03	0.49	0.00	0.00	0.00	0.01	0.00	0.00	0.00	102.84
Architectural Coating	18.53	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Coating Worker Trips	0.01	0.03	0.49	0.00	0.00	0.00	0.01	0.00	0.00	0.00	102.84
Fine Grading 07/01/2017-	23.17	170.82	108.58	0.01	859.54	7.15	866.69	179.51	6.57	186.08	29,569.91
Fine Grading Dust	0.00	0.00	0.00	0.00	859.50	0.00	859.50	179.50	0.00	179.50	0.00
Fine Grading Off Road Diesel	23.05	170.60	104.42	0.00	0.00	7.12	7.12	0.00	6.55	6.55	28,699.98
Fine Grading On Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fine Grading Worker Trips	0.11	0.22	4.16	0.01	0.04	0.03	0.07	0.01	0.02	0.04	869.93
Time Slice 1/1/2019-12/31/2019 Active	50.41	211.69	253.67	**0.34**	860.96	9.72	870.67	180.02	8.88	188.89	67,125.92
Asphalt 05/01/2018-06/30/2021	1.74	10.20	9.70	0.00	0.01	0.79	0.80	0.00	0.73	0.73	1,535.88
Paving Off-Gas	0.08	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Paving Off Road Diesel	1.63	10.04	8.69	0.00	0.00	0.78	0.78	0.00	0.72	0.72	1,272.41
Paving On Road Diesel	0.01	0.11	0.05	0.00	0.00	0.00	0.01	0.00	0.00	0.00	45.99
Paving Worker Trips	0.03	0.05	0.97	0.00	0.01	0.01	0.02	0.00	0.01	0.01	217.47
Building 04/01/2018-06/30/2021	8.06	45.29	138.33	0.33	1.40	2.53	3.93	0.50	2.27	2.76	35,917.34
Building Off Road Diesel	3.18	19.34	19.66	0.00	0.00	1.04	1.04	0.00	0.96	0.96	3,406.08
Building Vendor Trips	2.34	20.99	23.51	0.11	0.39	0.85	1.24	0.13	0.77	0.91	11,163.29
Building Worker Trips	2.54	4.96	95.15	0.22	1.01	0.64	1.65	0.36	0.54	0.90	21,347.97
Coating 05/01/2018-06/30/2021	18.55	0.02	0.46	0.00	0.00	0.00	0.01	0.00	0.00	0.00	102.83
Architectural Coating	18.53	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Coating Worker Trips	0.01	0.02	0.46	0.00	0.00	0.00	0.01	0.00	0.00	0.00	102.83
Fine Grading 07/01/2017-	22.06	156.18	105.19	0.01	859.54	6.39	865.93	179.51	5.88	185.39	29,569.88
Fine Grading Dust	0.00	0.00	0.00	0.00	859.50	0.00	859.50	179.50	0.00	179.50	0.00
Fine Grading Off Road Diesel	21.96	155.97	101.31	0.00	0.00	6.37	6.37	0.00	5.86	5.86	28,699.98
Fine Grading On Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fine Grading Worker Trips	0.10	0.20	3.88	0.01	0.04	0.03	0.07	0.01	0.02	0.04	869.90
Time Slice 1/1/2020-9/30/2020 Active	48.24	193.67	242.59	**0.34**	860.96	8.73	869.69	180.02	7.97	187.98	67,125.64
Asphalt 05/01/2018-06/30/2021	1.62	9.53	9.59	0.00	0.01	0.74	0.75	0.00	0.68	0.68	1,535.87
Paving Off-Gas	0.08	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Paving Off Road Diesel	1.51	9.38	8.65	0.00	0.00	0.73	0.73	0.00	0.67	0.67	1,272.41
Paving On Road Diesel	0.01	0.10	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	45.99
Paving Worker Trips	0.02	0.05	0.90	0.00	0.01	0.01	0.02	0.00	0.01	0.01	217.47
Building 04/01/2018-06/30/2021	7.36	41.70	130.18	0.33	1.40	2.33	3.73	0.50	2.08	2.58	35,917.09

	ROG	NOx	CO	SO2	PM10 Dust	PM10 Exhaust	PM10 Total	PM2.5 Dust	PM2.5 Exhaust	PM2.5 Total	CO2
Building Off Road Diesel	2.88	18.03	19.47	0.00	0.00	0.92	0.92	0.00	0.84	0.84	3,406.08
Building Vendor Trips	2.17	19.09	22.08	0.11	0.39	0.78	1.17	0.13	0.71	0.84	11,163.73
Building Worker Trips	2.31	4.58	88.62	0.22	1.01	0.64	1.65	0.36	0.54	0.90	21,347.29
Coating 05/01/2018-06/30/2021	18.54	0.02	0.43	0.00	0.00	0.00	0.01	0.00	0.00	0.00	102.83
Architectural Coating	18.53	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Coating Worker Trips	0.01	0.02	0.43	0.00	0.00	0.00	0.01	0.00	0.00	0.00	102.83
Fine Grading 07/01/2017-	20.71	142.42	102.39	0.01	859.54	5.66	865.20	179.51	5.20	184.72	29,569.85
Fine Grading Dust	0.00	0.00	0.00	0.00	859.50	0.00	859.50	179.50	0.00	179.50	0.00
Fine Grading Off Road Diesel	20.62	142.23	98.78	0.00	0.00	5.63	5.63	0.00	5.18	5.18	28,699.98
Fine Grading On Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fine Grading Worker Trips	0.09	0.19	3.61	0.01	0.04	0.03	0.07	0.01	0.02	0.04	869.87
Time Slice 10/1/2020-12/31/2020	27.53	51.25	140.19	0.33	1.42	3.07	4.49	0.50	2.76	3.27	37,555.79
Asphalt 05/01/2018-06/30/2021	1.62	9.53	9.59	0.00	0.01	0.74	0.75	0.00	0.68	0.68	1,535.87
Paving Off-Gas	0.08	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Paving Off Road Diesel	1.51	9.38	8.65	0.00	0.00	0.73	0.73	0.00	0.67	0.67	1,272.41
Paving On Road Diesel	0.01	0.10	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	45.99
Paving Worker Trips	0.02	0.05	0.90	0.00	0.01	0.01	0.02	0.00	0.01	0.01	217.47
Building 04/01/2018-06/30/2021	7.36	41.70	130.18	0.33	1.40	2.33	3.73	0.50	2.08	2.58	35,917.09
Building Off Road Diesel	2.88	18.03	19.47	0.00	0.00	0.92	0.92	0.00	0.84	0.84	3,406.08
Building Vendor Trips	2.17	19.09	22.08	0.11	0.39	0.78	1.17	0.13	0.71	0.84	11,163.73
Building Worker Trips	2.31	4.58	88.62	0.22	1.01	0.64	1.65	0.36	0.54	0.90	21,347.29
Coating 05/01/2018-06/30/2021	18.54	0.02	0.43	0.00	0.00	0.00	0.01	0.00	0.00	0.00	102.83
Architectural Coating	18.53	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Coating Worker Trips	0.01	0.02	0.43	0.00	0.00	0.00	0.01	0.00	0.00	0.00	102.83
Time Slice 1/1/2021-6/30/2021 Active	26.18	44.00	109.90	0.33	1.42	2.86	4.27	0.50	2.57	3.07	37,555.95
Asphalt 05/01/2018-06/30/2021	1.61	9.49	9.33	0.00	0.01	0.74	0.75	0.00	0.68	0.68	1,535.85
Paving Off-Gas	0.08	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Paving Off Road Diesel	1.51	9.38	8.65	0.00	0.00	0.73	0.73	0.00	0.67	0.67	1,272.41
Paving On Road Diesel	0.01	0.07	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	45.99
Paving Worker Trips	0.02	0.03	0.65	0.00	0.01	0.01	0.02	0.00	0.01	0.01	217.45
Building 04/01/2018-06/30/2021	6.03	34.49	100.27	0.33	1.40	2.12	3.52	0.50	1.89	2.39	35,917.28
Building Off Road Diesel	2.88	18.03	19.47	0.00	0.00	0.92	0.92	0.00	0.84	0.84	3,406.08
Building Vendor Trips	1.64	13.31	17.05	0.11	0.39	0.57	0.96	0.13	0.51	0.64	11,165.69
Building Worker Trips	1.52	3.16	63.74	0.22	1.01	0.64	1.65	0.36	0.54	0.90	21,345.52
Coating 05/01/2018-06/30/2021	18.54	0.02	0.31	0.00	0.00	0.00	0.01	0.00	0.00	0.00	102.82
Architectural Coating	18.53	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Coating Worker Trips	0.01	0.02	0.31	0.00	0.00	0.00	0.01	0.00	0.00	0.00	102.82

Construction Related Mitigation Measures

	ROG	NOx	CO	SO2	PM10 Dust	PM10 Exhaust	PM10 Total	PM2.5 Dust	PM2.5 Exhaust	PM2.5 Total	CO2

The following mitigation measures apply to Phase: Fine Grading 7/1/2017 - 9/30/2020 - Default Fine Site Grading/Excavation Description

For Soil Stablizing Measures, the Water exposed surfaces 2x daily watering mitigation reduces emissions by:

PM10: 55% PM25: 55%

For Unpaved Roads Measures, the Manage haul road dust 2x daily watering mitigation reduces emissions by:

PM10: 55% PM25: 55%

Phase Assumptions

Phase: Fine Grading 7/1/2017 - 9/30/2020 - Default Fine Site Grading/Excavation Description

Total Acres Disturbed: 252

Maximum Daily Acreage Disturbed: 50

Fugitive Dust Level of Detail: Default

38.2 lbs per acre-day

On Road Truck Travel (VMT): 0

Off-Road Equipment:

6 Graders (174 hp) operating at a 0.61 load factor for 8 hours per day

4 Rubber Tired Dozers (357 hp) operating at a 0.59 load factor for 8 hours per day

2 Rubber Tired Loaders (164 hp) operating at a 0.54 load factor for 8 hours per day

10 Scrapers (313 hp) operating at a 0.72 load factor for 8 hours per day

3 Tractors/Loaders/Backhoes (108 hp) operating at a 0.55 load factor for 8 hours per day

3 Water Trucks (189 hp) operating at a 0.5 load factor for 8 hours per day

Phase: Paving 5/1/2018 - 6/30/2021 - Default Paving Description

Acres to be Paved: 25

Off-Road Equipment:

2 Cement and Mortar Mixers (10 hp) operating at a 0.56 load factor for 0 hours per day

1 Pavers (100 hp) operating at a 0.62 load factor for 8 hours per day

2 Paving Equipment (104 hp) operating at a 0.53 load factor for 6 hours per day

2 Rollers (95 hp) operating at a 0.56 load factor for 6 hours per day

Phase: Building Construction 4/1/2018 - 6/30/2021 - Default Building Construction Description

Off-Road Equipment:

1 Aerial Lifts (60 hp) operating at a 0.46 load factor for 8 hours per day

2 Air Compressors (106 hp) operating at a 0.48 load factor for 8 hours per day

2 Cement and Mortar Mixers (10 hp) operating at a 0.56 load factor for 8 hours per day

2 Concrete/Industrial Saws (10 hp) operating at a 0.73 load factor for 8 hours per day

1 Cranes (399 hp) operating at a 0.43 load factor for 7 hours per day

	ROG	NOx	CO	SO2	PM10 Dust	PM10 Exhaust	PM10 Total	PM2.5 Dust	PM2.5 Exhaust	PM2.5 Total	CO2
3 Forklifts (145 hp) operating at a 0.3 load factor for 8 hours per day											
2 Generator Sets (49 hp) operating at a 0.74 load factor for 8 hours per day											
3 Tractors/Loaders/Backhoes (108 hp) operating at a 0.55 load factor for 7 hours per day											
2 Welders (45 hp) operating at a 0.45 load factor for 8 hours per day											

Phase: Architectural Coating 5/1/2018 - 6/30/2021 - Default Architectural Coating Description
Rule: Residential Interior Coatings begins 1/1/2005 ends 6/30/2008 specifies a VOC of 100
Rule: Residential Interior Coatings begins 7/1/2008 ends 12/31/2040 specifies a VOC of 50
Rule: Residential Exterior Coatings begins 1/1/2005 ends 6/30/2008 specifies a VOC of 250
Rule: Residential Exterior Coatings begins 7/1/2008 ends 12/31/2040 specifies a VOC of 100
Rule: Nonresidential Interior Coatings begins 1/1/2005 ends 12/31/2040 specifies a VOC of 250
Rule: Nonresidential Exterior Coatings begins 1/1/2005 ends 12/31/2040 specifies a VOC of 250

Table A-1
Start-up Emission Factors
Lytle Creek Ranch
Rialto, California

Variable Start Times (URBEMIS defaults)[1]						
Time	**Home-Work**	**Home-Shop**	**Home-Other**	**Combined Weight[2]**	**CO_2 Emissions (g/start)**	**Weighted CO_2 Emissions (g/start)**
5	0.7	3.3	6.1	0.038	13.35	0.510
10	1	9.5	7.6	0.058	14.99	0.865
20	1.4	14.4	7.8	0.069	18.81	1.295
30	2.2	18.3	7.2	0.076	23.35	1.763
40	2.6	12.2	7	0.065	28.60	1.856
50	2.8	7.5	7.9	0.062	34.57	2.126
60	2.2	4.2	6.2	0.045	41.25	1.866
120	2.6	3.6	6.6	0.047	95.67	4.538
180	6.2	3.7	7.2	0.062	108.53	6.774
240	8.9	2.1	4.9	0.057	121.38	6.933
300	8.6	2.6	4	0.053	134.20	7.061
360	8.6	2.6	4	0.053	147.00	7.734
420	8.7	2.6	4	0.053	159.77	8.459
480	8.7	2.6	3.9	0.052	172.53	9.049
540	8.7	2.7	3.9	0.053	185.25	9.750
600	8.7	2.7	3.9	0.053	197.96	10.419
660	8.7	2.7	3.9	0.053	210.64	11.087
720	8.7	2.7	3.9	0.053	223.30	11.753
						103.838

Notes:
1. The percentage breakdown by time since last start and trip type is based on URBEMIS defaults.
2. The trip type distribution is based on URBEMIS defaults:

Trip Type	Trip Type
Home-Work	32.90%
Home-Shop	18.00%
Home-Other	49.10%

Sources
Software User's Guide: URBEMIS2007 for Windows. Version 9.2
http://www.urbemis.com/software/URBEMIS9%20Users%20Manual%20Main%20Body.pdf

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Appendix B:

Crain and Associates Memorandum
Mobile Emissions Analysis Input

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EMAIL TRANSMITTED

September 15, 2009

Mr. Peter Lewandowski
Principal
Environmental Impact Sciences
26051 Via Concha
Mission Viejo, California 92691-5614

RE: Lytle Creek Development Mobile Emissions Analysis Input

Dear Peter,

As requested, we have estimated the number of daily (weekend days, as well as weekdays) project vehicle trips (VT) and vehicle miles of travel (VMT) for use in the Greenhouse Gas Emissions analysis for the Lytle Creek Ranch Specific Plan Environmental Impact Report (EIR). Specifically, this is an estimate of the amount of VT and VMT which would be added by the project. It should be noted that this analysis is consistent with, but measures somewhat different variables than those used in the traffic impact analysis. Specifically, this analysis considers how many VT and how much VMT would be added on a global basis by this project. The traffic impact analysis (and associated studies) looks at how many trips would be added to specific locations such as study intersections.

As a first step, we estimated the number of trips added by the project. This analysis was taken from and is consistent with the traffic analysis conducted for the project. The site generation values were taken directly from the computerized East Valley Transportation Model (EVTM) used for the traffic analysis. The weekend trip generation value was compared to the weekday trip generation value based on ITE trip estimates. The ITE rates are less specific to this project, but were less than 10 percent different from the model estimate for this site assuming the proposed project. The ITE projection for the weekend trip ends was slightly lower, but within five percent of the weekday trip end generation value. The EVTM model was run by the Southern California Association of Government (SCAG) Inland Empire office and was an appropriate modification of their RivSan Model used in order to reflect the proposed project.

2007 Sawtelle Blvd., Suite #4
Los Angeles, CA 90025
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310 444 9771 (fax)

www.crainandassociates.com

The RivSan Model was the model developed for this area and used to project traffic volumes for the San Bernardino County CMP. This model was developed from the regional model which SCAG uses for regional analyses. The regional model is the standard tool in use for air quality and other regional analyses, and that model utilizes the federally issued Urban Transportation Planning Software (UTPS) package.

A very important distinction should be made for the EVTM model's generation analysis. The model, as well as Institute of Transportation Engineers (ITE) "trip" generation rates within the Trip Generation Manual, estimates trip ends (the word "ends" was dropped from the ITE Trip Generation Manual between the 3rd and 4th editions). For most smaller land use projects where one trip end is at the proposed project site, but the other end is outside the study area, this distinction is not important. However, for the Greenhouse Gas Emissions analysis, the study area is the entire SCAG region. The vast majority of trips will have both ends of the trip within the study area. Thus, unlike the limited areas used in the traffic analysis for which a single trip end is included for each trip, both trip ends are included for each trip in this Greenhouse Gas Emissions analysis. The number of trip ends within the Specific Plan area matches the traffic study and other localized analyses, but due to trips which stop at the site and are already on the street network (such as people diverted to a newly built store nearer their home), the adopted method in the UTPS package is to set the number of trips equal to the number of production trip ends. (Each trip is a connection between a production end and an attraction end.) The federally set UTPS methodology was used for this Greenhouse Gas Emissions analysis.

The analysis below shows a summary of the number of productions (added regional trips) for each of the five project zones as well as for the Specific Plan as a total. It should be noted that productions are used for the person trip generation analysis prior to the trip distribution and mode split step. The calculated factor for each zone in the Specific Plan area (with a weighted average of 52%) was applied to the vehicle trip ends. In addition, the vehicle trips assigned by the model to the network were augmented to also include the vehicle trips which stayed within a zone (e.g. a car run to the grocery store which is three blocks away). Therefore, the estimate below is of the total vehicle trips which will be added to the Southern California basin by the Lytle Creek Ranch Specific Plan.

Zone	Neighborhood	Total Trip Ends	Percent Productions	Productions (Added Trips)
80	I	7,533	68.1%	5,130
81	I	2,697	72.1%	1,945
82	II	24,225	54.6%	13,227
83	III	46,614	46.3%	21,582
84	IV	10,444	54.2%	5,661
Specific Plan Total		***91,513***		***47,545***

Once the number of added trips (as opposed to trip ends) was determined, the trip length could then be multiplied by the trips for each project traffic model zone in order to determine the amount of vehicle miles of travel (VMT) which would be added to the region by the Specific Plan. Again, the project computer model utilized by SCAG was used for the average trip length calculation step. The trip length for each project zone was determined from the model output data. This result was then applied to the added vehicle trips as determined above. The following tables show the resulting analysis:

Zone	Neighborhood	Vehicle Trips	Average Trip Length	Added Vehicle Miles of Travel (VMT)
80	I	5,130	14.5	74,385
81	I	1,945	14.4	28,008
82	II	13,227	9.2	121,688
83	III	21,582	9.3	200,713
84	IV	5,661	13.0	73,593
Specific Plan Total		***47,545***		***498,387***

In summary, prior to mitigation, the land uses proposed to be built within the Lytle Creek Ranch Specific Plan area would be expected to add about 47,545 vehicle trips (VT) which add about 498,387 vehicles miles of travel (VMT) to the region.

Please contact me with any questions.

Sincerely,

George Rhyner
Senior Transportation Engineer

GR:cw
C19689B
JA79256
enclosures

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Appendix C:

URBEMIS Files for Mobile Emissions

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Urbemis 2007 Version 9.2.4

Detail Report for Annual Operational Mitigated Emissions (Tons/Year)

File Name: U:\Lytle Creek Ranch\Calculations\Traffic\URBEMIS\ENVIRON OPS bike_ped 091709.urb924

Project Name: Lytle Creek Ranch Final Buildout

Project Location: San Bernadino County

On-Road Vehicle Emissions Based on: Version : Emfac2007 V2.3 Nov 1 2006

Off-Road Vehicle Emissions Based on: OFFROAD2007

OPERATIONAL EMISSION ESTIMATES (Annual Tons Per Year, Mitigated)

Source	CO2
Single family housing	41,225.98
Condo/townhouse general	46,794.59
Elementary school	1,949.10
City park	618.96
Strip mall	21,939.81
TOTALS (tons/year, mitigated)	112,528.44

Includes correction for passby trips

Does not include double counting adjustment for internal trips

Analysis Year: 2030 Season: Annual

Emfac: Version : Emfac2007 V2.3 Nov 1 2006

Operational Mitigation Options Selected

Residential Mitigation Measures

Residential Mix of Uses Mitigation

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Operational Mitigation Options Selected

Residential Mitigation Measures

Percent Reduction in Trips is 1.07% (calculated as a % of 9.57 trips/day))

Note that the above percent is applied to a baseline of 9.57 and that product is

subtracted from the Unmitigated Trips

Inputs Selected:

The number of housing units within a 1/2 mile radius of the project, plus the

number of residential units included in the project are 11723.

The employment for the study area (within a 1/2 mile radius of the project) is 3596.

Residential Local-Serving Retail Mitigation

Percent Reduction in Trips is 2% (calculated as a % of 9.57 trips/day)))

Note that the above percent is applied to a baseline of 9.57 and that product is

subtracted from the Unmitigated Trips

Inputs Selected:

The Presence of Local-Serving Retail checkbox was selected.

Residential Transit Service Mitigation

Percent Reduction in Trips is 1.04% (calculated as a % of 9.57 trips/day)

Note that the above percent is applied to a baseline of 9.57 and that product is

subtracted from the Unmitigated Trips

Inputs Selected:

9/21/2009 5:06:10 PM

Operational Mitigation Options Selected

Residential Mitigation Measures

The Number of Daily Weekday Buses Stopping Within 1/4 Mile of Site is 34

The Number of Daily Rail or Bus Rapid Transit Stops Within 1/2 Mile of Site is 19

The Number of Dedicated Daily Shuttle Trips is 0

Residential Pedestrian/Bicycle Friendliness Mitigation

Percent Reduction in Trips is 6.6% (calculated as a % of 9.57 trips/day)

Note that the above percent is applied to a baseline of 9.57 and that product is

subtracted from the Unmitigated Trips

Inputs Selected:

The Number of Intersections per Square Mile is 0

The Percent of Streets with Sidewalks on One Side is 100%

The Percent of Streets with Sidewalks on Both Sides is 70%

The Percent of Arterials/Collectors with Bike Lanes or where Suitable,

Direct Parallel Routes Exist is 100%

Nonresidential Mitigation Measures

Non-Residential Mix of Uses Mitigation

Percent Reduction in Trips is 1.07%

Inputs Selected:

The number of housing units within a 1/2 mile radius of the project, plus the

number of residential units included in the project are 11723.

9/21/2009 5:06:10 PM

Nonresidential Mitigation Measures

The employment for the study area (within a 1/2 mile radius of the project) is 3596.

Non-Residential Local-Serving Retail Mitigation

Percent Reduction in Trips is 2%

Inputs Selected:

The Presence of Local-Serving Retail checkbox was selected.

Non-Residential Transit Service Mitigation

Percent Reduction in Trips is 1.04%

Inputs Selected:

The Number of Daily Weekday Buses Stopping Within 1/4 Mile of Site is 34

The Number of Daily Rail or Bus Rapid Transit Stops Within 1/2 Mile of Site is 19

The Number of Dedicated Daily Shuttle Trips is 0

Non-Residential Pedestrian/Bicycle Friendliness Mitigation

Percent Reduction in Trips is 6.6%

Inputs Selected:

The Number of Intersections per Square Mile is 0

The Percent of Streets with Sidewalks on One Side is 100%

The Percent of Streets with Sidewalks on Both Sides is 70%

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Nonresidential Mitigation Measures

The Percent of Arterials/Collectors with Bike Lanes or where Suitable,

Direct Parallel Routes Exist is 100%

Summary of Land Uses

Land Use Type	Acreage	Trip Rate	Unit Type	No. Units	Total Trips	Total VMT
Single family housing	396.00	6.86	dwelling units	3,409.00	23,401.43	206,985.72
Condo/townhouse general	211.20	5.31	dwelling units	4,998.00	26,562.39	234,944.39
Elementary school		0.79	students	1,950.00	1,532.14	9,796.97
City park		1.42	acres	318.00	451.44	3,128.49
Strip mall		26.21	1000 sq ft	849.42	22,266.84	110,189.88
					74,214.24	565,045.45

Vehicle Fleet Mix

Vehicle Type	Percent Type	Non-Catalyst	Catalyst	Diesel
Light Auto	44.2	0.0	100.0	0.0
Light Truck < 3750 lbs	9.9	0.0	99.0	1.0
Light Truck 3751-5750 lbs	21.8	0.0	100.0	0.0
Med Truck 5751-8500 lbs	12.1	0.0	100.0	0.0
Lite-Heavy Truck 8501-10,000 lbs	2.3	0.0	82.6	17.4
Lite-Heavy Truck 10,001-14,000 lbs	0.7	0.0	57.1	42.9
Med-Heavy Truck 14,001-33,000 lbs	1.1	0.0	18.2	81.8
Heavy-Heavy Truck 33,001-60,000 lbs	2.1	0.0	0.0	100.0
Other Bus	0.0	0.0	0.0	0.0

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Vehicle Fleet Mix

Vehicle Type	Percent Type	Non-Catalyst	Catalyst	Diesel
Urban Bus	0.0	0.0	0.0	0.0
Motorcycle	4.0	32.5	67.5	0.0
School Bus	0.1	0.0	0.0	100.0
Motor Home	1.7	0.0	88.2	11.8

Travel Conditions

	Residential			Commercial		
	Home-Work	Home-Shop	Home-Other	Commute	Non-Work	Customer
Urban Trip Length (miles)	12.7	7.0	9.5	13.3	7.4	8.9
Rural Trip Length (miles)	17.6	12.1	14.9	15.4	9.6	12.6
Trip speeds (mph)	30.0	30.0	30.0	30.0	30.0	30.0
% of Trips - Residential	32.9	18.0	49.1			
% of Trips - Commercial (by land use)						
Elementary school				20.0	10.0	70.0
City park				5.0	2.5	92.5
Strip mall				2.0	1.0	97.0

Operational Changes to Defaults

Ambient summer temperature changed from 80 degrees F to 85 degrees F

9/21/2009 5:05:29 PM

Urbemis 2007 Version 9.2.4

Detail Report for Annual Operational Unmitigated Emissions (Tons/Year)

File Name: U:\Lytle Creek Ranch\Calculations\Traffic\URBEMIS\ENVIRON OPS bike_ped 091709.urb924

Project Name: Lytle Creek Ranch Final Buildout

Project Location: San Bernadino County

On-Road Vehicle Emissions Based on: Version : Emfac2007 V2.3 Nov 1 2006

Off-Road Vehicle Emissions Based on: OFFROAD2007

OPERATIONAL EMISSION ESTIMATES (Annual Tons Per Year, Unmitigated)

Source	CO2
Single family housing	47,384.08
Condo/townhouse general	55,823.11
Elementary school	2,183.01
City park	693.24
Strip mall	24,572.70
TOTALS (tons/year, unmitigated)	130,656.14

Includes correction for passby trips

Does not include double counting adjustment for internal trips

Analysis Year: 2030 Season: Annual

Emfac: Version : Emfac2007 V2.3 Nov 1 2006

Summary of Land Uses

Land Use Type	Acreage	Trip Rate	Unit Type	No. Units	Total Trips	Total VMT
Single family housing	396.00	7.89	dwelling units	3,409.00	26,897.01	237,904.09

9/21/2009 5:05:29 PM

Summary of Land Uses

Land Use Type	Acreage	Trip Rate	Unit Type	No. Units	Total Trips	Total VMT
Condo/townhouse general	211.20	6.34	dwelling units	4,998.00	31,687.32	280,274.40
Elementary school		0.88	students	1,950.00	1,716.00	10,972.65
City park		1.59	acres	318.00	505.62	3,503.92
Strip mall		29.36	1000 sq ft	849.42	24,938.97	123,413.22
					85,744.92	656,068.28

Vehicle Fleet Mix

Vehicle Type	Percent Type	Non-Catalyst	Catalyst	Diesel
Light Auto	44.2	0.0	100.0	0.0
Light Truck < 3750 lbs	9.9	0.0	99.0	1.0
Light Truck 3751-5750 lbs	21.8	0.0	100.0	0.0
Med Truck 5751-8500 lbs	12.1	0.0	100.0	0.0
Lite-Heavy Truck 8501-10,000 lbs	2.3	0.0	82.6	17.4
Lite-Heavy Truck 10,001-14,000 lbs	0.7	0.0	57.1	42.9
Med-Heavy Truck 14,001-33,000 lbs	1.1	0.0	18.2	81.8
Heavy-Heavy Truck 33,001-60,000 lbs	2.1	0.0	0.0	100.0
Other Bus	0.0	0.0	0.0	0.0
Urban Bus	0.0	0.0	0.0	0.0
Motorcycle	4.0	32.5	67.5	0.0
School Bus	0.1	0.0	0.0	100.0
Motor Home	1.7	0.0	88.2	11.8

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Travel Conditions

	Residential			Commercial		
	Home-Work	Home-Shop	Home-Other	Commute	Non-Work	Customer
Urban Trip Length (miles)	12.7	7.0	9.5	13.3	7.4	8.9
Rural Trip Length (miles)	17.6	12.1	14.9	15.4	9.6	12.6
Trip speeds (mph)	30.0	30.0	30.0	30.0	30.0	30.0
% of Trips - Residential	32.9	18.0	49.1			
% of Trips - Commercial (by land use)						
Elementary school				20.0	10.0	70.0
City park				5.0	2.5	92.5
Strip mall				2.0	1.0	97.0

Operational Changes to Defaults

Ambient summer temperature changed from 80 degrees F to 85 degrees F

9/21/2009 5:10:00 PM

Urbemis 2007 Version 9.2.4

Detail Report for Annual Operational Unmitigated Emissions (Tons/Year)

File Name: U:\Lytle Creek Ranch\Calculations\Traffic\URBEMIS\ENVIRON OPS BAU unit no highrise.urb924

Project Name: Lytle Creek Ranch Final Buildout

Project Location: San Bernadino County

On-Road Vehicle Emissions Based on: Version : Emfac2007 V2.3 Nov 1 2006

Off-Road Vehicle Emissions Based on: OFFROAD2007

OPERATIONAL EMISSION ESTIMATES (Annual Tons Per Year, Unmitigated)

Source	CO2
Single family housing	103,950.16
Condo/townhouse general	20,032.48
Elementary school	2,183.01
City park	693.24
Strip mall	24,572.70
TOTALS (tons/year, unmitigated)	151,431.59

Includes correction for passby trips

Does not include double counting adjustment for internal trips

Analysis Year: 2030 Season: Annual

Emfac: Version : Emfac2007 V2.3 Nov 1 2006

Summary of Land Uses

Land Use Type	Acreage	Trip Rate	Unit Type	No. Units	Total Trips	Total VMT
Single family housing	1,303.40	8.73	dwelling units	6,759.00	59,006.07	521,908.74

9/21/2009 5:10:00 PM

Summary of Land Uses

Land Use Type	Acreage	Trip Rate	Unit Type	No. Units	Total Trips	Total VMT
Condo/townhouse general	103.00	6.90	dwelling units	1,648.00	11,371.20	100,578.28
Elementary school		0.88	students	1,950.00	1,716.00	10,972.65
City park		1.59	acres	318.00	505.62	3,503.92
Strip mall		29.36	1000 sq ft	849.42	24,938.97	123,413.22
					97,537.86	760,376.81

Vehicle Fleet Mix

Vehicle Type	Percent Type	Non-Catalyst	Catalyst	Diesel
Light Auto	44.2	0.0	100.0	0.0
Light Truck < 3750 lbs	9.9	0.0	99.0	1.0
Light Truck 3751-5750 lbs	21.8	0.0	100.0	0.0
Med Truck 5751-8500 lbs	12.1	0.0	100.0	0.0
Lite-Heavy Truck 8501-10,000 lbs	2.3	0.0	82.6	17.4
Lite-Heavy Truck 10,001-14,000 lbs	0.7	0.0	57.1	42.9
Med-Heavy Truck 14,001-33,000 lbs	1.1	0.0	18.2	81.8
Heavy-Heavy Truck 33,001-60,000 lbs	2.1	0.0	0.0	100.0
Other Bus	0.0	0.0	0.0	0.0
Urban Bus	0.0	0.0	0.0	0.0
Motorcycle	4.0	32.5	67.5	0.0
School Bus	0.1	0.0	0.0	100.0
Motor Home	1.7	0.0	88.2	11.8

9/21/2009 5:10:00 PM

Travel Conditions

	Residential			Commercial		
	Home-Work	Home-Shop	Home-Other	Commute	Non-Work	Customer
Urban Trip Length (miles)	12.7	7.0	9.5	13.3	7.4	8.9
Rural Trip Length (miles)	17.6	12.1	14.9	15.4	9.6	12.6
Trip speeds (mph)	30.0	30.0	30.0	30.0	30.0	30.0
% of Trips - Residential	32.9	18.0	49.1			
% of Trips - Commercial (by land use)						
Elementary school				20.0	10.0	70.0
City park				5.0	2.5	92.5
Strip mall				2.0	1.0	97.0

Operational Changes to Defaults

Ambient summer temperature changed from 80 degrees F to 85 degrees F

Appendix D:
EMFAC File Output

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Title    : Traffic - 2030 Annual Avg San Bernardino
Version  : Emfac2007 V2.3 Nov 1 2006
Run Date : 2009/06/25 12:12:07
Scen Year: 2030 -- All model years in the range 1986 to 2030 selected
Season   : Annual
Area     : San Bernardino
*****************************************************************************
***********
Year:,2030,, -- Model Years,,1986, to ,2030, Inclusive --,,,Annual
     Emfac2007 Emission Factors: V2.3 Nov 1 2006

County Average,,,,, San Bernardino,,,,,,County Average

,,,,Table  1:  Running Exhaust Emissions (grams/mile)

Pollutant Name: Total Organic Gases,,,,Temperature: 64F,,Relative Humidity:
43%

Speed,LDA,LDA,LDA,LDA,LDT1,LDT1,LDT1,LDT1,LDT2,LDT2,LDT2,LDT2,MDV,MDV,MDV,MDV,
LHD1,LHD1,LHD1,LHD1,LHD2,LHD2,LHD2,LHD2,MHD,MHD,MHD,MHD,HHD,HHD,HHD,HHD,OBUS,O
BUS,OBUS,OBUS,UBUS,UBUS,UBUS,UBUS,MCY,MCY,MCY,MCY,SBUS,SBUS,SBUS,SBUS,MH,MH,MH
,MH,ALL,ALL,ALL,ALL,
 MPH,NCAT,CAT,DSL,ALL,NCAT,CAT,DSL,ALL,NCAT,CAT,DSL,ALL,NCAT,CAT,DSL,ALL,NCAT,
 CAT,DSL,ALL,NCAT,CAT,DSL,ALL,NCAT,CAT,DSL,ALL,NCAT,CAT,DSL,ALL,NCAT,CAT,DSL,A
 LL,NCAT,CAT,DSL,ALL,NCAT,CAT,DSL,ALL,NCAT,CAT,DSL,ALL,NCAT,CAT,DSL,ALL,NCAT,C
 AT,DSL,ALL,

   20,   0.000,   0.024,   0.108,   0.024,   0.000,   0.030,   0.103,   0.031,
   0.000,   0.050,   0.112,   0.050,   0.000,   0.000,   0.000,   0.000,
   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
   3.532,   2.127,   0.000,   2.591,   0.000,   0.000,   0.000,   0.000,
   0.000,   0.000,   0.000,   0.000,   3.532,   0.051,   0.104,   0.065,
   25,   0.000,   0.018,   0.090,   0.018,   0.000,   0.023,   0.087,   0.023,
   0.000,   0.038,   0.094,   0.038,   0.000,   0.000,   0.000,   0.000,
   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
   3.198,   1.832,   0.000,   2.283,   0.000,   0.000,   0.000,   0.000,
   0.000,   0.000,   0.000,   0.000,   3.198,   0.040,   0.087,   0.054,
   30,   0.000,   0.015,   0.077,   0.015,   0.000,   0.019,   0.074,   0.019,
   0.000,   0.030,   0.080,   0.030,   0.000,   0.000,   0.000,   0.000,
   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
   3.029,   1.663,   0.000,   2.114,   0.000,   0.000,   0.000,   0.000,
   0.000,   0.000,   0.000,   0.000,   3.029,   0.034,   0.075,   0.047,
   35,   0.000,   0.013,   0.068,   0.013,   0.000,   0.016,   0.065,   0.016,
   0.000,   0.026,   0.070,   0.026,   0.000,   0.000,   0.000,   0.000,
   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
   3.002,   1.592,   0.000,   2.058,   0.000,   0.000,   0.000,   0.000,
   0.000,   0.000,   0.000,   0.000,   3.002,   0.030,   0.065,   0.043,


Pollutant Name: Carbon Monoxide,,,,Temperature: 64F,,Relative Humidity: 43%

Speed,LDA,LDA,LDA,LDA,LDT1,LDT1,LDT1,LDT1,LDT2,LDT2,LDT2,LDT2,MDV,MDV,MDV,MDV,
LHD1,LHD1,LHD1,LHD1,LHD2,LHD2,LHD2,LHD2,MHD,MHD,MHD,MHD,HHD,HHD,HHD,HHD,OBUS,O
BUS,OBUS,OBUS,UBUS,UBUS,UBUS,UBUS,MCY,MCY,MCY,MCY,SBUS,SBUS,SBUS,SBUS,MH,MH,MH
,MH,ALL,ALL,ALL,ALL,
```

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 MPH,NCAT,CAT,DSL,ALL,NCAT,CAT,DSL,ALL,NCAT,CAT,DSL,ALL,NCAT,CAT,DSL,ALL,NCAT,
 CAT,DSL,ALL,NCAT,CAT,DSL,ALL,NCAT,CAT,DSL,ALL,NCAT,CAT,DSL,ALL,NCAT,CAT,DSL,A
 LL,NCAT,CAT,DSL,ALL,NCAT,CAT,DSL,ALL,NCAT,CAT,DSL,ALL,NCAT,CAT,DSL,ALL,NCAT,C
 AT,DSL,ALL,

   20,   0.000,   0.703,   0.785,   0.703,   0.000,   0.900,   0.771,   0.900,
   0.000,   1.321,   0.799,   1.321,   0.000,   0.000,   0.000,   0.000,
   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
   27.311,  10.355,   0.000,  15.956,   0.000,   0.000,   0.000,   0.000,
   0.000,   0.000,   0.000,   0.000,  27.311,   0.991,   0.772,   1.103,
   25,   0.000,   0.646,   0.621,   0.646,   0.000,   0.825,   0.609,   0.824,
   0.000,   1.211,   0.632,   1.211,   0.000,   0.000,   0.000,   0.000,
   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
   26.161,   9.628,   0.000,  15.089,   0.000,   0.000,   0.000,   0.000,
   0.000,   0.000,   0.000,   0.000,  26.161,   0.911,   0.610,   1.018,
   30,   0.000,   0.595,   0.513,   0.595,   0.000,   0.759,   0.504,   0.758,
   0.000,   1.115,   0.523,   1.115,   0.000,   0.000,   0.000,   0.000,
   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
   26.390,   9.045,   0.000,  14.775,   0.000,   0.000,   0.000,   0.000,
   0.000,   0.000,   0.000,   0.000,  26.390,   0.840,   0.505,   0.949,
   35,   0.000,   0.549,   0.444,   0.549,   0.000,   0.701,   0.436,   0.700,
   0.000,   1.030,   0.452,   1.030,   0.000,   0.000,   0.000,   0.000,
   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
   28.035,   8.602,   0.000,  15.021,   0.000,   0.000,   0.000,   0.000,
   0.000,   0.000,   0.000,   0.000,  28.035,   0.778,   0.437,   0.894,


Pollutant Name: Oxides of Nitrogen,,,,Temperature: 64F,,Relative Humidity: 43%

Speed,LDA,LDA,LDA,LDA,LDT1,LDT1,LDT1,LDT1,LDT2,LDT2,LDT2,LDT2,MDV,MDV,MDV,MDV,
LHD1,LHD1,LHD1,LHD1,LHD2,LHD2,LHD2,LHD2,MHD,MHD,MHD,MHD,HHD,HHD,HHD,HHD,OBUS,O
BUS,OBUS,OBUS,UBUS,UBUS,UBUS,UBUS,MCY,MCY,MCY,MCY,SBUS,SBUS,SBUS,SBUS,MH,MH,MH
,MH,ALL,ALL,ALL,ALL,
 MPH,NCAT,CAT,DSL,ALL,NCAT,CAT,DSL,ALL,NCAT,CAT,DSL,ALL,NCAT,CAT,DSL,ALL,NCAT,
 CAT,DSL,ALL,NCAT,CAT,DSL,ALL,NCAT,CAT,DSL,ALL,NCAT,CAT,DSL,ALL,NCAT,CAT,DSL,A
 LL,NCAT,CAT,DSL,ALL,NCAT,CAT,DSL,ALL,NCAT,CAT,DSL,ALL,NCAT,CAT,DSL,ALL,NCAT,C
 AT,DSL,ALL,

   20,   0.000,   0.051,   1.372,   0.051,   0.000,   0.067,   1.378,   0.072,
   0.000,   0.114,   1.367,   0.114,   0.000,   0.000,   0.000,   0.000,
   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
   1.237,   1.080,   0.000,   1.132,   0.000,   0.000,   0.000,   0.000,
   0.000,   0.000,   0.000,   0.000,   1.237,   0.080,   1.378,   0.086,
   25,   0.000,   0.047,   1.267,   0.047,   0.000,   0.061,   1.272,   0.066,
   0.000,   0.105,   1.261,   0.105,   0.000,   0.000,   0.000,   0.000,
   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
   1.292,   1.039,   0.000,   1.122,   0.000,   0.000,   0.000,   0.000,
   0.000,   0.000,   0.000,   0.000,   1.292,   0.074,   1.271,   0.080,
   30,   0.000,   0.044,   1.211,   0.044,   0.000,   0.057,   1.216,   0.061,
   0.000,   0.098,   1.206,   0.098,   0.000,   0.000,   0.000,   0.000,
   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
```

```
   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
   1.347,   1.014,   0.000,   1.124,   0.000,   0.000,   0.000,   0.000,
   0.000,   0.000,   0.000,   0.000,   1.347,   0.070,   1.216,   0.076,
   35,   0.000,   0.042,   1.200,   0.042,   0.000,   0.054,   1.205,   0.058,
   0.000,   0.093,   1.195,   0.093,   0.000,   0.000,   0.000,   0.000,
   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
   1.402,   1.005,   0.000,   1.136,   0.000,   0.000,   0.000,   0.000,
   0.000,   0.000,   0.000,   0.000,   1.402,   0.066,   1.204,   0.073,


Pollutant Name: Carbon Dioxide,,,,Temperature: 64F,,Relative Humidity: 43%

Speed,LDA,LDA,LDA,LDA,LDT1,LDT1,LDT1,LDT1,LDT2,LDT2,LDT2,LDT2,MDV,MDV,MDV,MDV,
LHD1,LHD1,LHD1,LHD1,LHD2,LHD2,LHD2,LHD2,MHD,MHD,MHD,MHD,HHD,HHD,HHD,HHD,OBUS,O
BUS,OBUS,OBUS,UBUS,UBUS,UBUS,UBUS,MCY,MCY,MCY,MCY,SBUS,SBUS,SBUS,SBUS,MH,MH,MH
,MH,ALL,ALL,ALL,ALL,
 MPH,NCAT,CAT,DSL,ALL,NCAT,CAT,DSL,ALL,NCAT,CAT,DSL,ALL,NCAT,CAT,DSL,ALL,NCAT,
 CAT,DSL,ALL,NCAT,CAT,DSL,ALL,NCAT,CAT,DSL,ALL,NCAT,CAT,DSL,ALL,NCAT,CAT,DSL,A
 LL,NCAT,CAT,DSL,ALL,NCAT,CAT,DSL,ALL,NCAT,CAT,DSL,ALL,NCAT,CAT,DSL,ALL,NCAT,C
 AT,DSL,ALL,

   20,   0.000, 445.582, 345.720, 445.578,   0.000, 562.497, 345.720, 561.717,
   0.000, 574.266, 345.720, 574.250,   0.000,   0.000,   0.000,   0.000,
   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
   152.598, 176.615,   0.000, 168.681,   0.000,   0.000,   0.000,   0.000,
   0.000,   0.000,   0.000,   0.000, 152.598, 496.315, 345.720, 494.771,
   25,   0.000, 376.459, 345.720, 376.458,   0.000, 475.237, 345.720, 474.771,
   0.000, 485.181, 345.720, 485.171,   0.000,   0.000,   0.000,   0.000,
   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
   136.747, 162.134,   0.000, 153.748,   0.000,   0.000,   0.000,   0.000,
   0.000,   0.000,   0.000,   0.000, 136.747, 419.434, 345.720, 418.191,
   30,   0.000, 330.114, 345.720, 330.115,   0.000, 416.732, 345.720, 416.477,
   0.000, 425.452, 345.720, 425.446,   0.000,   0.000,   0.000,   0.000,
   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
   124.450, 154.266,   0.000, 144.417,   0.000,   0.000,   0.000,   0.000,
   0.000,   0.000,   0.000,   0.000, 124.450, 367.903, 345.720, 366.855,
   35,   0.000, 300.446, 345.720, 300.448,   0.000, 379.279, 345.720, 379.158,
   0.000, 387.215, 345.720, 387.212,   0.000,   0.000,   0.000,   0.000,
   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
   115.023, 152.160,   0.000, 139.892,   0.000,   0.000,   0.000,   0.000,
   0.000,   0.000,   0.000,   0.000, 115.023, 334.941, 345.720, 334.011,


Pollutant Name: Sulfur Dioxide,,,,Temperature: 64F,,Relative Humidity: 43%

Speed,LDA,LDA,LDA,LDA,LDT1,LDT1,LDT1,LDT1,LDT2,LDT2,LDT2,LDT2,MDV,MDV,MDV,MDV,
LHD1,LHD1,LHD1,LHD1,LHD2,LHD2,LHD2,LHD2,MHD,MHD,MHD,MHD,HHD,HHD,HHD,HHD,OBUS,O
BUS,OBUS,OBUS,UBUS,UBUS,UBUS,UBUS,MCY,MCY,MCY,MCY,SBUS,SBUS,SBUS,SBUS,MH,MH,MH
,MH,ALL,ALL,ALL,ALL,
 MPH,NCAT,CAT,DSL,ALL,NCAT,CAT,DSL,ALL,NCAT,CAT,DSL,ALL,NCAT,CAT,DSL,ALL,NCAT,
 CAT,DSL,ALL,NCAT,CAT,DSL,ALL,NCAT,CAT,DSL,ALL,NCAT,CAT,DSL,ALL,NCAT,CAT,DSL,A
 LL,NCAT,CAT,DSL,ALL,NCAT,CAT,DSL,ALL,NCAT,CAT,DSL,ALL,NCAT,CAT,DSL,ALL,NCAT,C
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 AT,DSL,ALL,

   20,   0.000,   0.004,   0.003,   0.004,   0.000,   0.005,   0.003,   0.005,
   0.000,   0.006,   0.003,   0.006,   0.000,   0.000,   0.000,   0.000,
   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
   0.002,   0.002,   0.000,   0.002,   0.000,   0.000,   0.000,   0.000,
   0.000,   0.000,   0.000,   0.000,   0.002,   0.005,   0.003,   0.005,
   25,   0.000,   0.004,   0.003,   0.004,   0.000,   0.005,   0.003,   0.005,
   0.000,   0.005,   0.003,   0.005,   0.000,   0.000,   0.000,   0.000,
   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
   0.002,   0.002,   0.000,   0.002,   0.000,   0.000,   0.000,   0.000,
   0.000,   0.000,   0.000,   0.000,   0.002,   0.004,   0.003,   0.004,
   30,   0.000,   0.003,   0.003,   0.003,   0.000,   0.004,   0.003,   0.004,
   0.000,   0.004,   0.003,   0.004,   0.000,   0.000,   0.000,   0.000,
   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
   0.002,   0.002,   0.000,   0.002,   0.000,   0.000,   0.000,   0.000,
   0.000,   0.000,   0.000,   0.000,   0.002,   0.004,   0.003,   0.004,
   35,   0.000,   0.003,   0.003,   0.003,   0.000,   0.004,   0.003,   0.004,
   0.000,   0.004,   0.003,   0.004,   0.000,   0.000,   0.000,   0.000,
   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
   0.002,   0.002,   0.000,   0.002,   0.000,   0.000,   0.000,   0.000,
   0.000,   0.000,   0.000,   0.000,   0.002,   0.003,   0.003,   0.003,


Pollutant Name: PM10,,,,Temperature: 64F,,Relative Humidity: 43%

Speed,LDA,LDA,LDA,LDA,LDT1,LDT1,LDT1,LDT1,LDT2,LDT2,LDT2,LDT2,MDV,MDV,MDV,MDV,
LHD1,LHD1,LHD1,LHD1,LHD2,LHD2,LHD2,LHD2,MHD,MHD,MHD,MHD,HHD,HHD,HHD,HHD,OBUS,O
BUS,OBUS,OBUS,UBUS,UBUS,UBUS,UBUS,MCY,MCY,MCY,MCY,SBUS,SBUS,SBUS,SBUS,MH,MH,MH
,MH,ALL,ALL,ALL,ALL,
 MPH,NCAT,CAT,DSL,ALL,NCAT,CAT,DSL,ALL,NCAT,CAT,DSL,ALL,NCAT,CAT,DSL,ALL,NCAT,
 CAT,DSL,ALL,NCAT,CAT,DSL,ALL,NCAT,CAT,DSL,ALL,NCAT,CAT,DSL,ALL,NCAT,CAT,DSL,A
 LL,NCAT,CAT,DSL,ALL,NCAT,CAT,DSL,ALL,NCAT,CAT,DSL,ALL,NCAT,CAT,DSL,ALL,NCAT,C
 AT,DSL,ALL,

   20,   0.000,   0.020,   0.059,   0.020,   0.000,   0.023,   0.056,   0.023,
   0.000,   0.048,   0.061,   0.048,   0.000,   0.000,   0.000,   0.000,
   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
   0.045,   0.003,   0.000,   0.017,   0.000,   0.000,   0.000,   0.000,
   0.000,   0.000,   0.000,   0.000,   0.045,   0.028,   0.057,   0.028,
   25,   0.000,   0.015,   0.049,   0.015,   0.000,   0.017,   0.047,   0.018,
   0.000,   0.037,   0.052,   0.037,   0.000,   0.000,   0.000,   0.000,
   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
   0.041,   0.002,   0.000,   0.015,   0.000,   0.000,   0.000,   0.000,
   0.000,   0.000,   0.000,   0.000,   0.041,   0.021,   0.048,   0.022,
   30,   0.000,   0.012,   0.042,   0.012,   0.000,   0.014,   0.041,   0.014,
   0.000,   0.029,   0.044,   0.029,   0.000,   0.000,   0.000,   0.000,
   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
   0.039,   0.002,   0.000,   0.014,   0.000,   0.000,   0.000,   0.000,
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```
   0.000,   0.000,   0.000,   0.000,   0.039,   0.017,   0.041,   0.017,
   35,   0.000,   0.010,   0.037,   0.010,   0.000,   0.012,   0.036,   0.012,
   0.000,   0.025,   0.039,   0.025,   0.000,   0.000,   0.000,   0.000,
   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
   0.038,   0.002,   0.000,   0.014,   0.000,   0.000,   0.000,   0.000,
   0.000,   0.000,   0.000,   0.000,   0.038,   0.014,   0.036,   0.015,


Pollutant Name: PM10  - Tire Wear,,,,Temperature: 64F,,Relative Humidity: 43%

Speed,LDA,LDA,LDA,LDA,LDT1,LDT1,LDT1,LDT1,LDT2,LDT2,LDT2,LDT2,MDV,MDV,MDV,MDV,
LHD1,LHD1,LHD1,LHD1,LHD2,LHD2,LHD2,LHD2,MHD,MHD,MHD,MHD,HHD,HHD,HHD,HHD,OBUS,O
BUS,OBUS,OBUS,UBUS,UBUS,UBUS,UBUS,MCY,MCY,MCY,MCY,SBUS,SBUS,SBUS,SBUS,MH,MH,MH
,MH,ALL,ALL,ALL,ALL,
 MPH,NCAT,CAT,DSL,ALL,NCAT,CAT,DSL,ALL,NCAT,CAT,DSL,ALL,NCAT,CAT,DSL,ALL,NCAT,
 CAT,DSL,ALL,NCAT,CAT,DSL,ALL,NCAT,CAT,DSL,ALL,NCAT,CAT,DSL,ALL,NCAT,CAT,DSL,A
 LL,NCAT,CAT,DSL,ALL,NCAT,CAT,DSL,ALL,NCAT,CAT,DSL,ALL,NCAT,CAT,DSL,ALL,NCAT,C
 AT,DSL,ALL,

   20,   0.000,   0.008,   0.008,   0.008,   0.000,   0.008,   0.008,   0.008,
   0.000,   0.008,   0.008,   0.008,   0.000,   0.000,   0.000,   0.000,
   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
   0.004,   0.004,   0.000,   0.004,   0.000,   0.000,   0.000,   0.000,
   0.000,   0.000,   0.000,   0.000,   0.004,   0.008,   0.008,   0.008,
   25,   0.000,   0.008,   0.008,   0.008,   0.000,   0.008,   0.008,   0.008,
   0.000,   0.008,   0.008,   0.008,   0.000,   0.000,   0.000,   0.000,
   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
   0.004,   0.004,   0.000,   0.004,   0.000,   0.000,   0.000,   0.000,
   0.000,   0.000,   0.000,   0.000,   0.004,   0.008,   0.008,   0.008,
   30,   0.000,   0.008,   0.008,   0.008,   0.000,   0.008,   0.008,   0.008,
   0.000,   0.008,   0.008,   0.008,   0.000,   0.000,   0.000,   0.000,
   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
   0.004,   0.004,   0.000,   0.004,   0.000,   0.000,   0.000,   0.000,
   0.000,   0.000,   0.000,   0.000,   0.004,   0.008,   0.008,   0.008,
   35,   0.000,   0.008,   0.008,   0.008,   0.000,   0.008,   0.008,   0.008,
   0.000,   0.008,   0.008,   0.008,   0.000,   0.000,   0.000,   0.000,
   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
   0.004,   0.004,   0.000,   0.004,   0.000,   0.000,   0.000,   0.000,
   0.000,   0.000,   0.000,   0.000,   0.004,   0.008,   0.008,   0.008,


Pollutant Name: PM10  - Brake Wear,,,,Temperature: 64F,,Relative Humidity: 43%

Speed,LDA,LDA,LDA,LDA,LDT1,LDT1,LDT1,LDT1,LDT2,LDT2,LDT2,LDT2,MDV,MDV,MDV,MDV,
LHD1,LHD1,LHD1,LHD1,LHD2,LHD2,LHD2,LHD2,MHD,MHD,MHD,MHD,HHD,HHD,HHD,HHD,OBUS,O
BUS,OBUS,OBUS,UBUS,UBUS,UBUS,UBUS,MCY,MCY,MCY,MCY,SBUS,SBUS,SBUS,SBUS,MH,MH,MH
,MH,ALL,ALL,ALL,ALL,
 MPH,NCAT,CAT,DSL,ALL,NCAT,CAT,DSL,ALL,NCAT,CAT,DSL,ALL,NCAT,CAT,DSL,ALL,NCAT,
 CAT,DSL,ALL,NCAT,CAT,DSL,ALL,NCAT,CAT,DSL,ALL,NCAT,CAT,DSL,ALL,NCAT,CAT,DSL,A
 LL,NCAT,CAT,DSL,ALL,NCAT,CAT,DSL,ALL,NCAT,CAT,DSL,ALL,NCAT,CAT,DSL,ALL,NCAT,C
 AT,DSL,ALL,

   20,   0.000,   0.013,   0.013,   0.013,   0.000,   0.013,   0.013,   0.013,
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```
   0.000,   0.013,   0.013,   0.013,   0.000,   0.000,   0.000,   0.000,
   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
   0.006,   0.006,   0.000,   0.006,   0.000,   0.000,   0.000,   0.000,
   0.000,   0.000,   0.000,   0.000,   0.006,   0.012,   0.013,   0.012,
   25,   0.000,   0.013,   0.013,   0.013,   0.000,   0.013,   0.013,   0.013,
   0.000,   0.013,   0.013,   0.013,   0.000,   0.000,   0.000,   0.000,
   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
   0.006,   0.006,   0.000,   0.006,   0.000,   0.000,   0.000,   0.000,
   0.000,   0.000,   0.000,   0.000,   0.006,   0.012,   0.013,   0.012,
   30,   0.000,   0.013,   0.013,   0.013,   0.000,   0.013,   0.013,   0.013,
   0.000,   0.013,   0.013,   0.013,   0.000,   0.000,   0.000,   0.000,
   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
   0.006,   0.006,   0.000,   0.006,   0.000,   0.000,   0.000,   0.000,
   0.000,   0.000,   0.000,   0.000,   0.006,   0.012,   0.013,   0.012,
   35,   0.000,   0.013,   0.013,   0.013,   0.000,   0.013,   0.013,   0.013,
   0.000,   0.013,   0.013,   0.013,   0.000,   0.000,   0.000,   0.000,
   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
   0.006,   0.006,   0.000,   0.006,   0.000,   0.000,   0.000,   0.000,
   0.000,   0.000,   0.000,   0.000,   0.006,   0.012,   0.013,   0.012,


Pollutant Name: Gasoline - mi/gal,,,,Temperature: 64F,,Relative Humidity: 43%

Speed,LDA,LDA,LDA,LDA,LDT1,LDT1,LDT1,LDT1,LDT2,LDT2,LDT2,LDT2,MDV,MDV,MDV,MDV,
LHD1,LHD1,LHD1,LHD1,LHD2,LHD2,LHD2,LHD2,MHD,MHD,MHD,MHD,HHD,HHD,HHD,HHD,OBUS,O
BUS,OBUS,OBUS,UBUS,UBUS,UBUS,UBUS,MCY,MCY,MCY,MCY,SBUS,SBUS,SBUS,SBUS,MH,MH,MH
,MH,ALL,ALL,ALL,ALL,
 MPH,NCAT,CAT,DSL,ALL,NCAT,CAT,DSL,ALL,NCAT,CAT,DSL,ALL,NCAT,CAT,DSL,ALL,NCAT,
 CAT,DSL,ALL,NCAT,CAT,DSL,ALL,NCAT,CAT,DSL,ALL,NCAT,CAT,DSL,ALL,NCAT,CAT,DSL,A
 LL,NCAT,CAT,DSL,ALL,NCAT,CAT,DSL,ALL,NCAT,CAT,DSL,ALL,NCAT,CAT,DSL,ALL,NCAT,C
 AT,DSL,ALL,

   20,   0.000,  19.835,   0.000,  19.835,   0.000,  15.712,   0.000,  15.712,
   0.000,  15.371,   0.000,  15.371,   0.000,   0.000,   0.000,   0.000,
   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
   43.003,  44.479,   0.000,  43.991,   0.000,   0.000,   0.000,   0.000,
   0.000,   0.000,   0.000,   0.000,  43.003,  18.199,   0.000,  18.304,
   25,   0.000,  23.472,   0.000,  23.472,   0.000,  18.593,   0.000,  18.593,
   0.000,  18.189,   0.000,  18.189,   0.000,   0.000,   0.000,   0.000,
   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
   47.285,  48.497,   0.000,  48.097,   0.000,   0.000,   0.000,   0.000,
   0.000,   0.000,   0.000,   0.000,  47.285,  21.499,   0.000,  21.609,
   30,   0.000,  26.764,   0.000,  26.764,   0.000,  21.200,   0.000,  21.200,
   0.000,  20.738,   0.000,  20.738,   0.000,   0.000,   0.000,   0.000,
   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
   50.648,  51.095,   0.000,  50.947,   0.000,   0.000,   0.000,   0.000,
   0.000,   0.000,   0.000,   0.000,  50.648,  24.478,   0.000,  24.589,
   35,   0.000,  29.406,   0.000,  29.406,   0.000,  23.293,   0.000,  23.293,
   0.000,  22.785,   0.000,  22.785,   0.000,   0.000,   0.000,   0.000,
```

```
   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
   52.734,  51.999,   0.000,  52.242,   0.000,   0.000,   0.000,   0.000,
   0.000,   0.000,   0.000,   0.000,  52.734,  26.858,   0.000,  26.968,


Pollutant Name: Diesel - mi/gal,,,,Temperature: 64F,,Relative Humidity: 43%

Speed,LDA,LDA,LDA,LDA,LDT1,LDT1,LDT1,LDT1,LDT2,LDT2,LDT2,LDT2,MDV,MDV,MDV,MDV,
LHD1,LHD1,LHD1,LHD1,LHD2,LHD2,LHD2,LHD2,MHD,MHD,MHD,MHD,HHD,HHD,HHD,HHD,OBUS,O
BUS,OBUS,OBUS,UBUS,UBUS,UBUS,UBUS,MCY,MCY,MCY,MCY,SBUS,SBUS,SBUS,SBUS,MH,MH,MH
,MH,ALL,ALL,ALL,ALL,
 MPH,NCAT,CAT,DSL,ALL,NCAT,CAT,DSL,ALL,NCAT,CAT,DSL,ALL,NCAT,CAT,DSL,ALL,NCAT,
 CAT,DSL,ALL,NCAT,CAT,DSL,ALL,NCAT,CAT,DSL,ALL,NCAT,CAT,DSL,ALL,NCAT,CAT,DSL,A
 LL,NCAT,CAT,DSL,ALL,NCAT,CAT,DSL,ALL,NCAT,CAT,DSL,ALL,NCAT,CAT,DSL,ALL,NCAT,C
 AT,DSL,ALL,

   20,   0.000,   0.000,  29.156,  29.156,   0.000,   0.000,  29.156,  29.156,
   0.000,   0.000,  29.156,  29.156,   0.000,   0.000,   0.000,   0.000,
   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,  29.156,  29.156,
   25,   0.000,   0.000,  29.156,  29.156,   0.000,   0.000,  29.156,  29.156,
   0.000,   0.000,  29.156,  29.156,   0.000,   0.000,   0.000,   0.000,
   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,  29.156,  29.156,
   30,   0.000,   0.000,  29.156,  29.156,   0.000,   0.000,  29.156,  29.156,
   0.000,   0.000,  29.156,  29.156,   0.000,   0.000,   0.000,   0.000,
   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,  29.156,  29.156,
   35,   0.000,   0.000,  29.156,  29.156,   0.000,   0.000,  29.156,  29.156,
   0.000,   0.000,  29.156,  29.156,   0.000,   0.000,   0.000,   0.000,
   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,  29.156,  29.156,




Title    : Traffic - 2030 Annual Avg San Bernardino
Version  : Emfac2007 V2.3 Nov 1 2006
Run Date : 2009/06/25 12:12:07
Scen Year: 2030 -- All model years in the range 1986 to 2030 selected
Season   : Annual
Area     : San Bernardino
*****************************************************************************
***********
Year:,2030,, -- Model Years,,1986, to ,2030, Inclusive --,,,Annual
     Emfac2007 Emission Factors: V2.3 Nov 1 2006
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County Average,,,,, San Bernardino,,,,,,County Average

,,,,Table 2: Starting Emissions (grams/trip)

Pollutant Name: Total Organic Gases,,,,Temperature: 64F,,Relative Humidity: ALL

Time,LDA,LDA,LDA,LDA,LDT1,LDT1,LDT1,LDT1,LDT2,LDT2,LDT2,LDT2,MDV,MDV,MDV,MDV,LHD1,LHD1,LHD1,LHD1,LHD2,LHD2,LHD2,LHD2,MHD,MHD,MHD,MHD,HHD,HHD,HHD,HHD,OBUS,OBUS,OBUS,OBUS,UBUS,UBUS,UBUS,UBUS,MCY,MCY,MCY,MCY,SBUS,SBUS,SBUS,SBUS,MH,MH,MH,MH,ALL,ALL,ALL,ALL,
min,NCAT,CAT,DSL,ALL,NCAT,CAT,DSL,ALL,NCAT,CAT,DSL,ALL,NCAT,CAT,DSL,ALL,NCAT,CAT,DSL,ALL,NCAT,CAT,DSL,ALL,NCAT,CAT,DSL,ALL,NCAT,CAT,DSL,ALL,NCAT,CAT,DSL,ALL,NCAT,CAT,DSL,ALL,NCAT,CAT,DSL,ALL,NCAT,CAT,DSL,ALL,NCAT,CAT,DSL,ALL,NCAT,CAT,DSL,ALL,NCAT,CAT,DSL,ALL,

5, 0.000, 0.006, 0.000, 0.006, 0.000, 0.008, 0.000, 0.008,
0.000, 0.013, 0.000, 0.013, 0.000, 0.000, 0.000, 0.000,
0.000, 0.000, 0.000, 0.000, 0.000, 0.000, 0.000, 0.000,
0.000, 0.000, 0.000, 0.000, 0.000, 0.000, 0.000, 0.000,
0.000, 0.000, 0.000, 0.000, 0.000, 0.000, 0.000, 0.000,
1.876, 0.304, 0.000, 0.833, 0.000, 0.000, 0.000, 0.000,
0.000, 0.000, 0.000, 0.000, 1.876, 0.012, 0.000, 0.022,
10, 0.000, 0.013, 0.000, 0.013, 0.000, 0.016, 0.000, 0.016,
0.000, 0.026, 0.000, 0.026, 0.000, 0.000, 0.000, 0.000,
0.000, 0.000, 0.000, 0.000, 0.000, 0.000, 0.000, 0.000,
0.000, 0.000, 0.000, 0.000, 0.000, 0.000, 0.000, 0.000,
0.000, 0.000, 0.000, 0.000, 0.000, 0.000, 0.000, 0.000,
1.860, 0.592, 0.000, 1.018, 0.000, 0.000, 0.000, 0.000,
0.000, 0.000, 0.000, 0.000, 1.860, 0.023, 0.000, 0.033,
20, 0.000, 0.024, 0.000, 0.024, 0.000, 0.030, 0.000, 0.030,
0.000, 0.050, 0.000, 0.050, 0.000, 0.000, 0.000, 0.000,
0.000, 0.000, 0.000, 0.000, 0.000, 0.000, 0.000, 0.000,
0.000, 0.000, 0.000, 0.000, 0.000, 0.000, 0.000, 0.000,
0.000, 0.000, 0.000, 0.000, 0.000, 0.000, 0.000, 0.000,
1.878, 1.122, 0.000, 1.376, 0.000, 0.000, 0.000, 0.000,
0.000, 0.000, 0.000, 0.000, 1.878, 0.045, 0.000, 0.055,
30, 0.000, 0.036, 0.000, 0.036, 0.000, 0.044, 0.000, 0.044,
0.000, 0.073, 0.000, 0.073, 0.000, 0.000, 0.000, 0.000,
0.000, 0.000, 0.000, 0.000, 0.000, 0.000, 0.000, 0.000,
0.000, 0.000, 0.000, 0.000, 0.000, 0.000, 0.000, 0.000,
0.000, 0.000, 0.000, 0.000, 0.000, 0.000, 0.000, 0.000,
1.963, 1.590, 0.000, 1.715, 0.000, 0.000, 0.000, 0.000,
0.000, 0.000, 0.000, 0.000, 1.963, 0.064, 0.000, 0.075,
40, 0.000, 0.046, 0.000, 0.046, 0.000, 0.057, 0.000, 0.056,
0.000, 0.095, 0.000, 0.095, 0.000, 0.000, 0.000, 0.000,
0.000, 0.000, 0.000, 0.000, 0.000, 0.000, 0.000, 0.000,
0.000, 0.000, 0.000, 0.000, 0.000, 0.000, 0.000, 0.000,
0.000, 0.000, 0.000, 0.000, 0.000, 0.000, 0.000, 0.000,
2.114, 1.997, 0.000, 2.036, 0.000, 0.000, 0.000, 0.000,
0.000, 0.000, 0.000, 0.000, 2.114, 0.083, 0.000, 0.094,
50, 0.000, 0.055, 0.000, 0.055, 0.000, 0.068, 0.000, 0.068,
0.000, 0.115, 0.000, 0.115, 0.000, 0.000, 0.000, 0.000,
0.000, 0.000, 0.000, 0.000, 0.000, 0.000, 0.000, 0.000,
0.000, 0.000, 0.000, 0.000, 0.000, 0.000, 0.000, 0.000,
0.000, 0.000, 0.000, 0.000, 0.000, 0.000, 0.000, 0.000,
2.331, 2.342, 0.000, 2.338, 0.000, 0.000, 0.000, 0.000,
0.000, 0.000, 0.000, 0.000, 2.331, 0.099, 0.000, 0.112,
60, 0.000, 0.064, 0.000, 0.064, 0.000, 0.079, 0.000, 0.079,
0.000, 0.134, 0.000, 0.134, 0.000, 0.000, 0.000, 0.000,
0.000, 0.000, 0.000, 0.000, 0.000, 0.000, 0.000, 0.000,
0.000, 0.000, 0.000, 0.000, 0.000, 0.000, 0.000, 0.000,
0.000, 0.000, 0.000, 0.000, 0.000, 0.000, 0.000, 0.000,

```
 2.424,   2.625,   0.000,   2.557,   0.000,   0.000,   0.000,   0.000,
 0.000,   0.000,   0.000,   0.000,   2.424,   0.114,   0.000,   0.127,
120,   0.000,   0.100,   0.000,   0.100,   0.000,   0.121,   0.000,   0.120,
0.000,   0.215,   0.000,   0.215,   0.000,   0.000,   0.000,   0.000,
0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
2.116,   3.043,   0.000,   2.731,   0.000,   0.000,   0.000,   0.000,
0.000,   0.000,   0.000,   0.000,   2.116,   0.168,   0.000,   0.179,
180,   0.000,   0.085,   0.000,   0.085,   0.000,   0.104,   0.000,   0.103,
0.000,   0.183,   0.000,   0.183,   0.000,   0.000,   0.000,   0.000,
0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
2.303,   2.732,   0.000,   2.588,   0.000,   0.000,   0.000,   0.000,
0.000,   0.000,   0.000,   0.000,   2.303,   0.144,   0.000,   0.156,
240,   0.000,   0.090,   0.000,   0.090,   0.000,   0.110,   0.000,   0.110,
0.000,   0.195,   0.000,   0.195,   0.000,   0.000,   0.000,   0.000,
0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
2.491,   2.884,   0.000,   2.752,   0.000,   0.000,   0.000,   0.000,
0.000,   0.000,   0.000,   0.000,   2.491,   0.153,   0.000,   0.166,
300,   0.000,   0.095,   0.000,   0.095,   0.000,   0.116,   0.000,   0.116,
0.000,   0.206,   0.000,   0.206,   0.000,   0.000,   0.000,   0.000,
0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
2.678,   3.031,   0.000,   2.912,   0.000,   0.000,   0.000,   0.000,
0.000,   0.000,   0.000,   0.000,   2.678,   0.162,   0.000,   0.176,
360,   0.000,   0.100,   0.000,   0.100,   0.000,   0.123,   0.000,   0.122,
0.000,   0.218,   0.000,   0.218,   0.000,   0.000,   0.000,   0.000,
0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
2.866,   3.173,   0.000,   3.070,   0.000,   0.000,   0.000,   0.000,
0.000,   0.000,   0.000,   0.000,   2.866,   0.170,   0.000,   0.185,
420,   0.000,   0.105,   0.000,   0.105,   0.000,   0.129,   0.000,   0.128,
0.000,   0.229,   0.000,   0.229,   0.000,   0.000,   0.000,   0.000,
0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
3.053,   3.311,   0.000,   3.224,   0.000,   0.000,   0.000,   0.000,
0.000,   0.000,   0.000,   0.000,   3.053,   0.179,   0.000,   0.195,
480,   0.000,   0.110,   0.000,   0.110,   0.000,   0.135,   0.000,   0.134,
0.000,   0.240,   0.000,   0.240,   0.000,   0.000,   0.000,   0.000,
0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
3.240,   3.443,   0.000,   3.375,   0.000,   0.000,   0.000,   0.000,
0.000,   0.000,   0.000,   0.000,   3.240,   0.187,   0.000,   0.204,
540,   0.000,   0.115,   0.000,   0.115,   0.000,   0.141,   0.000,   0.141,
0.000,   0.251,   0.000,   0.251,   0.000,   0.000,   0.000,   0.000,
0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
3.428,   3.570,   0.000,   3.522,   0.000,   0.000,   0.000,   0.000,
0.000,   0.000,   0.000,   0.000,   3.428,   0.195,   0.000,   0.213,
600,   0.000,   0.120,   0.000,   0.120,   0.000,   0.147,   0.000,   0.147,
0.000,   0.262,   0.000,   0.262,   0.000,   0.000,   0.000,   0.000,
0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
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```
  3.615,   3.692,   0.000,   3.666,   0.000,   0.000,   0.000,   0.000,
  0.000,   0.000,   0.000,   0.000,   3.615,   0.203,   0.000,   0.222,
  660,   0.000,   0.125,   0.000,   0.125,   0.000,   0.153,   0.000,   0.152,
  0.000,   0.273,   0.000,   0.273,   0.000,   0.000,   0.000,   0.000,
  0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
  0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
  0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
  3.803,   3.810,   0.000,   3.807,   0.000,   0.000,   0.000,   0.000,
  0.000,   0.000,   0.000,   0.000,   3.803,   0.211,   0.000,   0.231,
  720,   0.000,   0.130,   0.000,   0.130,   0.000,   0.159,   0.000,   0.158,
  0.000,   0.284,   0.000,   0.284,   0.000,   0.000,   0.000,   0.000,
  0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
  0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
  0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
  3.990,   3.922,   0.000,   3.945,   0.000,   0.000,   0.000,   0.000,
  0.000,   0.000,   0.000,   0.000,   3.990,   0.219,   0.000,   0.240,


Pollutant Name: Carbon Monoxide,,,,Temperature: 64F,,Relative Humidity: ALL

Time,LDA,LDA,LDA,LDA,LDT1,LDT1,LDT1,LDT1,LDT2,LDT2,LDT2,LDT2,MDV,MDV,MDV,MDV,L
HD1,LHD1,LHD1,LHD1,LHD2,LHD2,LHD2,LHD2,MHD,MHD,MHD,MHD,HHD,HHD,HHD,HHD,OBUS,OB
US,OBUS,OBUS,UBUS,UBUS,UBUS,UBUS,MCY,MCY,MCY,MCY,SBUS,SBUS,SBUS,SBUS,MH,MH,MH,
MH,ALL,ALL,ALL,ALL,
 min,NCAT,CAT,DSL,ALL,NCAT,CAT,DSL,ALL,NCAT,CAT,DSL,ALL,NCAT,CAT,DSL,ALL,NCAT,
 CAT,DSL,ALL,NCAT,CAT,DSL,ALL,NCAT,CAT,DSL,ALL,NCAT,CAT,DSL,ALL,NCAT,CAT,DSL,A
 LL,NCAT,CAT,DSL,ALL,NCAT,CAT,DSL,ALL,NCAT,CAT,DSL,ALL,NCAT,CAT,DSL,ALL,NCAT,C
 AT,DSL,ALL,

    5,   0.000,   0.104,   0.000,   0.104,   0.000,   0.137,   0.000,   0.137,
    0.000,   0.205,   0.000,   0.205,   0.000,   0.000,   0.000,   0.000,
    0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
    0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
    0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
    6.230,   1.664,   0.000,   3.199,   0.000,   0.000,   0.000,   0.000,
    0.000,   0.000,   0.000,   0.000,   6.230,   0.154,   0.000,   0.188,
   10,   0.000,   0.206,   0.000,   0.206,   0.000,   0.271,   0.000,   0.270,
   0.000,   0.406,   0.000,   0.406,   0.000,   0.000,   0.000,   0.000,
   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
   5.517,   3.260,   0.000,   4.019,   0.000,   0.000,   0.000,   0.000,
   0.000,   0.000,   0.000,   0.000,   5.517,   0.305,   0.000,   0.334,
   20,   0.000,   0.401,   0.000,   0.401,   0.000,   0.528,   0.000,   0.525,
   0.000,   0.792,   0.000,   0.792,   0.000,   0.000,   0.000,   0.000,
   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
   4.258,   6.249,   0.000,   5.580,   0.000,   0.000,   0.000,   0.000,
   0.000,   0.000,   0.000,   0.000,   4.258,   0.593,   0.000,   0.613,
   30,   0.000,   0.587,   0.000,   0.587,   0.000,   0.770,   0.000,   0.767,
   0.000,   1.158,   0.000,   1.158,   0.000,   0.000,   0.000,   0.000,
   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
   3.225,   8.968,   0.000,   7.037,   0.000,   0.000,   0.000,   0.000,
   0.000,   0.000,   0.000,   0.000,   3.225,   0.865,   0.000,   0.878,
   40,   0.000,   0.762,   0.000,   0.762,   0.000,   0.999,   0.000,   0.995,
   0.000,   1.504,   0.000,   1.504,   0.000,   0.000,   0.000,   0.000,
   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
   2.415,  11.417,   0.000,   8.389,   0.000,   0.000,   0.000,   0.000,
```

```
 0.000,   0.000,   0.000,   0.000,   2.415,   1.120,   0.000,   1.127,
 50,   0.000,   0.927,   0.000,   0.927,   0.000,   1.214,   0.000,   1.208,
 0.000,   1.831,   0.000,   1.831,   0.000,   0.000,   0.000,   0.000,
 0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
 0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
 0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
 1.830,  13.595,   0.000,   9.638,   0.000,   0.000,   0.000,   0.000,
 0.000,   0.000,   0.000,   0.000,   1.830,   1.360,   0.000,   1.362,
 60,   0.000,   1.081,   0.000,   1.081,   0.000,   1.414,   0.000,   1.408,
 0.000,   2.137,   0.000,   2.137,   0.000,   0.000,   0.000,   0.000,
 0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
 0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
 0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
 1.469,  15.503,   0.000,  10.783,   0.000,   0.000,   0.000,   0.000,
 0.000,   0.000,   0.000,   0.000,   1.469,   1.583,   0.000,   1.581,
120,   0.000,   1.701,   0.000,   1.701,   0.000,   2.178,   0.000,   2.169,
0.000,   3.357,   0.000,   3.356,   0.000,   0.000,   0.000,   0.000,
0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
4.488,  19.938,   0.000,  14.742,   0.000,   0.000,   0.000,   0.000,
0.000,   0.000,   0.000,   0.000,   4.488,   2.433,   0.000,   2.443,
180,   0.000,   1.338,   0.000,   1.338,   0.000,   1.729,   0.000,   1.722,
0.000,   2.657,   0.000,   2.657,   0.000,   0.000,   0.000,   0.000,
0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
7.092,  14.868,   0.000,  12.253,   0.000,   0.000,   0.000,   0.000,
0.000,   0.000,   0.000,   0.000,   7.092,   1.911,   0.000,   1.939,
240,   0.000,   1.450,   0.000,   1.450,   0.000,   1.869,   0.000,   1.861,
0.000,   2.882,   0.000,   2.882,   0.000,   0.000,   0.000,   0.000,
0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
9.419,  15.304,   0.000,  13.325,   0.000,   0.000,   0.000,   0.000,
0.000,   0.000,   0.000,   0.000,   9.419,   2.062,   0.000,   2.102,
300,   0.000,   1.549,   0.000,   1.549,   0.000,   1.994,   0.000,   1.985,
0.000,   3.081,   0.000,   3.081,   0.000,   0.000,   0.000,   0.000,
0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
11.471,  15.755,   0.000,  14.314,   0.000,   0.000,   0.000,   0.000,
0.000,   0.000,   0.000,   0.000,  11.471,   2.197,   0.000,   2.247,
360,   0.000,   1.635,   0.000,   1.635,   0.000,   2.102,   0.000,   2.093,
0.000,   3.254,   0.000,   3.253,   0.000,   0.000,   0.000,   0.000,
0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
13.247,  16.219,   0.000,  15.219,   0.000,   0.000,   0.000,   0.000,
0.000,   0.000,   0.000,   0.000,  13.247,   2.314,   0.000,   2.374,
420,   0.000,   1.708,   0.000,   1.708,   0.000,   2.195,   0.000,   2.185,
0.000,   3.400,   0.000,   3.400,   0.000,   0.000,   0.000,   0.000,
0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
14.747,  16.697,   0.000,  16.041,   0.000,   0.000,   0.000,   0.000,
0.000,   0.000,   0.000,   0.000,  14.747,   2.415,   0.000,   2.482,
480,   0.000,   1.768,   0.000,   1.768,   0.000,   2.271,   0.000,   2.261,
0.000,   3.520,   0.000,   3.519,   0.000,   0.000,   0.000,   0.000,
0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
15.970,  17.188,   0.000,  16.779,   0.000,   0.000,   0.000,   0.000,
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  0.000,   0.000,   0.000,   0.000,  15.970,   2.499,   0.000,   2.572,
  540,   0.000,   1.815,   0.000,   1.815,   0.000,   2.332,   0.000,   2.322,
  0.000,   3.613,   0.000,   3.613,   0.000,   0.000,   0.000,   0.000,
  0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
  0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
  0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
  16.918,  17.694,   0.000,  17.433,   0.000,   0.000,   0.000,   0.000,
  0.000,   0.000,   0.000,   0.000,  16.918,   2.566,   0.000,   2.644,
  600,   0.000,   1.849,   0.000,   1.849,   0.000,   2.377,   0.000,   2.366,
  0.000,   3.680,   0.000,   3.680,   0.000,   0.000,   0.000,   0.000,
  0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
  0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
  0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
  17.590,  18.214,   0.000,  18.004,   0.000,   0.000,   0.000,   0.000,
  0.000,   0.000,   0.000,   0.000,  17.590,   2.616,   0.000,   2.698,
  660,   0.000,   1.870,   0.000,   1.870,   0.000,   2.406,   0.000,   2.395,
  0.000,   3.721,   0.000,   3.721,   0.000,   0.000,   0.000,   0.000,
  0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
  0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
  0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
  17.986,  18.748,   0.000,  18.492,   0.000,   0.000,   0.000,   0.000,
  0.000,   0.000,   0.000,   0.000,  17.986,   2.649,   0.000,   2.733,
  720,   0.000,   1.878,   0.000,   1.878,   0.000,   2.419,   0.000,   2.408,
  0.000,   3.736,   0.000,   3.735,   0.000,   0.000,   0.000,   0.000,
  0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
  0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
  0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
  18.107,  19.295,   0.000,  18.895,   0.000,   0.000,   0.000,   0.000,
  0.000,   0.000,   0.000,   0.000,  18.107,   2.666,   0.000,   2.750,


Pollutant Name: Oxides of Nitrogen,,,,Temperature: 64F,,Relative Humidity: ALL

Time,LDA,LDA,LDA,LDA,LDT1,LDT1,LDT1,LDT1,LDT2,LDT2,LDT2,LDT2,MDV,MDV,MDV,MDV,L
HD1,LHD1,LHD1,LHD1,LHD2,LHD2,LHD2,LHD2,MHD,MHD,MHD,MHD,HHD,HHD,HHD,HHD,OBUS,OB
US,OBUS,OBUS,UBUS,UBUS,UBUS,UBUS,MCY,MCY,MCY,MCY,SBUS,SBUS,SBUS,SBUS,MH,MH,MH,
MH,ALL,ALL,ALL,ALL,
 min,NCAT,CAT,DSL,ALL,NCAT,CAT,DSL,ALL,NCAT,CAT,DSL,ALL,NCAT,CAT,DSL,ALL,NCAT,
 CAT,DSL,ALL,NCAT,CAT,DSL,ALL,NCAT,CAT,DSL,ALL,NCAT,CAT,DSL,ALL,NCAT,CAT,DSL,A
 LL,NCAT,CAT,DSL,ALL,NCAT,CAT,DSL,ALL,NCAT,CAT,DSL,ALL,NCAT,CAT,DSL,ALL,NCAT,C
 AT,DSL,ALL,

    5,   0.000,   0.040,   0.000,   0.040,   0.000,   0.053,   0.000,   0.053,
    0.000,   0.108,   0.000,   0.108,   0.000,   0.000,   0.000,   0.000,
    0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
    0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
    0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
    0.287,   0.097,   0.000,   0.161,   0.000,   0.000,   0.000,   0.000,
    0.000,   0.000,   0.000,   0.000,   0.287,   0.062,   0.000,   0.063,
   10,   0.000,   0.043,   0.000,   0.043,   0.000,   0.057,   0.000,   0.057,
   0.000,   0.114,   0.000,   0.114,   0.000,   0.000,   0.000,   0.000,
   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
   0.312,   0.147,   0.000,   0.202,   0.000,   0.000,   0.000,   0.000,
   0.000,   0.000,   0.000,   0.000,   0.312,   0.066,   0.000,   0.067,
   20,   0.000,   0.048,   0.000,   0.048,   0.000,   0.063,   0.000,   0.063,
   0.000,   0.126,   0.000,   0.126,   0.000,   0.000,   0.000,   0.000,
   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
   0.357,   0.233,   0.000,   0.275,   0.000,   0.000,   0.000,   0.000,
   0.000,   0.000,   0.000,   0.000,   0.357,   0.074,   0.000,   0.075,
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```
 30,   0.000,   0.052,   0.000,   0.052,   0.000,   0.069,   0.000,   0.068,
 0.000,   0.136,   0.000,   0.136,   0.000,   0.000,   0.000,   0.000,
 0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
 0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
 0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
 0.397,   0.304,   0.000,   0.335,   0.000,   0.000,   0.000,   0.000,
 0.000,   0.000,   0.000,   0.000,   0.397,   0.081,   0.000,   0.082,
 40,   0.000,   0.055,   0.000,   0.055,   0.000,   0.073,   0.000,   0.073,
 0.000,   0.144,   0.000,   0.144,   0.000,   0.000,   0.000,   0.000,
 0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
 0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
 0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
 0.430,   0.358,   0.000,   0.382,   0.000,   0.000,   0.000,   0.000,
 0.000,   0.000,   0.000,   0.000,   0.430,   0.086,   0.000,   0.088,
 50,   0.000,   0.058,   0.000,   0.058,   0.000,   0.077,   0.000,   0.076,
 0.000,   0.151,   0.000,   0.151,   0.000,   0.000,   0.000,   0.000,
 0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
 0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
 0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
 0.457,   0.397,   0.000,   0.417,   0.000,   0.000,   0.000,   0.000,
 0.000,   0.000,   0.000,   0.000,   0.457,   0.091,   0.000,   0.092,
 60,   0.000,   0.060,   0.000,   0.060,   0.000,   0.079,   0.000,   0.079,
 0.000,   0.156,   0.000,   0.156,   0.000,   0.000,   0.000,   0.000,
 0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
 0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
 0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
 0.478,   0.419,   0.000,   0.439,   0.000,   0.000,   0.000,   0.000,
 0.000,   0.000,   0.000,   0.000,   0.478,   0.094,   0.000,   0.096,
120,   0.000,   0.065,   0.000,   0.065,   0.000,   0.086,   0.000,   0.085,
0.000,   0.169,   0.000,   0.169,   0.000,   0.000,   0.000,   0.000,
0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
0.487,   0.421,   0.000,   0.443,   0.000,   0.000,   0.000,   0.000,
0.000,   0.000,   0.000,   0.000,   0.487,   0.101,   0.000,   0.103,
180,   0.000,   0.066,   0.000,   0.066,   0.000,   0.088,   0.000,   0.087,
0.000,   0.173,   0.000,   0.173,   0.000,   0.000,   0.000,   0.000,
0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
0.475,   0.423,   0.000,   0.440,   0.000,   0.000,   0.000,   0.000,
0.000,   0.000,   0.000,   0.000,   0.475,   0.103,   0.000,   0.105,
240,   0.000,   0.066,   0.000,   0.066,   0.000,   0.087,   0.000,   0.087,
0.000,   0.172,   0.000,   0.172,   0.000,   0.000,   0.000,   0.000,
0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
0.460,   0.420,   0.000,   0.434,   0.000,   0.000,   0.000,   0.000,
0.000,   0.000,   0.000,   0.000,   0.460,   0.103,   0.000,   0.104,
300,   0.000,   0.065,   0.000,   0.065,   0.000,   0.086,   0.000,   0.086,
0.000,   0.170,   0.000,   0.170,   0.000,   0.000,   0.000,   0.000,
0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
0.441,   0.417,   0.000,   0.425,   0.000,   0.000,   0.000,   0.000,
0.000,   0.000,   0.000,   0.000,   0.441,   0.101,   0.000,   0.103,
360,   0.000,   0.064,   0.000,   0.064,   0.000,   0.084,   0.000,   0.084,
0.000,   0.167,   0.000,   0.167,   0.000,   0.000,   0.000,   0.000,
0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
0.418,   0.413,   0.000,   0.415,   0.000,   0.000,   0.000,   0.000,
0.000,   0.000,   0.000,   0.000,   0.418,   0.100,   0.000,   0.101,
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  420,   0.000,   0.063,   0.000,   0.063,   0.000,   0.083,   0.000,   0.082,
  0.000,   0.163,   0.000,   0.163,   0.000,   0.000,   0.000,   0.000,
  0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
  0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
  0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
  0.391,   0.408,   0.000,   0.402,   0.000,   0.000,   0.000,   0.000,
  0.000,   0.000,   0.000,   0.000,   0.391,   0.097,   0.000,   0.099,
  480,   0.000,   0.061,   0.000,   0.061,   0.000,   0.080,   0.000,   0.080,
  0.000,   0.158,   0.000,   0.158,   0.000,   0.000,   0.000,   0.000,
  0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
  0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
  0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
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  0.000,   0.000,   0.000,   0.000,   0.361,   0.095,   0.000,   0.096,
  540,   0.000,   0.059,   0.000,   0.059,   0.000,   0.078,   0.000,   0.077,
  0.000,   0.153,   0.000,   0.153,   0.000,   0.000,   0.000,   0.000,
  0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
  0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
  0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
  0.326,   0.396,   0.000,   0.373,   0.000,   0.000,   0.000,   0.000,
  0.000,   0.000,   0.000,   0.000,   0.326,   0.092,   0.000,   0.093,
  600,   0.000,   0.057,   0.000,   0.057,   0.000,   0.074,   0.000,   0.074,
  0.000,   0.147,   0.000,   0.147,   0.000,   0.000,   0.000,   0.000,
  0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
  0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
  0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
  0.288,   0.389,   0.000,   0.355,   0.000,   0.000,   0.000,   0.000,
  0.000,   0.000,   0.000,   0.000,   0.288,   0.088,   0.000,   0.089,
  660,   0.000,   0.054,   0.000,   0.054,   0.000,   0.071,   0.000,   0.071,
  0.000,   0.140,   0.000,   0.140,   0.000,   0.000,   0.000,   0.000,
  0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
  0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
  0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
  0.247,   0.381,   0.000,   0.336,   0.000,   0.000,   0.000,   0.000,
  0.000,   0.000,   0.000,   0.000,   0.247,   0.084,   0.000,   0.085,
  720,   0.000,   0.051,   0.000,   0.051,   0.000,   0.067,   0.000,   0.067,
  0.000,   0.132,   0.000,   0.132,   0.000,   0.000,   0.000,   0.000,
  0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
  0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
  0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
  0.201,   0.372,   0.000,   0.314,   0.000,   0.000,   0.000,   0.000,
  0.000,   0.000,   0.000,   0.000,   0.201,   0.079,   0.000,   0.080,


Pollutant Name: Carbon Dioxide,,,,Temperature: 64F,,Relative Humidity: ALL

Time,LDA,LDA,LDA,LDA,LDT1,LDT1,LDT1,LDT1,LDT2,LDT2,LDT2,LDT2,MDV,MDV,MDV,MDV,L
HD1,LHD1,LHD1,LHD1,LHD2,LHD2,LHD2,LHD2,MHD,MHD,MHD,MHD,HHD,HHD,HHD,HHD,OBUS,OB
US,OBUS,OBUS,UBUS,UBUS,UBUS,UBUS,MCY,MCY,MCY,MCY,SBUS,SBUS,SBUS,SBUS,MH,MH,MH,
MH,ALL,ALL,ALL,ALL,
 min,NCAT,CAT,DSL,ALL,NCAT,CAT,DSL,ALL,NCAT,CAT,DSL,ALL,NCAT,CAT,DSL,ALL,NCAT,
 CAT,DSL,ALL,NCAT,CAT,DSL,ALL,NCAT,CAT,DSL,ALL,NCAT,CAT,DSL,ALL,NCAT,CAT,DSL,A
 LL,NCAT,CAT,DSL,ALL,NCAT,CAT,DSL,ALL,NCAT,CAT,DSL,ALL,NCAT,CAT,DSL,ALL,NCAT,C
 AT,DSL,ALL,

    5,   0.000,  11.989,   0.000,  11.988,   0.000,  15.093,   0.000,  15.027,
    0.000,  15.389,   0.000,  15.388,   0.000,   0.000,   0.000,   0.000,
    0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
    0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
    0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
    35.953,   1.769,   0.000,  13.265,   0.000,   0.000,   0.000,   0.000,
    0.000,   0.000,   0.000,   0.000,  35.953,  13.234,   0.000,  13.353,
   10,   0.000,  13.446,   0.000,  13.445,   0.000,  16.947,   0.000,  16.874,
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 0.000,  17.282,   0.000,  17.280,   0.000,   0.000,   0.000,   0.000,
 0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
 0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
 0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
 39.014,   3.528,   0.000,  15.462,   0.000,   0.000,   0.000,   0.000,
 0.000,   0.000,   0.000,   0.000,  39.014,  14.868,   0.000,  14.994,
 20,   0.000,  16.852,   0.000,  16.851,   0.000,  21.273,   0.000,  21.181,
 0.000,  21.696,   0.000,  21.695,   0.000,   0.000,   0.000,   0.000,
 0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
 0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
 0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
 44.957,   7.017,   0.000,  19.776,   0.000,   0.000,   0.000,   0.000,
 0.000,   0.000,   0.000,   0.000,  44.957,  18.677,   0.000,  18.813,
 30,   0.000,  20.913,   0.000,  20.912,   0.000,  26.424,   0.000,  26.309,
 0.000,  26.951,   0.000,  26.949,   0.000,   0.000,   0.000,   0.000,
 0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
 0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
 0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
 50.657,  10.466,   0.000,  23.983,   0.000,   0.000,   0.000,   0.000,
 0.000,   0.000,   0.000,   0.000,  50.657,  23.209,   0.000,  23.348,
 40,   0.000,  25.631,   0.000,  25.630,   0.000,  32.398,   0.000,  32.258,
 0.000,  33.046,   0.000,  33.043,   0.000,   0.000,   0.000,   0.000,
 0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
 0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
 0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
 56.117,  13.876,   0.000,  28.082,   0.000,   0.000,   0.000,   0.000,
 0.000,   0.000,   0.000,   0.000,  56.117,  28.462,   0.000,  28.600,
 50,   0.000,  31.005,   0.000,  31.003,   0.000,  39.196,   0.000,  39.027,
 0.000,  39.981,   0.000,  39.978,   0.000,   0.000,   0.000,   0.000,
 0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
 0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
 0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
 61.335,  17.248,   0.000,  32.075,   0.000,   0.000,   0.000,   0.000,
 0.000,   0.000,   0.000,   0.000,  61.335,  34.437,   0.000,  34.567,
 60,   0.000,  37.035,   0.000,  37.033,   0.000,  46.819,   0.000,  46.616,
 0.000,  47.756,   0.000,  47.752,   0.000,   0.000,   0.000,   0.000,
 0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
 0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
 0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
 66.311,  20.580,   0.000,  35.960,   0.000,   0.000,   0.000,   0.000,
 0.000,   0.000,   0.000,   0.000,  66.311,  41.134,   0.000,  41.250,
120,   0.000,  86.412,   0.000,  86.407,   0.000, 109.071,   0.000, 108.600,
0.000, 111.240,   0.000, 111.231,   0.000,   0.000,   0.000,   0.000,
0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
89.732,  35.003,   0.000,  53.409,   0.000,   0.000,   0.000,   0.000,
0.000,   0.000,   0.000,   0.000,  89.732,  95.757,   0.000,  95.665,
180,   0.000,  98.071,   0.000,  98.065,   0.000, 123.809,   0.000, 123.274,
0.000, 126.273,   0.000, 126.262,   0.000,   0.000,   0.000,   0.000,
0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
89.802,  41.353,   0.000,  57.647,   0.000,   0.000,   0.000,   0.000,
0.000,   0.000,   0.000,   0.000,  89.802, 108.705,   0.000, 108.533,
240,   0.000, 109.715,   0.000, 109.709,   0.000, 138.523,   0.000, 137.924,
0.000, 141.280,   0.000, 141.269,   0.000,   0.000,   0.000,   0.000,
0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
89.873,  47.329,   0.000,  61.637,   0.000,   0.000,   0.000,   0.000,
0.000,   0.000,   0.000,   0.000,  89.873, 121.629,   0.000, 121.378,
300,   0.000, 121.343,   0.000, 121.337,   0.000, 153.213,   0.000, 152.550,
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0.000, 156.263,   0.000, 156.250,   0.000,   0.000,   0.000,   0.000,
0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
89.943,  52.929,   0.000,  65.378,   0.000,   0.000,   0.000,   0.000,
0.000,   0.000,   0.000,   0.000,  89.943, 134.531,   0.000, 134.199,
360,   0.000, 132.956,   0.000, 132.949,   0.000, 167.878,   0.000, 167.152,
0.000, 171.220,   0.000, 171.206,   0.000,   0.000,   0.000,   0.000,
0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
90.014,  58.155,   0.000,  68.870,   0.000,   0.000,   0.000,   0.000,
0.000,   0.000,   0.000,   0.000,  90.014, 147.408,   0.000, 146.998,
420,   0.000, 144.554,   0.000, 144.546,   0.000, 182.519,   0.000, 181.729,
0.000, 186.153,   0.000, 186.137,   0.000,   0.000,   0.000,   0.000,
0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
90.084,  63.006,   0.000,  72.113,   0.000,   0.000,   0.000,   0.000,
0.000,   0.000,   0.000,   0.000,  90.084, 160.263,   0.000, 159.773,
480,   0.000, 156.136,   0.000, 156.128,   0.000, 197.135,   0.000, 196.283,
0.000, 201.060,   0.000, 201.043,   0.000,   0.000,   0.000,   0.000,
0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
90.155,  67.483,   0.000,  75.108,   0.000,   0.000,   0.000,   0.000,
0.000,   0.000,   0.000,   0.000,  90.155, 173.094,   0.000, 172.525,
540,   0.000, 167.703,   0.000, 167.694,   0.000, 211.728,   0.000, 210.812,
0.000, 215.941,   0.000, 215.923,   0.000,   0.000,   0.000,   0.000,
0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
90.225,  71.584,   0.000,  77.853,   0.000,   0.000,   0.000,   0.000,
0.000,   0.000,   0.000,   0.000,  90.225, 185.902,   0.000, 185.254,
600,   0.000, 179.254,   0.000, 179.245,   0.000, 226.296,   0.000, 225.317,
0.000, 230.798,   0.000, 230.779,   0.000,   0.000,   0.000,   0.000,
0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
90.296,  75.311,   0.000,  80.350,   0.000,   0.000,   0.000,   0.000,
0.000,   0.000,   0.000,   0.000,  90.296, 198.687,   0.000, 197.960,
660,   0.000, 190.790,   0.000, 190.780,   0.000, 240.840,   0.000, 239.798,
0.000, 245.630,   0.000, 245.609,   0.000,   0.000,   0.000,   0.000,
0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
90.366,  78.663,   0.000,  82.599,   0.000,   0.000,   0.000,   0.000,
0.000,   0.000,   0.000,   0.000,  90.366, 211.448,   0.000, 210.642,
720,   0.000, 202.311,   0.000, 202.300,   0.000, 255.359,   0.000, 254.255,
0.000, 260.436,   0.000, 260.414,   0.000,   0.000,   0.000,   0.000,
0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
90.437,  81.640,   0.000,  84.598,   0.000,   0.000,   0.000,   0.000,
0.000,   0.000,   0.000,   0.000,  90.437, 224.186,   0.000, 223.302,
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Pollutant Name: Sulfur Dioxide,,,,Temperature: 64F,,Relative Humidity: ALL

Time,LDA,LDA,LDA,LDA,LDT1,LDT1,LDT1,LDT1,LDT2,LDT2,LDT2,LDT2,MDV,MDV,MDV,MDV,L
HD1,LHD1,LHD1,LHD1,LHD2,LHD2,LHD2,LHD2,MHD,MHD,MHD,MHD,HHD,HHD,HHD,HHD,OBUS,OB
US,OBUS,OBUS,UBUS,UBUS,UBUS,UBUS,MCY,MCY,MCY,MCY,SBUS,SBUS,SBUS,SBUS,MH,MH,MH,
MH,ALL,ALL,ALL,ALL,

```
min,NCAT,CAT,DSL,ALL,NCAT,CAT,DSL,ALL,NCAT,CAT,DSL,ALL,NCAT,CAT,DSL,ALL,NCAT,
CAT,DSL,ALL,NCAT,CAT,DSL,ALL,NCAT,CAT,DSL,ALL,NCAT,CAT,DSL,ALL,NCAT,CAT,DSL,A
LL,NCAT,CAT,DSL,ALL,NCAT,CAT,DSL,ALL,NCAT,CAT,DSL,ALL,NCAT,CAT,DSL,ALL,NCAT,C
AT,DSL,ALL,

   5,   0.000,   0.000,   0.000,   0.000,   0.116,   0.000,   0.000,   0.000,
   0.116,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
   0.000,   0.000,   0.057,   0.000,   0.000,   0.000,   0.000,   0.000,
   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
  10,   0.000,   0.000,   0.000,   0.000,   0.116,   0.000,   0.000,   0.000,
  0.116,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
  0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
  0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
  0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
  0.001,   0.000,   0.057,   0.000,   0.000,   0.000,   0.000,   0.000,
  0.000,   0.000,   0.000,   0.000,   0.001,   0.000,   0.000,   0.000,
  20,   0.000,   0.000,   0.000,   0.000,   0.116,   0.000,   0.000,   0.000,
  0.116,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
  0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
  0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
  0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
  0.001,   0.000,   0.057,   0.000,   0.000,   0.000,   0.000,   0.000,
  0.000,   0.000,   0.000,   0.000,   0.001,   0.000,   0.000,   0.000,
  30,   0.000,   0.000,   0.000,   0.000,   0.116,   0.000,   0.000,   0.000,
  0.116,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
  0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
  0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
  0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
  0.001,   0.000,   0.057,   0.000,   0.000,   0.000,   0.000,   0.000,
  0.000,   0.000,   0.000,   0.000,   0.001,   0.000,   0.000,   0.000,
  40,   0.000,   0.000,   0.000,   0.000,   0.116,   0.000,   0.000,   0.000,
  0.116,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
  0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
  0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
  0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
  0.001,   0.000,   0.057,   0.000,   0.000,   0.000,   0.000,   0.000,
  0.000,   0.000,   0.000,   0.000,   0.001,   0.000,   0.000,   0.000,
  50,   0.000,   0.000,   0.000,   0.000,   0.116,   0.000,   0.000,   0.000,
  0.116,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
  0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
  0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
  0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
  0.001,   0.000,   0.057,   0.001,   0.000,   0.000,   0.000,   0.000,
  0.000,   0.000,   0.000,   0.000,   0.001,   0.000,   0.000,   0.000,
  60,   0.000,   0.000,   0.000,   0.000,   0.116,   0.000,   0.000,   0.000,
  0.116,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
  0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
  0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
  0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
  0.001,   0.001,   0.057,   0.001,   0.000,   0.000,   0.000,   0.000,
  0.000,   0.000,   0.000,   0.000,   0.001,   0.000,   0.000,   0.000,
 120,   0.000,   0.001,   0.000,   0.001,   0.116,   0.001,   0.000,   0.001,
 0.116,   0.001,   0.000,   0.001,   0.000,   0.000,   0.000,   0.000,
 0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
 0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
 0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
 0.001,   0.001,   0.057,   0.001,   0.000,   0.000,   0.000,   0.000,
 0.000,   0.000,   0.000,   0.000,   0.001,   0.001,   0.000,   0.001,
 180,   0.000,   0.001,   0.000,   0.001,   0.116,   0.001,   0.000,   0.001,
 0.116,   0.001,   0.000,   0.001,   0.000,   0.000,   0.000,   0.000,
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0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
0.001,   0.001,   0.057,   0.001,   0.000,   0.000,   0.000,   0.000,
0.000,   0.000,   0.000,   0.000,   0.001,   0.001,   0.000,   0.001,
240,   0.000,   0.001,   0.000,   0.001,   0.116,   0.001,   0.000,   0.001,
0.116,   0.001,   0.000,   0.001,   0.000,   0.000,   0.000,   0.000,
0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
0.001,   0.001,   0.057,   0.001,   0.000,   0.000,   0.000,   0.000,
0.000,   0.000,   0.000,   0.000,   0.001,   0.001,   0.000,   0.001,
300,   0.000,   0.001,   0.000,   0.001,   0.116,   0.002,   0.000,   0.001,
0.116,   0.002,   0.000,   0.002,   0.000,   0.000,   0.000,   0.000,
0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
0.001,   0.001,   0.057,   0.001,   0.000,   0.000,   0.000,   0.000,
0.000,   0.000,   0.000,   0.000,   0.001,   0.001,   0.000,   0.001,
360,   0.000,   0.001,   0.000,   0.001,   0.116,   0.002,   0.000,   0.002,
0.116,   0.002,   0.000,   0.002,   0.000,   0.000,   0.000,   0.000,
0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
0.001,   0.001,   0.057,   0.001,   0.000,   0.000,   0.000,   0.000,
0.000,   0.000,   0.000,   0.000,   0.001,   0.001,   0.000,   0.001,
420,   0.000,   0.001,   0.000,   0.001,   0.116,   0.002,   0.000,   0.002,
0.116,   0.002,   0.000,   0.002,   0.000,   0.000,   0.000,   0.000,
0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
0.001,   0.001,   0.057,   0.001,   0.000,   0.000,   0.000,   0.000,
0.000,   0.000,   0.000,   0.000,   0.001,   0.002,   0.000,   0.002,
480,   0.000,   0.002,   0.000,   0.002,   0.116,   0.002,   0.000,   0.002,
0.116,   0.002,   0.000,   0.002,   0.000,   0.000,   0.000,   0.000,
0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
0.001,   0.001,   0.057,   0.001,   0.000,   0.000,   0.000,   0.000,
0.000,   0.000,   0.000,   0.000,   0.001,   0.002,   0.000,   0.002,
540,   0.000,   0.002,   0.000,   0.002,   0.116,   0.002,   0.000,   0.002,
0.116,   0.002,   0.000,   0.002,   0.000,   0.000,   0.000,   0.000,
0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
0.001,   0.001,   0.057,   0.001,   0.000,   0.000,   0.000,   0.000,
0.000,   0.000,   0.000,   0.000,   0.001,   0.002,   0.000,   0.002,
600,   0.000,   0.002,   0.000,   0.002,   0.116,   0.002,   0.000,   0.002,
0.116,   0.002,   0.000,   0.002,   0.000,   0.000,   0.000,   0.000,
0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
0.001,   0.001,   0.057,   0.001,   0.000,   0.000,   0.000,   0.000,
0.000,   0.000,   0.000,   0.000,   0.001,   0.002,   0.000,   0.002,
660,   0.000,   0.002,   0.000,   0.002,   0.116,   0.002,   0.000,   0.002,
0.116,   0.002,   0.000,   0.002,   0.000,   0.000,   0.000,   0.000,
0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
0.001,   0.001,   0.057,   0.001,   0.000,   0.000,   0.000,   0.000,
0.000,   0.000,   0.000,   0.000,   0.001,   0.002,   0.000,   0.002,
720,   0.000,   0.002,   0.000,   0.002,   0.116,   0.002,   0.000,   0.002,
0.116,   0.003,   0.000,   0.003,   0.000,   0.000,   0.000,   0.000,
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  0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
  0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
  0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
  0.001,   0.001,   0.057,   0.001,   0.000,   0.000,   0.000,   0.000,
  0.000,   0.000,   0.000,   0.000,   0.001,   0.002,   0.000,   0.002,


Pollutant Name: PM10,,,,Temperature: 64F,,Relative Humidity: ALL

Time,LDA,LDA,LDA,LDA,LDT1,LDT1,LDT1,LDT1,LDT2,LDT2,LDT2,LDT2,MDV,MDV,MDV,MDV,L
HD1,LHD1,LHD1,LHD1,LHD2,LHD2,LHD2,LHD2,MHD,MHD,MHD,MHD,HHD,HHD,HHD,HHD,OBUS,OB
US,OBUS,OBUS,UBUS,UBUS,UBUS,UBUS,MCY,MCY,MCY,MCY,SBUS,SBUS,SBUS,SBUS,MH,MH,MH,
MH,ALL,ALL,ALL,ALL,
 min,NCAT,CAT,DSL,ALL,NCAT,CAT,DSL,ALL,NCAT,CAT,DSL,ALL,NCAT,CAT,DSL,ALL,NCAT,
 CAT,DSL,ALL,NCAT,CAT,DSL,ALL,NCAT,CAT,DSL,ALL,NCAT,CAT,DSL,ALL,NCAT,CAT,DSL,A
 LL,NCAT,CAT,DSL,ALL,NCAT,CAT,DSL,ALL,NCAT,CAT,DSL,ALL,NCAT,CAT,DSL,ALL,NCAT,C
 AT,DSL,ALL,

    5,   0.000,   0.001,   0.000,   0.001,   0.000,   0.001,   0.000,   0.001,
    0.000,   0.001,   0.000,   0.001,   0.000,   0.000,   0.000,   0.000,
    0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
    0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
    0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
    0.020,   0.000,   0.000,   0.007,   0.000,   0.000,   0.000,   0.000,
    0.000,   0.000,   0.000,   0.000,   0.020,   0.001,   0.000,   0.001,
   10,   0.000,   0.001,   0.000,   0.001,   0.000,   0.001,   0.000,   0.001,
   0.000,   0.003,   0.000,   0.003,   0.000,   0.000,   0.000,   0.000,
   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
   0.017,   0.000,   0.000,   0.006,   0.000,   0.000,   0.000,   0.000,
   0.000,   0.000,   0.000,   0.000,   0.017,   0.002,   0.000,   0.002,
   20,   0.000,   0.002,   0.000,   0.002,   0.000,   0.003,   0.000,   0.003,
   0.000,   0.005,   0.000,   0.005,   0.000,   0.000,   0.000,   0.000,
   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
   0.013,   0.001,   0.000,   0.005,   0.000,   0.000,   0.000,   0.000,
   0.000,   0.000,   0.000,   0.000,   0.013,   0.003,   0.000,   0.003,
   30,   0.000,   0.003,   0.000,   0.003,   0.000,   0.004,   0.000,   0.004,
   0.000,   0.008,   0.000,   0.008,   0.000,   0.000,   0.000,   0.000,
   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
   0.010,   0.001,   0.000,   0.004,   0.000,   0.000,   0.000,   0.000,
   0.000,   0.000,   0.000,   0.000,   0.010,   0.005,   0.000,   0.005,
   40,   0.000,   0.004,   0.000,   0.004,   0.000,   0.005,   0.000,   0.005,
   0.000,   0.010,   0.000,   0.010,   0.000,   0.000,   0.000,   0.000,
   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
   0.008,   0.001,   0.000,   0.003,   0.000,   0.000,   0.000,   0.000,
   0.000,   0.000,   0.000,   0.000,   0.008,   0.006,   0.000,   0.006,
   50,   0.000,   0.005,   0.000,   0.005,   0.000,   0.006,   0.000,   0.006,
   0.000,   0.013,   0.000,   0.013,   0.000,   0.000,   0.000,   0.000,
   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
   0.006,   0.002,   0.000,   0.003,   0.000,   0.000,   0.000,   0.000,
   0.000,   0.000,   0.000,   0.000,   0.006,   0.008,   0.000,   0.008,
   60,   0.000,   0.006,   0.000,   0.006,   0.000,   0.007,   0.000,   0.007,
   0.000,   0.015,   0.000,   0.015,   0.000,   0.000,   0.000,   0.000,
   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
```

```
 0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
 0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
 0.005,   0.002,   0.000,   0.003,   0.000,   0.000,   0.000,   0.000,
 0.000,   0.000,   0.000,   0.000,   0.005,   0.009,   0.000,   0.009,
120,   0.000,   0.010,   0.000,   0.010,   0.000,   0.012,   0.000,   0.012,
0.000,   0.025,   0.000,   0.025,   0.000,   0.000,   0.000,   0.000,
0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
0.013,   0.002,   0.000,   0.006,   0.000,   0.000,   0.000,   0.000,
0.000,   0.000,   0.000,   0.000,   0.013,   0.015,   0.000,   0.015,
180,   0.000,   0.012,   0.000,   0.012,   0.000,   0.013,   0.000,   0.013,
0.000,   0.028,   0.000,   0.028,   0.000,   0.000,   0.000,   0.000,
0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
0.020,   0.002,   0.000,   0.008,   0.000,   0.000,   0.000,   0.000,
0.000,   0.000,   0.000,   0.000,   0.020,   0.016,   0.000,   0.016,
240,   0.000,   0.013,   0.000,   0.013,   0.000,   0.014,   0.000,   0.014,
0.000,   0.030,   0.000,   0.030,   0.000,   0.000,   0.000,   0.000,
0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
0.026,   0.002,   0.000,   0.011,   0.000,   0.000,   0.000,   0.000,
0.000,   0.000,   0.000,   0.000,   0.026,   0.018,   0.000,   0.018,
300,   0.000,   0.014,   0.000,   0.014,   0.000,   0.015,   0.000,   0.015,
0.000,   0.032,   0.000,   0.032,   0.000,   0.000,   0.000,   0.000,
0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
0.032,   0.003,   0.000,   0.012,   0.000,   0.000,   0.000,   0.000,
0.000,   0.000,   0.000,   0.000,   0.032,   0.019,   0.000,   0.019,
360,   0.000,   0.015,   0.000,   0.015,   0.000,   0.016,   0.000,   0.016,
0.000,   0.034,   0.000,   0.034,   0.000,   0.000,   0.000,   0.000,
0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
0.037,   0.003,   0.000,   0.014,   0.000,   0.000,   0.000,   0.000,
0.000,   0.000,   0.000,   0.000,   0.037,   0.020,   0.000,   0.020,
420,   0.000,   0.015,   0.000,   0.015,   0.000,   0.017,   0.000,   0.017,
0.000,   0.036,   0.000,   0.036,   0.000,   0.000,   0.000,   0.000,
0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
0.041,   0.003,   0.000,   0.016,   0.000,   0.000,   0.000,   0.000,
0.000,   0.000,   0.000,   0.000,   0.041,   0.021,   0.000,   0.021,
480,   0.000,   0.016,   0.000,   0.016,   0.000,   0.018,   0.000,   0.018,
0.000,   0.037,   0.000,   0.037,   0.000,   0.000,   0.000,   0.000,
0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
0.045,   0.003,   0.000,   0.017,   0.000,   0.000,   0.000,   0.000,
0.000,   0.000,   0.000,   0.000,   0.045,   0.022,   0.000,   0.022,
540,   0.000,   0.016,   0.000,   0.016,   0.000,   0.018,   0.000,   0.018,
0.000,   0.038,   0.000,   0.038,   0.000,   0.000,   0.000,   0.000,
0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
0.047,   0.003,   0.000,   0.018,   0.000,   0.000,   0.000,   0.000,
0.000,   0.000,   0.000,   0.000,   0.047,   0.023,   0.000,   0.023,
600,   0.000,   0.016,   0.000,   0.016,   0.000,   0.019,   0.000,   0.018,
0.000,   0.039,   0.000,   0.039,   0.000,   0.000,   0.000,   0.000,
0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
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  0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
  0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
  0.049,   0.003,   0.000,   0.019,   0.000,   0.000,   0.000,   0.000,
  0.000,   0.000,   0.000,   0.000,   0.049,   0.023,   0.000,   0.023,
  660,   0.000,   0.017,   0.000,   0.017,   0.000,   0.019,   0.000,   0.019,
  0.000,   0.039,   0.000,   0.039,   0.000,   0.000,   0.000,   0.000,
  0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
  0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
  0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
  0.050,   0.003,   0.000,   0.019,   0.000,   0.000,   0.000,   0.000,
  0.000,   0.000,   0.000,   0.000,   0.050,   0.023,   0.000,   0.023,
  720,   0.000,   0.017,   0.000,   0.017,   0.000,   0.019,   0.000,   0.019,
  0.000,   0.039,   0.000,   0.039,   0.000,   0.000,   0.000,   0.000,
  0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
  0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
  0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
  0.051,   0.003,   0.000,   0.019,   0.000,   0.000,   0.000,   0.000,
  0.000,   0.000,   0.000,   0.000,   0.051,   0.023,   0.000,   0.023,
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Title    : Traffic - 2030 Annual Avg San Bernardino
Version  : Emfac2007 V2.3 Nov 1 2006
Run Date : 2009/06/25 12:12:07
Scen Year: 2030 -- All model years in the range 1986 to 2030 selected
Season   : Annual
Area     : San Bernardino
*****************************************************************************
***********
Year:,2030,, -- Model Years,,1986, to ,2030, Inclusive --,,,Annual
     Emfac2007 Emission Factors: V2.3 Nov 1 2006

County Average,,,,, San Bernardino,,,,,,County Average

,,,,Table  4:  Hot Soak Emissions (grams/trip)

Pollutant Name: Total Organic Gases,,,,Temperature: 64F,,Relative Humidity:
ALL

Time,LDA,LDA,LDA,LDA,LDT1,LDT1,LDT1,LDT1,LDT2,LDT2,LDT2,LDT2,MDV,MDV,MDV,MDV,L
HD1,LHD1,LHD1,LHD1,LHD2,LHD2,LHD2,LHD2,MHD,MHD,MHD,MHD,HHD,HHD,HHD,HHD,OBUS,OB
US,OBUS,OBUS,UBUS,UBUS,UBUS,UBUS,MCY,MCY,MCY,MCY,SBUS,SBUS,SBUS,SBUS,MH,MH,MH,
MH,ALL,ALL,ALL,ALL,
 min,NCAT,CAT,DSL,ALL,NCAT,CAT,DSL,ALL,NCAT,CAT,DSL,ALL,NCAT,CAT,DSL,ALL,NCAT,
 CAT,DSL,ALL,NCAT,CAT,DSL,ALL,NCAT,CAT,DSL,ALL,NCAT,CAT,DSL,ALL,NCAT,CAT,DSL,A
 LL,NCAT,CAT,DSL,ALL,NCAT,CAT,DSL,ALL,NCAT,CAT,DSL,ALL,NCAT,CAT,DSL,ALL,NCAT,C
 AT,DSL,ALL,

    5,   0.000,   0.023,   0.000,   0.023,   0.000,   0.028,   0.000,   0.028,
    0.000,   0.038,   0.000,   0.038,   0.000,   0.000,   0.000,   0.000,
    0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
    0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
    0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
    0.000,   0.128,   0.000,   0.085,   0.000,   0.000,   0.000,   0.000,
    0.000,   0.000,   0.000,   0.000,   0.000,   0.029,   0.000,   0.029,
   10,   0.000,   0.042,   0.000,   0.042,   0.000,   0.052,   0.000,   0.052,
   0.000,   0.070,   0.000,   0.070,   0.000,   0.000,   0.000,   0.000,
   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
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   0.001,   0.238,   0.000,   0.158,   0.000,   0.000,   0.000,   0.000,
   0.000,   0.000,   0.000,   0.000,   0.001,   0.054,   0.000,   0.053,
   20,   0.000,   0.072,   0.000,   0.072,   0.000,   0.089,   0.000,   0.089,
   0.000,   0.119,   0.000,   0.119,   0.000,   0.000,   0.000,   0.000,
   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
   0.001,   0.409,   0.000,   0.272,   0.000,   0.000,   0.000,   0.000,
   0.000,   0.000,   0.000,   0.000,   0.001,   0.091,   0.000,   0.091,
   30,   0.000,   0.092,   0.000,   0.092,   0.000,   0.114,   0.000,   0.113,
   0.000,   0.153,   0.000,   0.153,   0.000,   0.000,   0.000,   0.000,
   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
   0.001,   0.531,   0.000,   0.353,   0.000,   0.000,   0.000,   0.000,
   0.000,   0.000,   0.000,   0.000,   0.001,   0.117,   0.000,   0.116,
   40,   0.000,   0.100,   0.000,   0.100,   0.000,   0.123,   0.000,   0.123,
   0.000,   0.165,   0.000,   0.165,   0.000,   0.000,   0.000,   0.000,
   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
   0.002,   0.578,   0.000,   0.384,   0.000,   0.000,   0.000,   0.000,
   0.000,   0.000,   0.000,   0.000,   0.002,   0.127,   0.000,   0.126,
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Hot soak results are scaled to reflect zero emissions for trip lengths of less than 5 minutes (about 25% of in-use trips).

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Title    : Traffic - 2030 Annual Avg San Bernardino
Version  : Emfac2007 V2.3 Nov 1 2006
Run Date : 2009/06/25 12:12:07
Scen Year: 2030 -- All model years in the range 1986 to 2030 selected
Season   : Annual
Area     : San Bernardino
******************************************************************************
***********
Year:,2030,, -- Model Years,,1986, to ,2030, Inclusive --,,,Annual
     Emfac2007 Emission Factors: V2.3 Nov 1 2006

County Average,,,,, San Bernardino,,,,,,County Average

,,,,Table 5a:  Partial Day Diurnal Loss Emissions (grams/hour)

Pollutant Name: Total Organic Gases,,,,Temperature: ALL,,Relative Humidity:
ALL

Temp,LDA,LDA,LDA,LDA,LDT1,LDT1,LDT1,LDT1,LDT2,LDT2,LDT2,LDT2,MDV,MDV,MDV,MDV,L
HD1,LHD1,LHD1,LHD1,LHD2,LHD2,LHD2,LHD2,MHD,MHD,MHD,MHD,HHD,HHD,HHD,HHD,OBUS,OB
US,OBUS,OBUS,UBUS,UBUS,UBUS,UBUS,MCY,MCY,MCY,MCY,SBUS,SBUS,SBUS,SBUS,MH,MH,MH,
MH,ALL,ALL,ALL,ALL,
degF,NCAT,CAT,DSL,ALL,NCAT,CAT,DSL,ALL,NCAT,CAT,DSL,ALL,NCAT,CAT,DSL,ALL,NCAT,
CAT,DSL,ALL,NCAT,CAT,DSL,ALL,NCAT,CAT,DSL,ALL,NCAT,CAT,DSL,ALL,NCAT,CAT,DSL,AL
L,NCAT,CAT,DSL,ALL,NCAT,CAT,DSL,ALL,NCAT,CAT,DSL,ALL,NCAT,CAT,DSL,ALL,NCAT,CAT
,DSL,ALL,

   64,   0.000,   0.025,   0.000,   0.025,   0.000,   0.034,   0.000,   0.033,
   0.000,   0.051,   0.000,   0.051,   0.000,   0.000,   0.000,   0.000,
   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
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   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
   0.000,   0.312,   0.000,   0.207,   0.000,   0.000,   0.000,   0.000,
   0.000,   0.000,   0.000,   0.000,   0.000,   0.043,   0.000,   0.042,
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Title    : Traffic - 2030 Annual Avg San Bernardino
Version  : Emfac2007 V2.3 Nov 1 2006
Run Date : 2009/06/25 12:12:07
Scen Year: 2030 -- All model years in the range 1986 to 2030 selected
Season   : Annual
Area     : San Bernardino
******************************************************************************
***********
Year:,2030,, -- Model Years,,1986, to ,2030, Inclusive --,,,Annual
     Emfac2007 Emission Factors: V2.3 Nov 1 2006

County Average,,,,, San Bernardino,,,,,,County Average

,,,,Table 5b:  Multi-Day Diurnal Loss Emissions (grams/hour)

Pollutant Name: Total Organic Gases,,,,Temperature: ALL,,Relative Humidity:
ALL

Temp,LDA,LDA,LDA,LDA,LDT1,LDT1,LDT1,LDT1,LDT2,LDT2,LDT2,LDT2,MDV,MDV,MDV,MDV,L
HD1,LHD1,LHD1,LHD1,LHD2,LHD2,LHD2,LHD2,MHD,MHD,MHD,MHD,HHD,HHD,HHD,HHD,OBUS,OB
US,OBUS,OBUS,UBUS,UBUS,UBUS,UBUS,MCY,MCY,MCY,MCY,SBUS,SBUS,SBUS,SBUS,MH,MH,MH,
MH,ALL,ALL,ALL,ALL,
degF,NCAT,CAT,DSL,ALL,NCAT,CAT,DSL,ALL,NCAT,CAT,DSL,ALL,NCAT,CAT,DSL,ALL,NCAT,
CAT,DSL,ALL,NCAT,CAT,DSL,ALL,NCAT,CAT,DSL,ALL,NCAT,CAT,DSL,ALL,NCAT,CAT,DSL,AL
L,NCAT,CAT,DSL,ALL,NCAT,CAT,DSL,ALL,NCAT,CAT,DSL,ALL,NCAT,CAT,DSL,ALL,NCAT,CAT
,DSL,ALL,

   64,   0.000,   0.002,   0.000,   0.002,   0.000,   0.002,   0.000,   0.002,
   0.000,   0.004,   0.000,   0.004,   0.000,   0.000,   0.000,   0.000,
   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
   0.000,   0.029,   0.000,   0.020,   0.000,   0.000,   0.000,   0.000,
   0.000,   0.000,   0.000,   0.000,   0.000,   0.003,   0.000,   0.003,
```

```
Title    : Traffic - 2030 Annual Avg San Bernardino
Version  : Emfac2007 V2.3 Nov 1 2006
Run Date : 2009/06/25 12:12:07
Scen Year: 2030 -- All model years in the range 1986 to 2030 selected
Season   : Annual
Area     : San Bernardino
******************************************************************************
***********
Year:,2030,, -- Model Years,,1986, to ,2030, Inclusive --,,,Annual
     Emfac2007 Emission Factors: V2.3 Nov 1 2006

County Average,,,,, San Bernardino,,,,,,County Average

,,,,Table 6a:  Partial Day Resting Loss Emissions (grams/hour)
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Pollutant Name: Total Organic Gases,,,,Temperature: ALL,,Relative Humidity:
ALL

Temp,LDA,LDA,LDA,LDA,LDT1,LDT1,LDT1,LDT1,LDT2,LDT2,LDT2,LDT2,MDV,MDV,MDV,MDV,L
HD1,LHD1,LHD1,LHD1,LHD2,LHD2,LHD2,LHD2,MHD,MHD,MHD,MHD,HHD,HHD,HHD,HHD,OBUS,OB
US,OBUS,OBUS,UBUS,UBUS,UBUS,UBUS,MCY,MCY,MCY,MCY,SBUS,SBUS,SBUS,SBUS,MH,MH,MH,
MH,ALL,ALL,ALL,ALL,
degF,NCAT,CAT,DSL,ALL,NCAT,CAT,DSL,ALL,NCAT,CAT,DSL,ALL,NCAT,CAT,DSL,ALL,NCAT,
CAT,DSL,ALL,NCAT,CAT,DSL,ALL,NCAT,CAT,DSL,ALL,NCAT,CAT,DSL,ALL,NCAT,CAT,DSL,AL
L,NCAT,CAT,DSL,ALL,NCAT,CAT,DSL,ALL,NCAT,CAT,DSL,ALL,NCAT,CAT,DSL,ALL,NCAT,CAT
,DSL,ALL,

   64,   0.000,   0.015,   0.000,   0.015,   0.000,   0.020,   0.000,   0.020,
   0.000,   0.033,   0.000,   0.033,   0.000,   0.000,   0.000,   0.000,
   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
   0.000,   0.111,   0.000,   0.074,   0.000,   0.000,   0.000,   0.000,
   0.000,   0.000,   0.000,   0.000,   0.000,   0.024,   0.000,   0.023,
```

```
Title    : Traffic - 2030 Annual Avg San Bernardino
Version  : Emfac2007 V2.3 Nov 1 2006
Run Date : 2009/06/25 12:12:07
Scen Year: 2030 -- All model years in the range 1986 to 2030 selected
Season   : Annual
Area     : San Bernardino
*****************************************************************************
***********
Year:,2030,, -- Model Years,,1986, to ,2030, Inclusive --,,,Annual
     Emfac2007 Emission Factors: V2.3 Nov 1 2006

County Average,,,,, San Bernardino,,,,,,County Average

,,,,Table 6b:  Multi-Day Resting Loss Emissions (grams/hour)

Pollutant Name: Total Organic Gases,,,,Temperature: ALL,,Relative Humidity:
ALL

Temp,LDA,LDA,LDA,LDA,LDT1,LDT1,LDT1,LDT1,LDT2,LDT2,LDT2,LDT2,MDV,MDV,MDV,MDV,L
HD1,LHD1,LHD1,LHD1,LHD2,LHD2,LHD2,LHD2,MHD,MHD,MHD,MHD,HHD,HHD,HHD,HHD,OBUS,OB
US,OBUS,OBUS,UBUS,UBUS,UBUS,UBUS,MCY,MCY,MCY,MCY,SBUS,SBUS,SBUS,SBUS,MH,MH,MH,
MH,ALL,ALL,ALL,ALL,
degF,NCAT,CAT,DSL,ALL,NCAT,CAT,DSL,ALL,NCAT,CAT,DSL,ALL,NCAT,CAT,DSL,ALL,NCAT,
CAT,DSL,ALL,NCAT,CAT,DSL,ALL,NCAT,CAT,DSL,ALL,NCAT,CAT,DSL,ALL,NCAT,CAT,DSL,AL
L,NCAT,CAT,DSL,ALL,NCAT,CAT,DSL,ALL,NCAT,CAT,DSL,ALL,NCAT,CAT,DSL,ALL,NCAT,CAT
,DSL,ALL,

   64,   0.000,   0.001,   0.000,   0.001,   0.000,   0.001,   0.000,   0.001,
   0.000,   0.002,   0.000,   0.002,   0.000,   0.000,   0.000,   0.000,
   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
   0.000,   0.011,   0.000,   0.007,   0.000,   0.000,   0.000,   0.000,
   0.000,   0.000,   0.000,   0.000,   0.000,   0.002,   0.000,   0.002,
```

```
Title    : Traffic - 2030 Annual Avg San Bernardino
Version  : Emfac2007 V2.3 Nov 1 2006
Run Date : 2009/06/25 12:12:07
Scen Year: 2030 -- All model years in the range 1986 to 2030 selected
Season   : Annual
Area     : San Bernardino
******************************************************************************
***********
Year:,2030,, -- Model Years,,1986, to ,2030, Inclusive --,,,Annual
     Emfac2007 Emission Factors: V2.3 Nov 1 2006

County Average,,,,, San Bernardino,,,,,,County Average

,,,,Table  7:  Estimated Travel Fractions

Pollutant Name: ,,,,Temperature: ALL,,Relative Humidity: ALL

,LDA,LDA,LDA,LDA,LDT1,LDT1,LDT1,LDT1,LDT2,LDT2,LDT2,LDT2,MDV,MDV,MDV,MDV,LHD1,
LHD1,LHD1,LHD1,LHD2,LHD2,LHD2,LHD2,MHD,MHD,MHD,MHD,HHD,HHD,HHD,HHD,OBUS,OBUS,O
BUS,OBUS,UBUS,UBUS,UBUS,UBUS,MCY,MCY,MCY,MCY,SBUS,SBUS,SBUS,SBUS,MH,MH,MH,MH,A
LL,ALL,ALL,ALL,
,NCAT,CAT,DSL,ALL,NCAT,CAT,DSL,ALL,NCAT,CAT,DSL,ALL,NCAT,CAT,DSL,ALL,NCAT,CAT,
DSL,ALL,NCAT,CAT,DSL,ALL,NCAT,CAT,DSL,ALL,NCAT,CAT,DSL,ALL,NCAT,CAT,DSL,ALL,NC
AT,CAT,DSL,ALL,NCAT,CAT,DSL,ALL,NCAT,CAT,DSL,ALL,NCAT,CAT,DSL,ALL,NCAT,CAT,DSL
,ALL,

%VMT,   0.000,   0.564,   0.000,   0.564,   0.000,   0.137,   0.000,   0.138,
0.000,   0.286,   0.000,   0.286,   0.000,   0.000,   0.000,   0.000,   0.000,
0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
0.000,   0.000,   0.000,   0.000,   0.000,   0.004,   0.009,   0.000,   0.013,
0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.004,
0.995,   0.001,   1.000,
%TRIP,   0.000,   0.575,   0.000,   0.575,   0.000,   0.127,   0.001,   0.128,
0.000,   0.281,   0.000,   0.281,   0.000,   0.000,   0.000,   0.000,   0.000,
0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
0.000,   0.000,   0.000,   0.000,   0.000,   0.006,   0.011,   0.000,   0.017,
0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.006,
0.994,   0.001,   1.000,
%VEH,   0.000,   0.553,   0.000,   0.553,   0.000,   0.124,   0.001,   0.125,
0.000,   0.273,   0.000,   0.273,   0.000,   0.000,   0.000,   0.000,   0.000,
0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
0.000,   0.000,   0.000,   0.000,   0.000,   0.017,   0.033,   0.000,   0.050,
0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.017,
0.983,   0.001,   1.000,
```


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Title    : Traffic - 2030 Annual Avg San Bernardino
Version  : Emfac2007 V2.3 Nov 1 2006
Run Date : 2009/06/25 12:12:07
Scen Year: 2030 -- All model years in the range 1986 to 2030 selected
Season   : Annual
Area     : San Bernardino
******************************************************************************
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***********
Year:,2030,, -- Model Years,,1986, to ,2030, Inclusive --,,,Annual
     Emfac2007 Emission Factors: V2.3 Nov 1 2006

County Average,,,,, San Bernardino,,,,,,County Average

,,,,Table  8:  Evaporative Running Loss Emissions (grams/minute)

Pollutant Name: Total Organic Gases,,,,Temperature: 64F,,Relative Humidity:
ALL

Time,LDA,LDA,LDA,LDA,LDT1,LDT1,LDT1,LDT1,LDT2,LDT2,LDT2,LDT2,MDV,MDV,MDV,MDV,L
HD1,LHD1,LHD1,LHD1,LHD2,LHD2,LHD2,LHD2,MHD,MHD,MHD,MHD,HHD,HHD,HHD,HHD,OBUS,OB
US,OBUS,OBUS,UBUS,UBUS,UBUS,UBUS,MCY,MCY,MCY,MCY,SBUS,SBUS,SBUS,SBUS,MH,MH,MH,
MH,ALL,ALL,ALL,ALL,
 min,NCAT,CAT,DSL,ALL,NCAT,CAT,DSL,ALL,NCAT,CAT,DSL,ALL,NCAT,CAT,DSL,ALL,NCAT,
 CAT,DSL,ALL,NCAT,CAT,DSL,ALL,NCAT,CAT,DSL,ALL,NCAT,CAT,DSL,ALL,NCAT,CAT,DSL,A
 LL,NCAT,CAT,DSL,ALL,NCAT,CAT,DSL,ALL,NCAT,CAT,DSL,ALL,NCAT,CAT,DSL,ALL,NCAT,C
 AT,DSL,ALL,

    1,   0.000,   0.009,   0.000,   0.009,   0.000,   0.148,   0.000,   0.148,
    0.000,   0.220,   0.000,   0.220,   0.000,   0.000,   0.000,   0.000,
    0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
    0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
    0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
    0.000,   0.005,   0.000,   0.004,   0.000,   0.000,   0.000,   0.000,
    0.000,   0.000,   0.000,   0.000,   0.000,   0.089,   0.000,   0.088,
    2,   0.000,   0.007,   0.000,   0.007,   0.000,   0.076,   0.000,   0.076,
    0.000,   0.113,   0.000,   0.113,   0.000,   0.000,   0.000,   0.000,
    0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
    0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
    0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
    0.000,   0.054,   0.000,   0.036,   0.000,   0.000,   0.000,   0.000,
    0.000,   0.000,   0.000,   0.000,   0.000,   0.047,   0.000,   0.047,
    3,   0.000,   0.008,   0.000,   0.008,   0.000,   0.054,   0.000,   0.054,
    0.000,   0.079,   0.000,   0.079,   0.000,   0.000,   0.000,   0.000,
    0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
    0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
    0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
    0.000,   0.079,   0.000,   0.053,   0.000,   0.000,   0.000,   0.000,
    0.000,   0.000,   0.000,   0.000,   0.000,   0.036,   0.000,   0.035,
    4,   0.000,   0.010,   0.000,   0.010,   0.000,   0.045,   0.000,   0.044,
    0.000,   0.064,   0.000,   0.064,   0.000,   0.000,   0.000,   0.000,
    0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
    0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
    0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
    0.000,   0.094,   0.000,   0.063,   0.000,   0.000,   0.000,   0.000,
    0.000,   0.000,   0.000,   0.000,   0.000,   0.031,   0.000,   0.031,
    5,   0.000,   0.011,   0.000,   0.011,   0.000,   0.039,   0.000,   0.039,
    0.000,   0.054,   0.000,   0.054,   0.000,   0.000,   0.000,   0.000,
    0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
    0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
    0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
    0.000,   0.103,   0.000,   0.069,   0.000,   0.000,   0.000,   0.000,
    0.000,   0.000,   0.000,   0.000,   0.000,   0.028,   0.000,   0.028,
   10,   0.000,   0.014,   0.000,   0.014,   0.000,   0.028,   0.000,   0.028,
   0.000,   0.037,   0.000,   0.037,   0.000,   0.000,   0.000,   0.000,
   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
   0.000,   0.121,   0.000,   0.081,   0.000,   0.000,   0.000,   0.000,
   0.000,   0.000,   0.000,   0.000,   0.000,   0.024,   0.000,   0.023,
   15,   0.000,   0.015,   0.000,   0.015,   0.000,   0.025,   0.000,   0.025,
```

```
0.000,   0.032,   0.000,   0.032,   0.000,   0.000,   0.000,   0.000,
0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
0.000,   0.125,   0.000,   0.084,   0.000,   0.000,   0.000,   0.000,
0.000,   0.000,   0.000,   0.000,   0.000,   0.022,   0.000,   0.022,
20,   0.000,   0.015,   0.000,   0.015,   0.000,   0.024,   0.000,   0.024,
0.000,   0.031,   0.000,   0.031,   0.000,   0.000,   0.000,   0.000,
0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
0.001,   0.127,   0.000,   0.085,   0.000,   0.000,   0.000,   0.000,
0.000,   0.000,   0.000,   0.000,   0.001,   0.022,   0.000,   0.022,
25,   0.000,   0.015,   0.000,   0.015,   0.000,   0.023,   0.000,   0.023,
0.000,   0.030,   0.000,   0.030,   0.000,   0.000,   0.000,   0.000,
0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
0.001,   0.127,   0.000,   0.085,   0.000,   0.000,   0.000,   0.000,
0.000,   0.000,   0.000,   0.000,   0.001,   0.022,   0.000,   0.021,
30,   0.000,   0.015,   0.000,   0.015,   0.000,   0.023,   0.000,   0.023,
0.000,   0.030,   0.000,   0.030,   0.000,   0.000,   0.000,   0.000,
0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
0.001,   0.125,   0.000,   0.084,   0.000,   0.000,   0.000,   0.000,
0.000,   0.000,   0.000,   0.000,   0.001,   0.021,   0.000,   0.021,
35,   0.000,   0.015,   0.000,   0.015,   0.000,   0.023,   0.000,   0.023,
0.000,   0.029,   0.000,   0.029,   0.000,   0.000,   0.000,   0.000,
0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
0.001,   0.123,   0.000,   0.083,   0.000,   0.000,   0.000,   0.000,
0.000,   0.000,   0.000,   0.000,   0.001,   0.021,   0.000,   0.021,
40,   0.000,   0.015,   0.000,   0.015,   0.000,   0.023,   0.000,   0.022,
0.000,   0.029,   0.000,   0.029,   0.000,   0.000,   0.000,   0.000,
0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
0.001,   0.122,   0.000,   0.082,   0.000,   0.000,   0.000,   0.000,
0.000,   0.000,   0.000,   0.000,   0.001,   0.021,   0.000,   0.021,
45,   0.000,   0.015,   0.000,   0.015,   0.000,   0.022,   0.000,   0.022,
0.000,   0.029,   0.000,   0.029,   0.000,   0.000,   0.000,   0.000,
0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
0.001,   0.121,   0.000,   0.081,   0.000,   0.000,   0.000,   0.000,
0.000,   0.000,   0.000,   0.000,   0.001,   0.021,   0.000,   0.021,
50,   0.000,   0.015,   0.000,   0.015,   0.000,   0.022,   0.000,   0.022,
0.000,   0.029,   0.000,   0.029,   0.000,   0.000,   0.000,   0.000,
0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
0.001,   0.119,   0.000,   0.080,   0.000,   0.000,   0.000,   0.000,
0.000,   0.000,   0.000,   0.000,   0.001,   0.021,   0.000,   0.021,
55,   0.000,   0.015,   0.000,   0.015,   0.000,   0.022,   0.000,   0.022,
0.000,   0.028,   0.000,   0.028,   0.000,   0.000,   0.000,   0.000,
0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
0.001,   0.118,   0.000,   0.079,   0.000,   0.000,   0.000,   0.000,
0.000,   0.000,   0.000,   0.000,   0.001,   0.020,   0.000,   0.020,
60,   0.000,   0.014,   0.000,   0.014,   0.000,   0.022,   0.000,   0.022,
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0.000,   0.028,   0.000,   0.028,   0.000,   0.000,   0.000,   0.000,
0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,   0.000,
0.001,   0.117,   0.000,   0.078,   0.000,   0.000,   0.000,   0.000,
0.000,   0.000,   0.000,   0.000,   0.001,   0.020,   0.000,   0.020,
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Appendix E:

Life Cycle Greenhouse Gas Emissions from Building materials

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Life Cycle Greenhouse Gas Emissions from Building Materials

Prepared for:
Lytle Development Company
Ontario, California

Prepared by:
ENVIRON International Corporation
San Francisco, California

Date:
September 28, 2009

Project Number:
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ENVIRON

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Acronyms

AP-42	Compilation of Air Pollutant Emission Factors
$CaCO_3$	limestone
CaO	calcium oxide
CCAR	California Climate Action Registry
CO_2	carbon dioxide
CO_2e	carbon dioxide equivalent
DOE	Department of Energy
EERE	Energy Efficiency and Renewable Energy
EIA	Energy Information Administration
ENVIRON	ENVIRON International Corporation
ft^2	square feet
GHG	greenhouse gas
GRP	General Reporting Protocol
kWh/m^2	kilowatt hour per square meter
LCA	life cycle analyses
LCR	Lytle Creek Ranch
MMBTU	million British thermal units

EXECUTIVE SUMMARY

This report evaluates the life cycle greenhouse gas (GHG) emissions associated with the building materials used in the construction of the Lytle Creek Ranch development. The life cycle GHG emissions include the embodied energy from the materials manufacture and the energy used to transport those materials to the site. This report then compares the life cycle GHG emissions to the overall annual operational emissions of Lytle Creek Ranch. The materials analyzed in this report include materials for 1) residential and non-residential buildings and 2) site infrastructure. This report calculates the overall life cycle emissions from construction materials to be 1,044 – 8,881 tonnes per year, or 1 – 9% of the overall Lytle Creek Ranch project emissions.

ENVIRON estimated the life cycle GHG emissions for buildings by conducting an analysis of available literature on life cycle analyses (LCA) for buildings. According to these studies, approximately 75 - 97% of GHG emissions from buildings are associated with energy usage during the operational phase; the other 3 - 25% of the GHG emissions are due to material manufacture and transport. Using the GHG emissions from the operation of Lytle Creek Ranch buildings, 3% to 25% corresponds to 802 – 8,639 tonnes CO_2 per year or 0.8 – 8.8% of Lytle Creek Ranch project emissions.

ENVIRON calculated the life cycle GHG emissions for infrastructure (roads, storm drains, utilities, gas, electricity, cable) to be equal to a one time emission of 9,688 tonnes CO_2. This analysis considered the manufacture and transport of concrete and asphalt. Based on this analysis, the manufacture of the materials leads to 9,549 tonnes of emissions, and the transport of the materials leads to 140 tonnes of CO_2 emissions. Although Lytle Creek Ranch estimates the need for volume of asphalt approximately three times higher than that of concrete, the majority of the emissions for infrastructure result from the manufacture of concrete because of the higher CO_2 emission factor associated with this process. Because the asphalt and concrete are locally sourced, the transportation emissions are relatively small. If a 40 year lifespan of the infrastructure is assumed, the total annualized emissions are 242 tonnes per year or 0.2% of Lytle Creek Ranch project emissions.

The overall life cycle emissions from embodied energy in Lytle Creek Ranch building materials, annualized by 40 years, are 1,044 – 8,881 tonnes CO_2 per year. This represents 1 – 9% of the annualized GHG emissions from the Lytle Creek Ranch project. The bulk of these emissions (77% – 97% of the LCA emissions) are based on general life cycle analysis studies and do not reflect the design features of Lytle Creek Ranch. Aspects of the project will tend to drive the life cycle emissions towards the lower end of the range; one example is the emphasis on the use of local construction materials.

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1 Introduction

This report evaluates the life cycle greenhouse gas (GHG) emissions associated with the building materials used in the construction of the Lytle Creek Ranch development. The life cycle GHG emissions include the embodied energy from the materials manufacture and the energy used to transport those materials to the site. This report then compares the life cycle GHG emissions to the overall annual operational emissions of Lytle Creek Ranch. The materials analyzed in this report include materials for 1) residential and non-residential buildings and 2) site infrastructure.

1.1 Background on Life Cycle Analysis

LCA is a method developed to evaluate the mass balance of inputs and outputs of systems and to organize and convert those inputs and outputs into environmental themes or categories. In this case, the LCA is related to GHG emissions associated with the different stages of a life cycle. The LCA field is still relatively new, and while there are general standards for goals and general practices for LCAs[1] the specific methodologies and, in particular, the boundaries chosen for the LCA makes inter-comparison of various studies difficult. Simple choices such as the useful life of a building or road, for example, can change the LCA outcome substantially. Additionally, the geographic location, climatic zone and building type significantly influence patterns of energy consumption (and energy efficiency) and therefore determine life cycle GHG emissions, which makes comparisons among different studies difficult.

The calculations and results presented in this report are estimates and should be used only for a general comparison to the overall GHG emissions estimated in the Climate Change Section of the Draft EIR for Lytle Creek Ranch. LCA emissions vary based on input assumptions and assessment boundaries (e.g., how far back to trace the origin of a material). Assumptions made in this report are generally conservative. However, due to the open-ended nature of LCAs, the analysis is not exact and may be highly uncertain.

2 Emissions Estimates

2.1 Life Cycle GHG Emissions from Building Materials

ENVIRON estimated the life cycle GHG emissions for building materials by conducting an analysis of available literature on life cycle analyses (LCA) for buildings. According to these studies, approximately 75 - 97% of GHG emissions from buildings are associated with energy usage during the operational phase; the other 3 - 25% of the GHG emissions are due to building material manufacture and transport. Based on the GHG emissions from the operation of Lytle Creek Ranch buildings[2], 3% to 25% corresponds to 802 – 8,639 tonnes CO_2 per year, as shown in Table 1. The specific LCA studies used are discussed in the next section.

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[1] ISO 14044 and ISO 14040

[2] Climate Change Technical Report: Lytle Creek Ranch. July 2009.

With the current energy generation mix in the US which relies heavily on fossil fuel based sources, focusing on energy efficiency measures (which ultimately reduces lifetime GHG emissions) is more effective in reducing the overall GHG footprint than focusing on materials with low embodied energy. As the energy generation measures reduce their GHG intensity (shift away from fossil fuel to renewable fuels), material selection will be a more critical factor in a building's GHG emissions over its life cycle.

2.1.1 LCA Studies for Buildings

The LCA literature studies tend to compare the energy used to make and transport building materials, or the embodied energy, with the operational energy use. In this manner, the relative importance of the embodied energy can be assessed. ENVIRON discusses several studies that compare the embodied energy and the operational energy.

A life cycle assessment of a 66,000 ft^2 sustainably-designed university building[3] in the US Mid-west[4] estimated that the GHG emissions associated with its energy use over a 100-year time horizon to be 135,000 metric tones of carbon dioxide equivalent (CO_2e), 96.5% of which result from operations phase activities, 3% from material production (of which ⅓ is cement production) and 0.5% from transportation and decommissioning combined. The study also notes that the GHG emissions closely matches the distribution of life cycle energy distributions, indicating that operational energy requirements are the key factor determining overall GHG emissions, especially when considering fossil fuel based energy generation. This building has a longer estimated life than Lytle Creek Ranch buildings, which would lead to a lower comparison of embodied energy to operational energy.

A study of single-family homes in the US Mid-west,[5] one built using standard construction techniques and the second incorporating energy efficiency measures, reached similar conclusions. Over the life cycle of the homes (assumed to be 50 years), the conventional home uses 15,000 MMBTU and the energy efficient configuration uses 6,000 MMBTU of energy, representing a 60% reduction in overall energy. As GHG emissions closely match the distribution of life cycle energy distributions, the energy efficient variant resulted in 63% fewer emissions. Of the total energy use over the structure's life cycle, 91% of the conventional house total energy results from energy consumed in the use stage (e.g., operating energy). This value drops to 74% in the energy efficient home as the energy embodied in the building materials stays the same or is slightly higher than that in the conventional home and operating energy is reduced.

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[3] Includes 4 floors of classroom and open-plan offices and 3 floors of hotel rooms, in this evaluation used as a surrogate for a generic commercial structure.

[4] Scheuer, C., G.A. Keoleian, and P. Reppe. (2003) Life cycle energy and environmental performance of a new university building: Modeling challenges and design implications. *Energy and Buildings*, **35**(10): p. 1049.

[5] Keoleian, G.A., S. Blanchard, and P. Reppe. (2000) Life-cycle energy, costs, and strategies for improving a single-family house. *Journal of Industrial Ecology*, **4**(2): p. 135.

Similarly, a review of 60 case studies of homes from nine European countries in a variety of climates[6] indicated that operating energy represents the largest part of energy demand by a building during its life cycle. In one evaluation the operating energy is reported as between 92 - 95% for conventional construction and 72 - 90% for low-energy buildings[7] (which are also consistent with other literature references[8]). Sartori and Hestnes[6] also note that buildings constructed with energy efficiency measures may have a higher energy (and concomitant GHG emissions) embodied by the materials used in construction (e.g., more insulation, higher thermal mass), but over the lifespan of the building the overall energy use (operating and embodied energy) is dramatically lower due to the large reductions in operating energy. As an example, the embodied energy was estimated to be 1171 kWh/m^2 for a conventional house and 1391 kWh/m^2 for a passive, energy efficient home, an increase of 220 kWh/m^2 or 19%. Over the lifetime of the building, however, the total energy (operating and embodied) of the conventional house was approximately 22,500 kWh/m^2, while the passive house was roughly 5,500 kWh/m^2, a four-fold decrease in the total energy over an assumed 80 year life cycle.

2.1.2 Energy Efficiency vs. Embodied Energy in Buildings

From our analysis of these assessments, we note the following major conclusions:

- To minimize GHG lifetime emissions, optimization of energy efficiency (both thermal and electrical) for the operational phase of a building should be the primary emphasis for design, especially when the energy supplied is generated from fossil fuel sources.
- Passive design measures such as the orientation of structure to maximize solar heating and daylighting as well as natural ventilation; heavy construction to increase the thermal mass of the structure with materials that have a high capacity for absorbing heat and change temperature slowly; and solar control like window shading[9] should be emphasized[10,11,12] as they have a negligible increase in embodied energy (GHG emissions from material production) and can reduce total energy substantially.[13]
- Active energy efficiency measures (e.g., mechanical ventilation, artificial cooling, free cooling) may as much as double the embodied energy of the structure, but can halve overall energy usage.

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[6] Sartori, I. and A.G. Hestnes. (2007) Energy use in the life cycle of conventional and low-energy buildings: A review article. *Energy and Buildings*, **39**(3): p. 249.

[7] Winther, B.N. and A.G. Hestnes. (1999) Solar versus green: The analysis of a Norwegian row house. *Solar Energy*, **66**(6): p. 387.

[8] Adalberth, K., A. Almgren, and E.H. Petersen. (2001) Life Cycle Assessment of Four Multi-Family Buildings. *International Journal of Low Energy and Sustainable Buildings*, **2**.

[9] United Nations Environment Program 2007 Buildings and Climate Change report whole-house system measures are recommended for the Mediterranean and desert climate zones.

[10] Browning, W.D. and J.J. Romm. (1998) *Greening the Building and the Bottom Line*. Snowmass, Colorado: Rocky Mountain Institute.

[11] United Nations Environment Program. (2007) *Buildings and Climate Change: Status, Challenges and Opportunities.*

[12] US Department of Energy Building Technologies Program. (2007) www.eere.energy.gov/buildings/. October.

[13] Sartori, I. and A.G. Hestnes. (2007) Energy use in the life cycle of conventional and low-energy buildings: A review article. *Energy and Buildings*, **39**(3): p. 249.

- With the current energy generation mix in the US which relies heavily on fossil fuel based sources, focusing on energy efficiency measures (which ultimately reduces lifetime GHG emissions) is more effective in reducing the overall GHG footprint than focusing on materials with low embodied energy. As the energy generation measures reduce their GHG intensity (shift away from fossil fuel to renewable), material selection will be a more critical factor in a building's GHG emissions over its life cycle.

One cannot evaluate the life cycle emissions of a building product independent of the impact that the building product has on energy use. For example, studies that evaluate the relative embodied energy and GHG emissions associated with the production of structural materials such as steel, concrete or wood generally indicate that the wood products have the lowest GHG emissions as it is produced from a renewable resource that may actually remove CO_2 during its production phase and sequester it during its use phase.[14,15] However, these studies do not account for the effect of the material on overall building energy efficiency, which is often heavily dependent on the climate in which the building is located. In desert climates, the thermal mass of the structure is important for energy savings, as the thermal mass cools at night and keep the house cool during the day during hot weather and conversely heats during the day keeps the house warm during the evening during cool weather. To increase thermal mass, concrete is much more effective than wood. In other types of climates (cooler with less solar heating), wood with insulation has a greater impact at improving overall building efficiency.

For some building products or systems, the net energy savings during the operational portion of the building's life cycle are comparable. If this is the case, then the alternative with the lowest embodied GHG emissions will result in the lowest life cycle GHG emissions.

Building materials with high replacement rates, like carpeting and wiring, can often have a high contribution to the overall GHG emissions as their impact is dependent on renovation schedules. For example, if two building materials have the same embodied energy but one is replaced every 5 years and the second is replaced every 25 years then the first will have five times the embodied energy over the lifetime of the building. As such Scheuer et al.[16] indicate that "[d]esign strategies that maximize the service life of building materials should be maximized." These strategies include designing the structure for minimal material use and choosing materials with low embodied energy, high recycled content, and long life spans.

From our analysis of these product or system specific assessments, we note the following major conclusions:

- Products or systems which have the greatest impact in improving overall building energy efficiency over the building's life cycle should be selected to minimize life cycle GHG

[14] Borjesson, P. and L. Gustavsson. (2000) Greenhouse gas balances in building construction: Wood versus concrete from life-cycle and forest land-use perspectives. *Energy Policy*, **28**(9): p. 575.
[15] Lenzen, M. and G. Treloar. (2002) Embodied energy in buildings: Wood versus concrete - Reply to Borjesson and Gustavsson. *Energy Policy*, **30**(3): p. 249.
[16] Scheuer, C., G.A. Keoleian, and P. Reppe. (2003) Life cycle energy and environmental performance of a new university building: Modeling challenges and design implications. *Energy and Buildings*, **35**(10): p. 1049.

emissions. These alternatives may not necessarily have the lowest embodied GHG emissions.

- When evaluating products or systems that have similar impacts on overall building energy efficiency, alternatives with the lowest embodied GHG emissions should be selected to minimize GHG emissions.
- Materials with high replacement rates (e.g., carpeting, wiring) tend to have higher embodied energy due to their short life cycle, therefore minimizing embodied GHG emissions is most critical for these types of products or systems to minimize overall GHG emissions. Materials with low replacement rates (e.g., piping, air ducts) tend to have lower embodied energy over the life cycle of the building, therefore differences in overall GHG emissions between several alternatives are likely to be small.

2.2 GHG Emissions from Manufacture of Infrastructure Materials

ENVIRON evaluated the embodied energies of materials likely to be found in the infrastructure (roads, storm drains, utilities, gas, electricity, cable) of the Lytle Creek Ranch development. The embodied energies of different materials vary based upon the transportation distance and manufacturing processes. A material that is locally-sourced may require a large amount of energy to be produced and, on the contrary, a material with a relatively low energy intensity may be sourced from farther away. ENVIRON assumed that concrete and asphalt will be among the dominant materials used in the infrastructure and estimated the embodied energies of these two materials. The manufacture of these materials results in overall CO_2 emissions of 9,549 tonnes. Although asphalt is predicted to be used in higher quantities than concrete, 80% of these emissions (7,636 tonnes) result from the manufacture of concrete because the CO_2 emission factor of concrete is over fifty times that of asphalt.

2.2.1 Embodied Energy in Concrete Production

Concrete is composed primarily of cement, water, and aggregate such as sand and gravel, with small amounts of chemical admixtures. A typical concrete mix contains approximately 15% cement by volume.[17] Because the remaining 85% of concrete is composed of water and aggregate, ENVIRON assumed that all of the manufacture-related embodied energy in concrete stems from the production of cement.

There are two main sources of CO_2 emissions from the production of cement: “calcining” emissions and fossil fuel combustion emissions. Calcining emissions result from the chemical conversion of limestone ($CaCO_3$) to calcium oxide (CaO) and carbon dioxide (CO_2). CaO is a precursor to cement and CO_2 is released to the atmosphere. The emissions from fossil fuel combustion vary based on fuel type, but in general slightly more than half of the emissions

[17] Portland Cement Association. Cement and Concrete Basics. http://www.cement.org/basics/concretebasics_concretebasics.asp

associated with cement production are attributed to calcining emissions and the remainder result from fossil fuel combustion.[18]

ENVIRON used three sources to estimate CO_2 emission factors for the production of cement. The Energy Information Administration (EIA)[19] and AP-42[20] estimate that 0.5 tonnes of CO_2 are emitted from the calcining process for every 1 tonne of cement produced. AP-42 also provides a range (0.75 – 1.19 tonnes CO_2 / tonne cement) of total CO_2 emission factors (including calcining emissions and fossil fuel combustion emissions). The consulting group Battelle[21] estimates a total CO_2 emission factor for cement production in North America of 0.99 tonnes CO_2 / tonne cement. These emission factors are presented in Table 2.

2.2.2 Embodied Energy in Asphalt Production

The manufacture of asphalt is less energy intensive than the manufacture of cement. Asphalt is composed of asphalt cement and aggregate; the aggregate typically constitutes 92% by weight of the asphalt mixture.[22] AP-42 estimates CO_2 emission factors for batch mix (37 pounds CO_2 / short ton asphalt) and drum mix (33 pounds CO_2 / short ton asphalt) hot mix asphalt plants based on fuel usage within the plants.[23] ENVIRON used the average of these two values to represent the embodied energy of asphalt for Lytle Creek Ranch infrastructure.

2.2.3 Embodied Energy in Infrastructure

ENVIRON used the CO_2 emission factors from cement and asphalt to estimate the embodied energy of the infrastructure materials in the Lytle Creek Ranch development. ENVIRON used volumes of virgin concrete and asphalt as provided by Lytle Development Company for Lytle Creek Ranch, resulting in the predicted material amounts shown in Table 3. The estimated emissions from the manufacture of the infrastructure materials are presented in Table 4. Because concrete is 15% cement by volume,[24] the total volume of concrete in Table 3 is multiplied by 15% to yield the volume of cement presented in Table 4. The emissions from the cement manufacture are assumed to be equal to the emissions from concrete manufacture. One-time emissions from concrete and asphalt manufacture for infrastructure materials are estimated to be 7,636 and 1,913 tonnes CO_2, respectively.

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[18] USGS 2005 Minerals Yearbook: Cement. February 2007. pg 16.1-16.2. http://minerals.usgs.gov/minerals/pubs/commodity/cement/cemenmyb05.pdf

[19] EIA Energy Market and Economic Impacts of S.280, the Climate Stewardship and Innovation Act of 2007. August 2007. http://www.eia.doe.gov/oiaf/servicerpt/csia/special_topics.html

[20] EPA AP42 Section 11.6: Portland Cement Manufacturing. http://www.epa.gov/ttn/chief/ap42/ch11/final/c11s06.pdf

[21] Battelle. Humphreys, K. and Mahasenan, M. Climate Change: Toward a Sustainable Cement Industry. March 2002.

[22] EPA AP42 section 11.1: Hot Mix Asphalt Plants. pg 11.1-1. http://www.epa.gov/ttn/chief/ap42/ch11/final/c11s01.pdf

[23] EPA AP42 section 11.1: Hot Mix Asphalt Plants. Tables 11.1-5 and 11.1-7. http://www.epa.gov/ttn/chief/ap42/ch11/final/c11s01.pdf

[24] Portland Cement Association. Cement and Concrete Basics. http://www.cement.org/basics/concretebasics_concretebasics.asp

2.3 Transportation of Materials for Infrastructure

ENVIRON estimated the emissions from the transportation of the infrastructure. ENVIRON selected distances based on an expected trip distance of local manufacturers of cement and asphalt to the Lytle Creek Ranch development,[25] provided by the Lytle Development Company. Using the infrastructure material quantities specified in Table 3, ENVIRON estimated emissions of 140 tonnes CO_2 from the transportation of the concrete and asphalt in the infrastructure.[26] Details of the calculations are outlined in Table 5.

2.3.1 Calculation of Emissions from Transportation of Materials for Buildings

Although each particular shipper operates with greater or lesser efficiencies, ENVIRON assumed an average GHG emission rate per tonne-mile[27] for each mode of transportation. Although it is likely that more dense material has a slightly lower GHG shipping intensity than does less dense material, this analysis developed a single emission factor per tonne-mile of material moved, regardless of density, for each mode of transportation.

2.3.1.1 Emissions associated with transporting the material

Emission factors were calculated from DOE EERE energy intensity indicators.[28] EERE data is presented in terms of energy per mile traveled. These were converted using AP-42 conversion factors[29] for energy in different types of fuel, and California Climate Action Registry (CCAR) General Reporting Protocol (GRP)[30] emission factors for mass of CO_2 emitted per gallon of fuel. Trains and trucks are assumed to run on diesel. These emission factors are listed in Table 5. The emission factors developed above were multiplied by the distances traveled by each type of transportation.

2.4 Summary of Emissions from Buildings and Infrastructure

Table 6 presents the summary of the life cycle greenhouse gas (GHG) emissions associated with the building materials used in the construction of the Lytle Creek Ranch development. The life cycle GHG emissions include the embodied energy from the materials manufacture and the energy used to transport those materials to the site. The materials analyzed include materials for 1) residential and non-residential buildings and 2) site infrastructure. This report calculates the overall life cycle emissions from construction materials to be 1,044 – 8,881 tonnes per year, or 1 – 9% of the overall Lytle Creek Ranch project emissions. Aspects of this project such as the emphasis on the use of local construction materials are expected to drive the life cycle emissions toward the lower end of the range.

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[25] The distance for concrete and asphalt assumes the use of a local source 3 miles from Lytle Creek Ranch.
[26] For the estimates of emissions from material transportation, ENVIRON conservatively assumed that the entire concrete mix, not just cement, is transported from the source locations to the development site.
[27] A tonne-mile refers to the amount of material (in tonnes) moved a distance of one mile.
[28] Grams CO_2 per tonne-mile. See http://intensityindicators.pnl.gov/trend_data.stm Transportation sector data.
[29] AP-42 conversions available at http://www.epa.gov/ttn/chief/ap42/appendix/appa.pdf
[30] The GRP is available online at http://www.climateregistry.org/resources/docs/protocols/grp/GRP_3.1_January2009.pdf

Table 1
Life Cycle Greenhouse Gas (GHG) Emissions From Materials[1] Used for Buildings
Lytle Creek Ranch
Rialto, California

GHG Emissions from Energy Usage Associated with Residential and Non-Residential Buildings[2]	Embodied Energy as Percentage of Overall Energy[3]	
	3%	25%
(tonnes CO_2 / year)		
25,916	802	8,639

Notes:
1. All materials were analyzed. See references below for more details.
2. Represents CO2 emissions from electricity and natural gas use. From the Lytle Creek Ranch Climate Change Report.
3. Percentages are based upon LCA studies below. The studies compared energy used in the manufacture and transport of materials to energy use from electricity and natural gas. Varying lifetimes of homes were assumed in each study. As homes become more energy efficient, the portion of GHGs from embodied energy increases.

Abbreviations:
CO_2 = carbon dioxide
GHG = greenhouse gas
LCA = life cycle analysis

Sources:
Scheuer, C., G.A. Keoleian, and P. Reppe. (2003) Life cycle energy and environmental performance of a new university building: Modeling challenges and design implications. *Energy and Buildings* , **35**(10): p. 1049.
Keoleian, G.A., S. Blanchard, and P. Reppe. (2000) Life-cycle energy, costs, and strategies for improving a single-family house. *Journal of Industrial Ecology* , **4**(2): p. 135.
Sartori, I. and A.G. Hestnes. (2007) Energy use in the life cycle of conventional and low-energy buildings: A review article. *Energy and Buildings* , **39**(3): p. 249.

Winther, B.N. and A.G. Hestnes. (1999) Solar versus green: The analysis of a Norwegian row house. *Solar Energy* , **66**(6): p. 387.

Adalberth, K., A. Almgren, and E.H. Petersen. (2001) Life Cycle Assessment of Four Multi-Family Buildings. *International Journal of Low Energy and Sustainable Buildings* , **2**.

Table 2
Greenhouse Gas (GHG) Emission Factors for the Manufacture of Cement
Lytle Creek Ranch
Rialto, California

Data Source	Calcining Emissions[4]	Fossil Fuel Emissions[5]
	(tonnes CO_2/tonne cement)	
EIA[1]	0.5	-
EPA AP-42[2]	0.5	-
	0.75 - 1.19	
	0.92	
Battelle[3]	0.99	

Notes:

1. From the Energy Market and Economic Impacts of S.280, the Climate Stewardship and Innovation Act of 2007. Calculations are detailed in the Documentation for Emissions of Greenhouse Gases in the United States 2004, pg 35 - 38.

2. From AP-42 section 11.6: Portland Cement Manufacturing. Approximately 500 kg of CO_2 are released per Mg of cement produced during the calcining process; total manufacturing emissions depend on energy consumption (pg 11.6-6). Table 11.6-8 specifies 2,100 lbs CO_2 per ton of clinker produced (ENVIRON used the higher value instead of 1,800 lbs / ton to be conservative). Clinker is a precursor to cement. Using a clinker factor of 0.88 lb clinker/lb cement (from the Battelle report) yields an emission factor of 0.92 tonnes CO_2/tonne cement.

3. From Table 1-2 of the Battelle report. The North American average emission factor is 0.99 kg CO_2/kg cement; the global average is 0.87 kg CO_2/kg cement.

4. There are two main sources of CO_2 emissions from the manufacture of cement: the calcining process and fossil fuel combustion. Calcining emissions result from the chemical reaction of converting limestone ($CaCO_3$) to calcium oxide (CaO) and carbon dioxide (CO_2). CaO is a precursor to concrete and CO_2 is released to the atmosphere.

5. Fossil fuel combustion usually provides the energy necessary to manufacture cement. The emissions from the fossil fuel combustion vary depending on the type of fuel used; in general the combustion accounts for slightly less than half of the CO_2 emissions from the manufacture of cement.

Abbreviations:
AP-42 = Compilation of Air Pollutant Emission Factors
CO_2 = carbon dioxide
EIA = Energy Information Administration
EPA = Environmental Protection Agency
kg = kilogram
Mg = megagram = 1,000 kg
NA = not available

Sources:
EIA Energy Market and Economic Impacts of S.280, the Climate Stewardship and Innovation Act of 2007. August 2007. http://www.eia.doe.gov/oiaf/servicerpt/csia/special_topics.html
EPA AP42 Section 11.6: Portland Cement Manufacturing.
http://www.epa.gov/ttn/chief/ap42/ch11/final/c11s06.pdf
Battelle. Humphreys, K. and Mahasenan, M. Climate Change: Toward a Sustainable Cement Industry. March 2002.

Table 3
Quantities of Infrastructure Materials
Lytle Creek Ranch
Rialto, California

CONCRETE			
	Projected Material Needed[1]	**Density[2]**	**Total Weight[3]**
	(cu ft)	**(lb/cu ft)**	**(tonnes)**
New	1,224,307	150	8330042%
Re-used	0	150	0
Total	1,224,307	---	83,300
		Total Concrete (cu yd)	45,345
ASPHALT			
	Projected Material Needed[1]	**Density[4]**	**Total Weight[3]**
	(cu ft)	**(lb/cu ft)**	**(tonnes)**
New	3,759,243	64.11	109,315
Re-used	0	64.11	0
Total	3,759,243	---	109,315
		Total Asphalt (cu yd)	139,231

Notes:
1. Material volumes provided by Lytle Development Company.
2. Density of concrete calculated from mass and volume reported by Lytle Development Company.
3. Total material quantities (tonnes) for concrete and asphalt are calculated by converting cubic feet of material into mass in tonnes using the conversion factor of 0.00045 tonnes/lb.
4. Density of asphalt calculated from mass and volume reported by Lytle Development Company.

Abbreviations:
cu ft = cubic foot
cu yd = cubic yard
DU = dwelling units
ft = foot
in = inch
lb = pound
sq ft = square foot

Table 4
Greenhouse Gas (GHG) Emissions from Manufacture of Infrastructure Materials
Lytle Creek Ranch
Rialto, California

Material	Emission Factor	Volume of Material	Mass of Material	Emissions from Manufacture of Material[3]
	(tonnes CO_2/tonne material)	(cu yd)	(tonnes)	(tonnes CO_2)
Cement (in new concrete)[1]	0.990	6,802	7,713	7,636
Asphalt, new[2]	0.018	139,231	109,315	1,913
TOTAL				**9,549**

Notes:

1. Concrete is composed of cement, water, aggregate, and chemical admixtures; concrete mixtures are approximately 15% cement by volume (Portland Cement Association). Cement accounts for almost all of the CO_2 emissions associated with the manufacture of conrete. The cement emission factors provided by AP-42 cover a wide range of processing technologies and emission factors, so ENVIRON used the cement emission factor provided by the Battelle report.

2. From AP-42 section 11.1: Hot Mix Asphalt Plants. Tables 11.1-5 and 11.1-7. ENVIRON assumed an average emission factor from batch mix hot asphalt plants and drum mix hot asphalt plants.

3. Because the manufacture of cement is the main contributor to CO_2 emissions in the production of concrete, ENVIRON assumed that the emissions from the manufacture of cement are equal to the emissions from the overall manufacture of concrete.

Abbreviations:
CO_2 = carbon dioxide
cu yd = cubic yard

Sources:
Battelle. Humphreys, K. and Mahasenan, M. Climate Change: Toward a Sustainable Cement Industry. March 2002.
EPA AP42 section 11.1: Hot Mix Asphalt Plants. Tables 11.1-5 and 11.1-7.
http://www.epa.gov/ttn/chief/ap42/ch11/final/c11s01.pdf
Intergovernmental Panel on Climate Change, Fourth Assessment Report, 2007. Table 2.14. Available at: http://ipcc-wg1.ucar.edu/wg1/Report/AR4WG1_Print_Ch02.pdf.
Portland Cement Association. Cement and Concrete Basics. http://www.cement.org/basics/concretebasics_concretebasics.asp

Table 5
Greenhouse Gas (GHG) Emissions from Transportation of Infrastructure Raw Materials
Lytle Creek Ranch
Rialto, California

Material	Total Mass Transported[1]	Distance from Source Location[2]	Mass-Distance[3]	Emission Factor[4]	Emissions to Transport to Construction Site[5]	
		Local Source	Local Source	Truck	Local Source	Total
	(tonnes material)	(miles)	(tonne-miles)	(grams CO_2/ tonne-mile)	(tonnes CO_2)	
Concrete	83,300	3	249,901	253	63	63
Asphalt	109,315	3	301,709		76	76
TOTAL						**140**

Notes:
1. The total mass transported is assumed to contain only virgin materials. For manufacturing emissions, only the amount of cement is considered; however, for transportation emissions, the entire mass of virgin concrete is considered because the concrete mix is transported from the source locations.
2. Distances from source to project location provided by Lytle Development Company
3. Mass distance is the mass of material multipled by the distance traveled. ENVIRON assumed that the concrete and asphalt aggregate come from local sources. The petroleum used in the asphalt comes from the Port of Los Angeles. Asphalt is roughly 92% by weight aggregate, so ENVIRON assumed that the remaining 8% is representative of the mass of petroleum transported from the Port of Los Angeles.
4. Emission factors for truck calculated from DOE EERE energy intensity indicators. EERE data is presented in Btu / ton mile. These were converted using AP-42 conversion factors for energy in different types of fuel, and CCAR GRP emission factors for mass CO_2 emitted per gallon of fuel. Trucks are assumed to run on diesel.
5. Emissions calculated by multiplying the mass-distance by the emission factor. Because of the close proximity of the source locations to Lytle Creek Ranch, ENVIRON conservatively assumed that all infrastructure materials will be transported by truck.

Sources:
DOE EERE energy intensity indicators. http://intensityindicators.pnl.gov/trend_data.stm Transportation sector data.
AP42 conversions available at http://www.epa.gov/ttn/chief/ap42/appendix/appa.pdf

Table 6
Summary of Life Cycle Greenhouse Gas (GHG) Emissions from Buildings, Infrastructure
Lytle Creek Ranch
Rialto, California

Emissions Source[1]		Emissions from Manufacture of Materials[3]	Emissions from Transportation of Materials[4]	Total Emissions	Assumed Lifetime of Emissions Source[5]	Total Annualized Emissions[6]	Total Annual Emissions from LCR[7]	LCA Fraction of Total Emissions[8]
		(tonnes CO_2)			(years)	(tonnes CO_2 / year)	(tonnes CO_2 / year)	(%)
Buildings[2]	Low Estimate	32,061		32,061	40	802	98,059	0.8%
	High Estimate	345,545		345,545		8,639		9%
Infrastructure		9,549	140	9,688		242		0.2%
TOTAL		41749 - 355234		41749 - 355234		1044 - 8881		1.1% - 9%

Notes:
1. ENVIRON estimated LCA emissions from two sources: buildings, and infrastructure.
2. Emissions from buildings are shown as a range from a low to a high estimate based on the range presented in Table 1. The values in Table 1 are multiplied by the assumed lifetime of 40 years to yield total emissions in tonnes CO_2.
3. Emissions from the manufacture of materials for infrastructure are from Table 4.
4. Emissions from the transportation of materials for infrastructure are from Table 5.
5. The assumed lifetime of emissions source may be adjusted; here ENVIRON has assumed a conservatively short lifetime of 40 years.
6. Total emissions are divided by the assumed lifetime of emissions sources to yield the total annualized emissions.
7. From the Lytle Creek Ranch Climate Change Report.
8. The LCA fraction of total emissions is calculated by dividing the total annualized emissions by the total emissions from Lytle Creek Ranch.

Abbreviations:
CO_2 = carbon dioxide
LCA = life cycle assessment
LCR = Lytle Creek Ranch

Sources:
Values are calculated using Tables 1 through 5 and the emissions presented in the Lytle Creek Ranch Climate Change Report.

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Appendix III-H

ACOUSTICAL ANALYSIS

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NOISE ASSESSMENT TECHNICAL REPORT

Lytle Creek Ranch Specific Plan
City of Rialto

Prepared by:

PCR SERVICES CORPORATION

June 2008

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1.0 EXECUTIVE SUMMARY

This noise assessment report provides an analysis of potential short-term and long-term noise impacts associated with the proposed Lytle Creek Ranch Specific Plan Project (project). The proposed project is located in the city limits of Rialto and mostly within the City's sphere of influence in San Bernardino County. The analysis evaluated the proposed project using standard methodologies and comparing the results to applicable noise standards and impact criteria.

1.1 FINDINGS

The key findings of the noise analysis presented in this study are as follows:

Project construction would result in a substantial increase in ambient noise levels for sensitive land uses in close proximity to the project site. However, short-term construction noise would be less than significant because all construction activity would proceed in compliance with existing City requirements and proposed conditions of approval (Mitigation Measure N-1). In addition, Mitigation Measures N-2 through N-4 would pro-actively reduce construction generated noise levels to the extent feasible.

Project-related traffic would increase the existing ambient noise at off-site roadway segments in the vicinity of the project site. The increase in project-related off-site traffic noise would exceed the 3 A-Weighted decibels (dBA) in terms of Community Noise Equivalent Level (CNEL) threshold increase for significant noise impacts. The highest increase in traffic noise would be along roadway segments that surrounding or entering to the project site. A maximum increase of 3.5 dBA, 4.1 dBA, 4.4 dBA, and 5.7 dBA CNEL over the existing condition would occur along Lytle Creek Road west of Sierra Avenue, Riverside Avenue between Sierra Avenue and Alder Avenue, Riverside Avenue between Alder Avenue and Locust Avenue, and Country Club Drive north of Riverside Avenue, respectively. Conventional mitigation measures such as construction of noise barrier walls will not be feasible as the barriers will obstruct the access to the residences properties. Therefore, the long-term noise impact due to off-site traffic would be significant and unavoidable.

The proposed noise sensitive uses including residential and schools would be exposed to traffic noise from existing surrounding roadways including I-15 Freeway, Glen Helen Parkway, Sierra Avenue, Riverside Avenue, and future internal roadways (main loops). The projected traffic noise levels along these roadways would exceed the City's noise standard of 65 dBA CNEL exterior noise levels for residential and schools uses. Noise barrier walls would be required to reduce the traffic noise to meet the City's noise standard. Noise barriers of

approximately 5 to 8 feet in height would be required for residential lots and schools along the street roadways, which exceed 65 dBA CNEL. Higher noise barriers would be required for residential uses along the I-15 Freeway. The effectiveness of the noise barrier depends on the relative pad and roadway elevation. The final noise barrier height shall be determined when the final site and grading plans are completed.

The upper levels of residential unit lots adjacent to I-15 Freeway could be exposed to noise levels in excess of the City's noise standard, even with noise barrier. Therefore, it is recommended that no outdoor balconies be constructed for residential units facing the I-15 Freeway or if balconies are to be built, provide noise barrier (such as transparent Plexiglas panels) to reduce the freeway noise to 65 dBA CNEL.

With the incorporation of the Mitigation Measures N-5, N-6, and N-9, the exterior noise environment at proposed developments along major roadways would be reduced to meet the City and County noise standards and will reduce the noise impact to less than significant.

Implementation of Mitigation Measures N-7 and N-10 will ensure that interior noise environments of residential, school and commercial office building structures meet the State, County and City noise insulation requirements. Thus, would reduce the noise impact to a less than significant level. In addition, implementation of Mitigation Measure N-8 would reduce the potential noise impacts from the schools and parks onto adjacent residential uses to a less than significant level.

2.0 INTRODUCTION

This noise impact analysis has been prepared to evaluate the potential noise impacts and mitigation measures associated with the proposed Lytle Creek Ranch development located within the city limits of Rialto and mostly within the City's sphere of influence in San Bernardino County, California. Figure 1 shows the project location. The Lytle Creek Ranch is a 2,447.3-acre master planned community, which includes four separate neighborhoods. There are currently no active land uses on the site. The project proposes to establish a specific plan that will direct the overall development and build-out of the entire 2,447.3 acres. This report is intended to satisfy the City's and County's requirement for a noise impact analysis by examining the impacts of the proposed project on noise-sensitive uses in the area and evaluating the mitigation measures incorporated as part of the design.

2.1 PURPOSE

The objectives of this noise assessment are to:

a) Determine the noise impacts associated with the proposed project to the nearby noise sensitive uses (e.g., residential, schools, and hospitals);

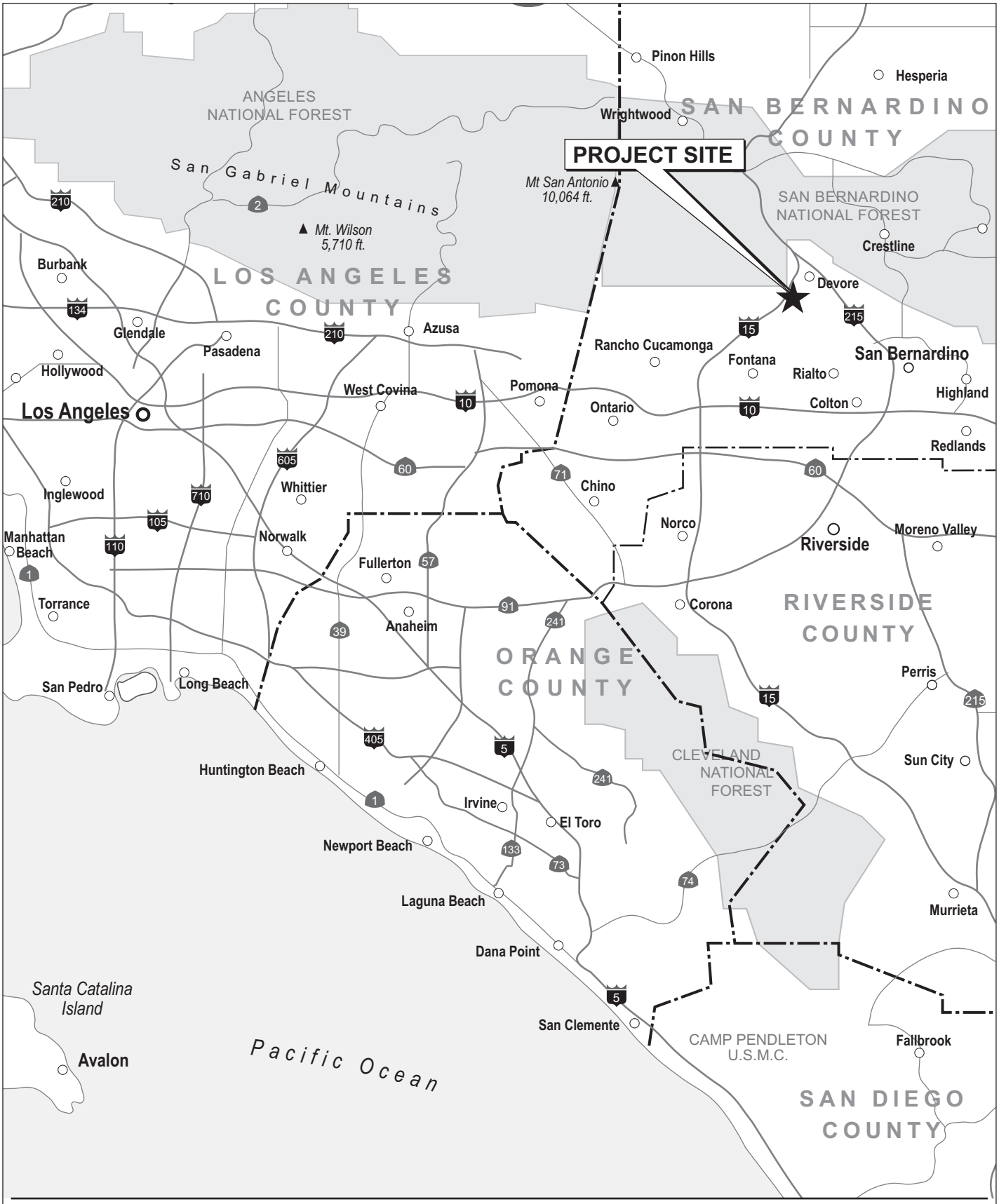
b) Evaluate the potential noise impacts from existing noise sources on to the future residential and other noise sensitive uses at the project site; and

c) Provide noise mitigation measures as required to meet applicable noise regulations and standards.

2.2 DEVELOPMENT DESCRIPTION AND LOCATION

The proposed project, known as the Lytle Creek Ranch project is located in an unincorporated area of San Bernardino County, California. The location of the proposed project, in a regional and a local context, is illustrated in Figure 1 on page 4.

The Lytle Creek Ranch is a master planned residential and mixed-use community, in four separate and unique neighborhoods. The community is planned for 8,407 residential units, 849,420 square feet of retail space, an elementary school and middle school, as well as both a golf course and a park. The Conceptual Land Use Plan, as shown on Figure 2 on page 5, illustrates the layout of the proposed project. The proposed development is expected to be built-out by 2030, while some individual phases would be built prior to that date.



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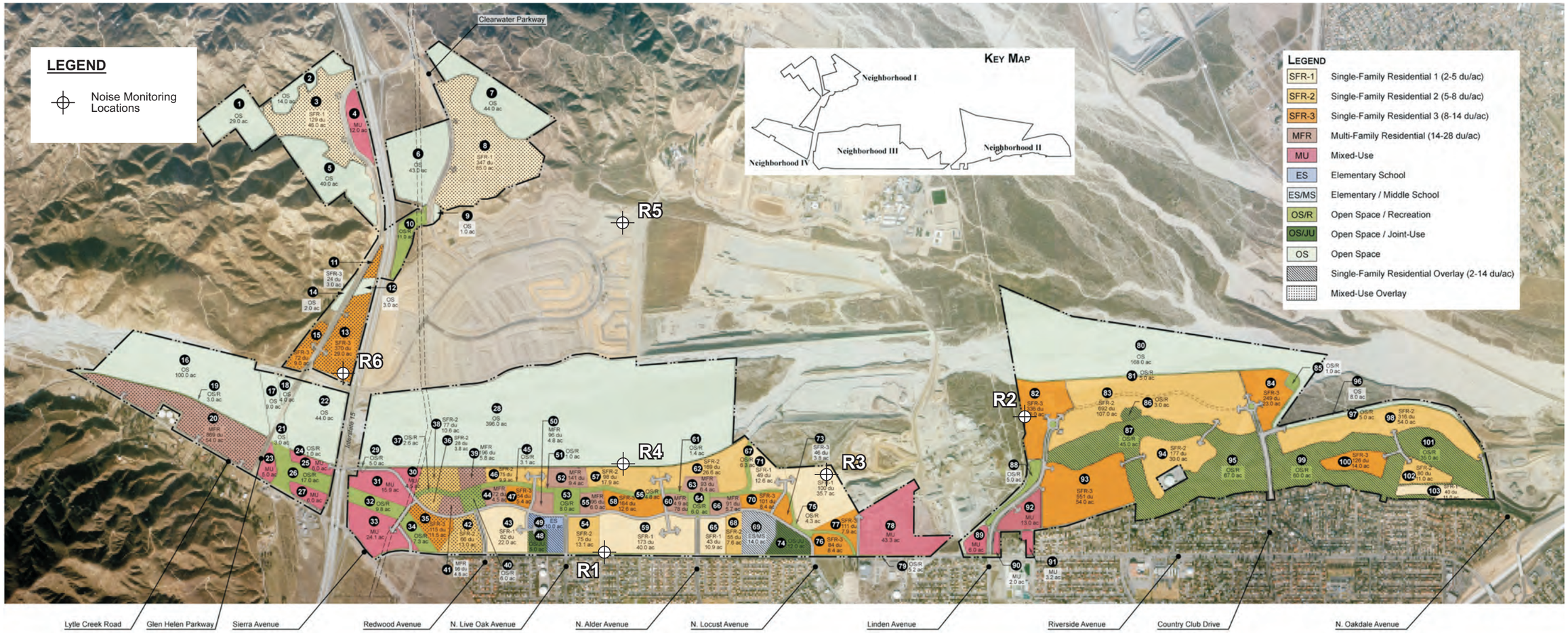
Source: PCR Services Corporation, 2007.

Figure 1
Lytle Creek Ranch Regional Map

PRELIMINARY WORKING DRAFT-Work-in-Progress



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Source: KTGY Group, January 2008

Figure 2
Project Site and Noise Monitoring Locations

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3.0 ENVIRONMENTAL SETTING

3.1 NOISE BASICS

Noise is generally defined as unwanted or annoying sound that is typically associated with human activity and which interferes with or disrupts normal activities. Sound levels can be easily measured, however, perceptibility of sound is subjective and the physical response to sound complicates the analysis of its impact on people.

The decibel (dB) is a conventional unit for measuring the amplitude of sound because it accounts for the large variations in sound pressure amplitude and reflects the way people perceive changes in sound amplitude.[1] The human hearing system is not equally sensitive to sound at all frequencies. Therefore, to approximate this human frequency-dependent response, the A-weighted system is used to adjust measured sound levels. The A-weighted decibel scale (dBA) provides this compensation by discriminating against upper and lower frequencies in a manner approximating the sensitivity of the human ear. The scale ranges from zero for the least perceptible sound to about 130 for the pain threshold. Examples of various sound levels in different environments are shown in Table 1 on page 7.

Noise may be generated from a point source, such as a piece of construction equipment, or from a line source, such as moving motor vehicles along a roadway. Due to spreading losses, noise attenuates or decreases with distance. The rate of attenuation is a function of both distance and the type of terrain over which the noise passes. Over "hard" sites such as developed areas with pavement, noise from a line source attenuates at a rate of 3.0 dBA per doubling of distance. Over "soft" sites such as undeveloped open space, vegetated, or landscaped areas, noise from a line source attenuates more rapidly at a rate of 4.5 dBA per doubling of distance. The attenuation rate for point source noise over a "hard" site is 6.0 dBA per doubling of distance and over a "soft" site is 7.5 dBA per doubling of distance.[2] These conditions represent the extremes and most areas will actually contain a combination of both "hard" and "soft" site elements, with the noise attenuation placed somewhere in between these two attenuation factors.

---

[1] *All sound levels, measured in decibel (dB), in this study are relative to $2x10^{-5}$ N/m^2.*

[2] *Caltrans' 1998 Technical Noise Supplement, N-2142 (Ground Absorption). A "hard" or reflective site does not provide any excess ground-effect attenuation and is characteristic of asphalt, concrete, and very hard packed soils. An acoustically "soft" or absorptive site is characteristic of normal earth and most ground with vegetation.*

Table 1

Typical Sound Levels and Human Response

Noise Source (Reference Distance)	Noise Level (dBA)	Human Response
Military Jet Takeoff (50 ft) Civil Defense Siren (100 ft)	130	Pain Threshold
Commercial Jet Takeoff (200ft)	120	
Unmuffled Motorcycle Auto Horn (3 ft) Riveting Machine	110	Physical Discomfort
Diesel Pile Driver (100 ft) Ambulance Siren (100 ft) Garbage Truck (3 ft)	100	Very Loud and Annoying Hearing Damage (Steady 8-Hour Exposure)
Heavy Truck (50 ft) Pneumatic Drill (50 ft)	90	
Freight Train (50 ft) Shouting (3 ft)	80	Annoying
Freeway Traffic (50 ft) Vacuum Cleaner (3 ft) Power Mower (100 ft)	70	Telephone Use Difficult
Dishwashers Air Conditioning Units (20 ft)	60	Intrusive
Light Auto Traffic (100 ft)	50	
Living Room Bedroom	40	Quiet
Library Soft Whisper (5 ft)	30	Very Quiet
Broadcasting Studio	20	Just Audible

Source: Melville C. Branch, R. Dale Beland et al., 1970, Outdoor Noise in the Metropolitan Environment, p. 2.

3.1.1 Environmental Noise Descriptor

Several rating scales have been developed to analyze the adverse effect of community noise on people. Since environmental noise fluctuates over time, these scales consider that the effect of noise is dependent upon the total acoustical energy content, as well as the time and duration of occurrence. The most frequently used noise descriptors are summarized below.

Equivalent Sound Level (L_{eq}). L_{eq} is a measurement of the acoustic energy content of noise averaged over a specified time period. Thus, the L_{eq} of a time-varying sound and that of a steady sound are the same if they deliver the same amount of energy to the receptor's ear during exposure. L_{eq} for one-hour periods, during the daytime or nighttime hours, and 24 hours are

commonly used in environmental assessments. For evaluating community impacts, this rating scale does not vary, regardless of whether the noise occurs during day or night.

Percentile Exceeded Sound Level (L_n). The sound level exceeded *n* percent of the measurement time period. For example, L_{50} is the sound level exceeded 50 percent of the time during measurement period.

Day-Night Sound Level (L_{dn}). L_{dn}, the day-night average noise, is a 24-hour L_{eq} with a 10-decibel penalty added to noise events occurring at nighttime. Nighttime is defined as 10:00 P.M. to 7:00 A.M. The effect of this penalty is that, in the calculation of Ldn, an event during nighttime hours is equivalent to an event during the daytime hour that is 10 decibels louder. This accounts for higher sensitivity of people to noise events during nighttime hours when background noise is lower and most people are sleeping.

Community Noise Equivalent Level (CNEL). Similar to L_{dn}, CNEL is a 24-hour-period average noise with 5 dBA added to the noise levels produced in the evening, from 7:00 P.M. to 10:00 P.M., and 10 dBA added to the noise levels produced at night from 10:00 P.M. to 7:00 A.M.

The values of L_{dn} and CNEL rarely differ by more than 1 dBA, with CNEL the more restrictive scale. In general, human sound perception is such that a change of sound level of 3 dBA is just perceivable, a change of 5 dBA is clearly noticeable, and a change of 10 dBA is perceived as doubling or halving the sound level.

3.2 REGULATORY FRAMEWORK

Government agencies have established noise standards and guidelines to protect people from potential hearing damage and various other adverse physiological and social effects associated with noise. Standards and guidelines that may be applicable to this project are discussed below.

3.2.1 Applicable Federal Policies

The U.S. Department of Housing and Urban Development (HUD) has set a goal of 45 dBA L_{dn} as a desirable maximum interior standard for residential units developed under HUD funding. While HUD does not specify acceptable exterior noise levels, standard construction of residential dwellings typically provide 20 dBA of acoustical attenuation with the windows closed and 10 dBA with the windows open. Based on this assumption, the exterior L_{dn} or CNEL should not exceed 65 dBA under normal conditions.

3.2.2 Applicable State of California Policies

The California Department of Health Services (DHS) Office of Noise Control has studied the correlation of noise levels and their effects on various land uses. As a result, the DHS has established four categories for judging the severity of noise intrusion on specified land uses:

- Normally Acceptable: is generally acceptable, with no mitigation necessary.
- Conditionally Acceptable: may require some mitigation, as established through a noise study.
- Normally Unacceptable: requires substantial mitigation.
- Clearly unacceptable: probably cannot be mitigated to a less-than-significant level.

The types of land uses addressed by the State standards and the acceptable noise categories for each land use are presented in Table 2 on page 10. As the matrix indicates, an exterior noise level up to 60 dBA CNEL is “normally acceptable” for low-density residential uses, without special noise insulation requirements. A noise level between 60 CNEL and 70 CNEL is considered “conditionally acceptable” for low-density residential uses, while a noise level of 75 dBA CNEL or more is identified as "clearly unacceptable" for all residential uses.

In addition, Title 24 of the State Noise Insulation Standards (California Administrative Code) requires that an acoustical analysis be prepared for all new developments of multi-family dwellings, condominiums, hotels and motels proposed for areas within the 60 dB Ldn (or CNEL) contour of a major noise source for the purpose of documenting that an acceptable interior noise level of 45 dB Ldn (or CNEL) or below will be achieved with the windows and doors closed.

3.2.3 Applicable County of San Bernardino Policies and Regulations

3.2.3.1 General Plan Noise Element

The overall purpose of a general plan is to protect citizens from the harmful and annoying effects of exposure to excessive noise, and to protect the represented economic base by preventing the encroachment of incompatible land uses within areas affected by existing noise-producing uses. The general goals of the San Bernardino County Noise Element are to:

- B-5: Develop and adopt specific policies and an effective implementation program to abate and avoid excessive noise exposures in the County by requiring that effective

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Table 2

State of California Land Use Compatibility for Community Noise Environments

Land Use	Community Noise Exposure CNEL, dBA			
	Normally Acceptable	Conditionally Acceptable	Normally Unacceptable	Clearly Unacceptable
Residential—Low-Density Single-Family, Duplex, Mobile Homes	50 to 60	55 to 70	70 to 75	Above 75
Residential—Multi-Family	50 to 65	60 to 70	70 to 75	Above 75
Transient Lodging—Motels, Hotels	50 to 65	60 to 70	70 to 80	Above 80
Schools, Libraries, Churches, Hospitals, Nursing Homes	50 to 70	60 to 70	70 to 80	Above 80
Auditoriums, Concert Halls, Amphitheaters	—	50 to 70	—	Above 65
Sports Arena, Outdoor Spectator Sports	—	50 to 75	—	Above 70
Playgrounds, Neighborhood Parks	50 to 70	—	67 to 75	Above 72
Golf Courses, Riding Stables, Water Recreation, Cemeteries	50 to 75	—	70 to 80	Above 80
Office Buildings, Business Commercial and Professional	50 to 70	67 to 77	Above 75	—
Industrial, Manufacturing, Utilities, Agriculture	50 to 75	70 to 80	Above 75	—

Normally Acceptable: Specified land use is satisfactory, based upon the assumption that any buildings involved are of normal conventional construction without any special noise insulation requirements.

Conditionally Acceptable: New construction or development should be undertaken only after a detailed analysis of the noise reduction requirements is made and needed noise insulation features included in the design. Conventional construction, but with closed windows and fresh air supply systems or air conditioning will normally suffice.

Normally Unacceptable: New construction or development should generally be discouraged. If new construction or development does proceed, a detailed analysis of the noise reduction requirements must be made and needed noise insulation features included in the design.

Clearly Unacceptable: New construction or development should generally not be undertaken.

Source: Office of Planning and Research, State of California General Plan Guidelines, October 2003.

noise mitigation measures be incorporated into the design of new noise-generating and new noise-sensitive land uses.

- B-6: Provide sufficient noise exposure information so that existing and potential noise impacts may be effectively addressed in the land use planning and project review processes.

- NO-1g: New development of residential or other noise-sensitive land uses will not be permitted in noise-impacted areas unless effective mitigation measures are

incorporated into the project design to reduce noise levels to the standards of Tables 3 and 4. Noise-sensitive land uses include residential uses, schools, hospitals, nursing homes, churches and libraries."

- NO-4f: The County will require any project (new construction or additions) to meet the County Noise Ordinance standards as a condition of building permit approval.

The San Bernardino County General Plan presents interior and exterior noise level standards for both mobile and locally regulated sources. These standards are presented in Table 3 on page 12 and Table 4 on page 13, respectively.

3.2.3.2 San Bernardino County General Design Standards

The County recognizes that some forms of noise are inherent of urban development and maintenance and are difficult to control. Section 87.0905 (e), "Exempt Noises" of the Performance Standards provides for these exemptions. Those applicable to the project include:

- Motor vehicles not under the control of the industrial use (i.e., those preempted by State or federal law),
- Emergency equipment, vehicles, and devices, and
- Temporary construction, repair, or demolition activities between 7:00 A.M. and 7:00 P.M., except Sundays and Federal holidays.
- The performance standards prohibit noise-generating activities on private property, which cause noise levels measured on another property to exceed levels listed in Table 4 on page 13.

3.2.4 Applicable City of Rialto Policies and Regulations

3.2.4.1 City of Rialto General Plan

The City of Rialto has established guidelines for land use compatibility, which is similar but modified version of the State's standards. The City's guidelines are provided in the City's Noise Element of the General Plan and are presented in Table 5 on page 14.

Table 3

County of San Bernardino Interior/Exterior Noise Level Standards – Mobile Noise Sources

Land Use Categories	Uses	L_{dn} (or CNEL)[a], dB Interior[b]	Exterior[c]
Residential	Single- and multi-family, duplex, mobile homes	45	60[d]
Commercial	Hotel, motel, transient lodging	45	60[d]
	Commercial retail, bank, restaurant	50	NA
	Office building, research and development, professional offices	45	65
	Amphitheater, concert hall, auditorium, movie theater	45	NA
Institutional/Public	Hospital, nursing home, school classroom, church, library	45	65
Open Space	Park	NA	65

[a] *L_{dn} is the day-night average sound level; CNEL is the community noise equivalent level. The difference between L_{dn} and CNEL values is usually within 1dB.*

[b] *Indoor environment, excluding bathrooms, kitchens, toilets, closets, and corridors.*

[c] *Outdoor environment, limited to private yard of single-family dwellings, park picnic areas, multi-family private patios or balconies, school playgrounds, mobile home parks, hotel and motel recreation areas, and hospital/office building patios.*

[d] *An exterior noise level of up to 65 dB L_{dn} (or CNEL) will be allowed provided exterior noise levels have been substantially mitigated through a reasonable application of the best available noise reduction technology, and interior noise exposure does not exceed 45 dB L_{dn} (or CNEL) with windows and doors closed. Requiring that windows and doors remain closed to achieve an acceptable interior noise level will necessitate the use of air conditioning or mechanical ventilation.*

Source: San Bernardino County General Plan.

3.2.4.2 City of Rialto Municipal Codes

The City of Rialto Noise Ordinance (Rialto Municipal Code, RMC) restricts unnecessary or excessive noise.[3] The Noise Ordinance does not define what constitutes a noise violation in terms of numeric standards. Rather, it characterizes a noise violation as any noise that is unreasonably loud, unnecessary or unusual that disturbs the comfort, repose, health, peace and quiet or which causes discomfort or annoyance to any reasonable person of normal sensitivity [Section 9.50.030]. Among others, specific examples of violations cited in the Noise Ordinance that would pertain to the project include the following:

[3] *City of Rialto Municipal Code, Chapter 9.50 Noise Control, approved January 2008.*

Table 4

County of San Bernardino Exterior Noise Standards – Stationary Sources[a]

Affected Land Use (Receiving Noise)	7:00 A.M. – 10:00 P.M.		10:00 P.M. – 7:00 A.M.	
	L_{eq} (dBA)[b,c]	L_{max} (dBA)	L_{eq} (dBA)[b,c]	L_{max} (dBA)
Residential	55	75	45	65
Professional Services	55	75	55	75
Other Commercial	60	80	60	80
Industrial	70	90	70	90

[a] *Noise sources which are stationary and not pre-empted from local noise control. Pre-empted sources include vehicles operated on public roadways, railroad line operations and aircraft in flight.*

[b] *No person shall operate or cause to be operated any source of sound at any location or allow the creation of any noise on property owned, leased, occupied or otherwise controlled by such person, which causes the noise level, when measured on any other property to exceed: (1) The noise standard for that receiving land use for a cumulative period of more than 30 minutes; (2) The noise standard plus 5 dBA for a cumulative period of more than 15 minutes in any hour; (3) The noise standard plus 10 dBA for a cumulative period of more than 5 minutes; (4) The noise standard plus 15 dBA for a cumulative period of more than 1 minutes in any hour; and (5) The noise standard plus 20 dBA for any period of time. If the measured ambient level exceeds any of the fist four noise limit categories, the allowable noise exposure standard should reflect the ambient noise level.*

[c] *If the alleged offense consists of impact noise or simple tone noise, each of the noise levels are reduced by 5 dBA.*

Source: San Bernardino County General Plan and Performance Standards (8.07.09).

- Loading and unloading any vehicle, or operating or permitting the use of dollies, carts, forklifts, or other wheeled equipment that causes any impulsive sound, raucous or unnecessary noise within one thousand feet of a residence, between the hours of 8:00 P.M. and 8:00 A.M. in residential zones or 8:00 P.M. and 7:00 A.M. in all other zones [Section 9.50.050(B)];

- Activities conducted on the grounds of any public or private schools during regular hours of operation are exempt from the Noise Ordinance [Section 9.50.060(B)].

With regard to construction noise, the City of Rialto does not specify quantitative limits. Rather, the City sets limits on when construction activity can occur . Therefore, pursuant to the City's Noise Ordinance, the project construction related noise impacts would not be considered significant unless construction occurs outside the City's allowed duration as follows:

1. October 1st through April 30th - 7:00 A.M. to 5:30 P.M. Monday through Friday, 8:00 A.M. to 5:00 P.M. on Saturday. Construction activities are not permitted on Sundays and State holidays.

Table 5

City of Rialto Land Use Compatibility for Community Noise Environments

Land Use	Community Noise Exposure CNEL, dBA			
	Clearly Compatible	Normally Compatible	Normally Incompatible	Clearly Incompatible
Residential - Single-Family, Duplex, Multiple Family, Mobile Homes	Up to 55	55 to 65	65 to 70	Above 70
Commercial - Hotels, Motels, Transient Lodging	Up to 55	55 to 65	65 to 80	Above 80
Institutional – Hospitals, Schools, Churches, Libraries	Up to 55	55 to 65	65 to 75	Above 75
Institutional - Auditoriums, Meeting Halls	Up to 55	55 to 60	60 to 70	Above 70
Open Space - Parks, Playgrounds	Up to 65	65 to 70	70 to 75	Above 75
Commercial – Office Buildings	Up to 60	60 to 75	75 to 80	Above 80
Commercial - Commercial Retail, Banks, Theaters, Restaurants	Up to 60	60 to 80	Above 80	--
Commercial/Industrial - Wholesale Warehousing, Manufacturing, Auto Dealership	Up to 65	65 to 80	Above 80	--
Agricultural - Farming/Groves	Up to 85	--	--	--

Clearly Compatible: Specified land use is satisfactory, based upon the assumption that any buildings involved are of normal conventional construction without any special noise insulation requirements.

Normally Compatible: New construction or development should be undertaken only after a detailed analysis of the noise reduction requirements is made and needed noise insulation features included in the design. Conventional construction, but with closed windows and fresh air supply systems or air conditioning will normally suffice.

Normally Incompatible: New construction or development should generally be discouraged. If new construction or development does proceed, a detailed analysis of the noise reduction requirements must be made and needed noise insulation features included in the design.

Clearly Incompatible: New construction or development should generally not be undertaken.

Source: Noise Element of the General Plan for the City of Rialto, November 1, 1991.

2. May 1st through September 30th - 6:00 A.M. to 7:00 P.M. Monday through Friday, 8:00 A.M. to 5:00 P.M. on Saturday. Construction activities are not permitted on Sundays and State holidays.

3.3 EXISTING NOISE ENVIRONMENT

3.3.1 Noise Sources

Based on a field survey, the predominant noise source in the project vicinity is roadway noise from surround roadways (i.e. I-15 and Riverside Avenue) and to a lesser extent from Hyundai Pavilion, the Sheriff's shooting ranges, and Sunwest Materials.

Hyundai Pavilion: Hyundai Pavilion at Glen Helen is the nation's largest amphitheater, with the capacity to accommodate over 65,000 people. Located where the I-15 and I-215 Freeways meet in Devore, the Pavilion hosts some of Southern California's biggest concert events. Situated within the Glen Helen Regional Park, the venue is separated from the project site by a ridgeline and is located approximately one-half mile northeast of the project site. The concert season typically runs from mid April through October as well as special events. No events occurred within the noise measurement period and, therefore, ambient noise levels were characterized based on available studies.

An acoustical analysis was conducted as part of the Glen Helen Specific Plan Revised Draft EIR prepared in July of 2005.[4] The noise study for the Glen Helen Specific Plan project included measurements during the concert of a loud rock and roll band (Motley Crue/Scorpion) at the pavilion. The noise monitoring location most representative of the Lytle Greek Ranch site was conducted in the Sycamore Flats area approximately 1,500 feet east of the I-15 Freeway and 50 feet south of Glen Helen Parkway near the northern boundary of the project Neighborhood I. The 11-minute sound reading was obtained from 10:27 P.M. and recorded an L_{eq} of 55.9 dBA and an L_{max} of 61.5 dBA. The study showed that neither music nor crowd noise, were audible and only pyrotechnic effects at the concert could be heard in the background. In addition, it was concluded that the dominate noise source was traffic along Glen Helen Parkway and I-15. Therefore, considering that the proposed project is located at a significantly farther distance form the pavilion than the monitoring location, the proposed project would not be impacted by the noise from the amphitheater and further assessment of this noise source is not warranted.

Sheriff's Training Facility: The facility is located approximately a one-half mile to the east of the project site (Neighborhood I). The training activities include firing of weapons at the gun range, SWAT exercises, and live fire training. In addition, occasional bomb disposal operation training occurs on a portion of the facility site. The training operations generally occur from 8 A.M. to 11 P.M., Monday through Friday, with occasional operations on weekends; however, the bomb disposal training operations do not have a regular schedule and may occur during day or night, as needed. Based on a study conducted in June of 2000, the noise associated

[4] *County of San Bernardino, "Glen Helen Specific Plan Revised Draft EIR", Appendix E – Noise Study. Pages 7, 8, and 16.*

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with blast operations of 10 pounds of dynamite with a 1 pound booster (among loudest practices), as measured at the property line nearest to the project site boundary, reached a maximum level (L_{max}) of 55.1 dBA.[5] According to County Noise Ordinance, the L_{max} at the residential use property line shall not exceed 75 dBA during the day or 65 dBA during night. As such, based on the study and the recorded values for nighttime experiments, the maximum noise level, did not exceed the County's standards of 75 dBA for daytime peak noise level and 65 dBA nighttime peak noise level.[6] It should be noted that because a blast lasts only a fraction of a second, L_{eq} and other time weighted values are not applicable.

While larger charges may be exploded at the facility, they would only be done so as a requirement of emergency procedures. Chapter 9, Section 87.0905(e), of the County Performance Standards "Exempt Noises", notes that the noise from "Emergency equipment, vehicles, and devices" is exempt for local regulation. Furthermore, because the blast noises are of such short duration, they do not add measurably to the ambient noise level which is logarithmically averaged over a 24-hour period. Based on this information, no further characterization of bomb disposal activities is necessary. However, long-term measurements near the project site property line were conducted to determine whether gun range activities exceed the County Performance Standards.

Sunwest Materials Mining Operations: The quarry and a tile manufacturing facility are located between the project's Neighborhood II and Neighborhood III. These facilities generally operate in coordination with each other and operate between 5 A.M. and 5 P.M. Monday through Friday. As no previous studies were available, long-term measurements along the project site property line (nearest to the mining operations) were conducted to determine whether noise levels from these facilities exceed the County Performance Standards.

3.3.2 Ambient Noise Measurement

To characterize the existing noise environment on the project site, four long-term ambient sound measurements were conducted continuously from June 2nd to June 5th, 2006 (locations R1 to R4). In addition, ambient noise levels at three locations near the project sites (locations R5, R6A and R6B), measured from March 23rd to March 26th, 2006 are also included in the analysis.[7] The monitoring locations are identified in Figure 2 on page 5.

Monitoring location R1 was located at the south side of the project boundary, approximately 50 feet north Riverside Avenue, to characterize the ambient noise along the

[5] *County of San Bernardino, "Glen Helen Specific Plan Revised Draft EIR", Appendix E – Noise Study, Page 17.*

[6] *Ibid.*

[7] *Lytle Creek North, Noise Assessment Technical Report, PCR Services Corporation 2006.*

project south boundary. Location R2 was located near the northeast corner of the Neighborhood II and the quarry area to provide ambient noise including the mining and tile manufacturing facilities. Location R3 was located at the east side of Neighborhood III, also near the quarry area. Location R4 was located approximately center of Neighborhood III, north boundary of residential area.

Location R5 is close to the southeast corner of Neighborhood I and the Sheriff's Training Facility to provide ambient noise levels from the gun range. Locations R6A and 6B are approximately 30 feet and 200 feet from I-15 and were selected to characterize the noise level from traffic on I-15. A summary of noise measurement data is provided in Table 6 on page 18.

As shown, the measured CNEL at locations R2, R3 and R4 (51.6 dBA to 59.8 dBA) are below the County's Performance Standards for residential development, i.e. less than 60 dBA CNEL. Based on the measurement data, proposed residential uses would not be subject to noise levels from the Sheriff's Training Facility or Sunwest Materials that exceed the County's Performance Standards (R2, R3, R4 and R5). However, noise levels near Riverside Avenue (R1) and I-15 (R6A and R6B) substantially exceed the County's Performance Standards, and as such, exterior noise levels must be mitigated to 65 dBA CNEL through a reasonable application of the best available noise reduction technology and interior noise exposure must not exceed 45 dBA CNEL with windows and doors closed.

To further characterize the area's noise environment, the CNEL generated by existing traffic on local roadways was established using a spreadsheet noise model based on calculation methodology provided in the Caltrans Technical Noise Supplement (TeNS) document and traffic volume data provided by the project's traffic consultant.[8] The roadway noise calculation procedures provided in the Caltrans TeNS are consistent with Federal Highway Administration RD-77-108 roadway noise prediction methodologies.[9] This methodology allows for the definition of roadway configurations, barrier information (if any), and receiver locations. To represent a simplified analysis, consistent with the amount of project related technical information currently available, the noise model assumes a "hard" site condition (i.e., this is a conservative assumption which limits sound attenuation due to ground condition to a maximum of 3 dBA per doubling of distance) and no barriers between the roadway and receivers.

The traffic noise prediction model calculates the 24-hour CNEL noise levels based on specific information including; Average Daily Traffic Volume (ADT), percentages of day, evening and nighttime traffic volumes relative to ADT, vehicle speed and distance between the noise receptor and the roadway. As indicated in Table 7 on page 19, the calculated CNEL from

[8] *Traffic Impact Analysis Report for the Lytle Creek Ranch Planned Development Project, Crain & Associates, August 2007.*

[9] *Technical Noise Supplement, TeNS, California Department of Transportation, October 1998.*

Table 6

Summary of Measured Ambient Noise Measurements (dBA) [a]

Receptor Location [b]	Date	CNEL	L_{eq} (1-hour) Daytime Avg.	Daytime Min	Daytime Max	Nighttime Avg	Nighttime Min	Nighttime Max
R1 – South boundary of Neighborhood III, 50 feet north of Riverside Avenue								
Weekday	6/02/06	70.7	64.9	63.3	66.4	63.9	58.7	67.9
Weekend	6/03/06	68.7	63.0	61.7	64.3	61.4	60.0	62.6
Weekend	6/04/06 [c]	--	--	--	--	--	--	--
Weekday	6/05/06 [c]	--	--	--	--	--	--	--
R2 – Northeast boundary of Neighborhood II								
Weekday	6/02/06	57.6	50.4	43.4	56.3	50.6	43.1	54.9
Weekend	6/03/06	52.4	47.0	41.1	50.5	45.3	41.9	46.6
Weekend	6/04/06	51.6	49.2	42.0	58.3	43.3	40.4	47.3
Weekday	6/05/06	59.8	49.1	43.2	51.9	53.7	40.0	62.4
R3 – West of Neighborhood III								
Weekday	6/02/06	58.0	49.0	42.1	52.4	51.7	44.4	58.4
Weekend	6/03/06	58.4	49.4	43.4	54.8	51.9	45.3	55.6
Weekend	6/04/06	55.6	48.8	44.6	55.6	49.0	44.3	52.8
Weekday	6/05/06	54.9	48.6	43.8	51.6	47.9	45.8	49.6
R4 – North side of Residential area of Neighborhood III								
Weekday	6/02/06	55.6	49.4	43.9	55.6	49.0	42.9	54.2
Weekend	6/03/06	51.9	48.4	41.6	54.9	44.5	42.0	48.3
Weekend	6/04/06	54.2	49.3	41.4	56.5	47.1	41.7	54.2
Weekday	6/05/06	55.2	54.4	45.0	61.3	46.3	40.1	49.7
R5 – East of Neighborhood I, near the Gun Ranges								
Weekday	3/23/06 [d]	61.6	60.8	43.9	65.9	52.7	44.2	60.9
Weekday	3/24/06	55.7	51..8	42.8	57.0	48.4	44.6	53.1
Weekend	3/25/06	49.8	49.3	38.5	53.8	40.2	35.3	43.4
Weekend	3/26/06	52.0	50.8	42.5	55.4	43.0	30.7	46.6
R6A – Northwest corner of Neighborhood IV, 200 feet from I-15 right-of-way								
Weekday	3/23/06	71.8	66.2	62.4	69.1	64.7	60.4	66.7
Weekday	3/24/06	73.1	68.6	67.3	70.1	65.7	62.7	67.3
Weekend	3/25/06	75.2	69.0	68.0	70.3	68.5	65.9	70.8
Weekend	3/26/06	72.1	67.4	61.4	69.4	64.4	59.0	69.5
R6B – Northwest corner of Neighborhood IV, 30 feet from I-15 right-of-way								
Weekday	3/23/06	82.7	77.1	76.0	78.4	75.8	72.5	78.4
Weekday	3/24/06	83.4	78.3	76.1	79.6	76.4	73.7	79.2
Weekend	3/25/06	82.4	77.9	75.4	78.8	75.2	73.8	77.8
Weekend	3/26/06	81.3	76.9	72.5	78.4	73.7	70.1	77.8

[a] *Based on ambient sound measurements conducted from June 2nd to 5th, 2006, using Larson-Davis 820 Type 1 Integrating Sound Level Meters. Noise measurement data is provided in the Appendix. Noise data for locations 5, 6A and 6B were extracted from the noise study for the Lytle Creek North Project, (PCR 2006)*

[b] *Noise measurement locations are depicted in Figure 1 on page 4.*

[c] *No noise measurement taken.*

[d] *Elevated noise levels are a result of ongoing construction activities near the monitoring locations.*

Source: PCR Services Corporation, 2007.

Table 7

Existing Vehicular Traffic Noise Levels

Roadway Segment	Adjacent Noise Sensitive Land Use	Existing CNEL (dBA) at Referenced Distances from Roadway Right-of-Way[a]		
		Adjacent	25 Feet	50 Feet
Lytle Creek Road				
West of Sierra Ave.	Residential	64.8	62.3	60.8
Riverside Avenue				
Between Sierra Ave. & Alder Ave.	Residential	70.9	68.4	66.9
Between Alder Ave. & Locust Ave.	Residential	70.3	67.9	66.3
Between Locust Ave. & Linden Ave.	Residential	71.7	69.3	67.7
Between Linden Ave. & Knollwood Ave.	Residential / School	72.7	70.2	68.7
Between Knollwood Ave. & Country Club Dr.	Residential	73.2	70.8	69.2
East of Country Club Dr.	Residential/ School	73.0	70.6	69.0
Between Easton St. & Baseline Rd.	Residential	72.4	69.9	68.4
South of Baseline Rd.	Residential	72.2	69.8	68.2
Baseline Road				
West of Sierra Ave.	Residential	69.6	67.2	65.6
Between Sierra Ave. & Alder Ave.	Residential	70.6	68.1	66.6
Between Alder Ave. & Ayala Dr.	Residential	71.8	69.3	67.8
Between Ayala Dr. & Riverside Ave.	Residential	72.7	70.3	68.7
East of Riverside Ave.	Residential	72.4	70.0	68.4
Sierra Avenue				
South of Summit Ave.	Residential	71.6	69.2	67.6
North of Baseline Rd.	Residential	71.1	68.7	67.1
South of Baseline Rd.	Residential	70.6	68.2	66.6
Summit Avenue				
Between I-15 & Sierra Ave.	Residential	72.3	69.8	68.3
Casa Grande Drive				
West of Alder Ave.	Residential	64.0	61.0	59.2
East of Alder Ave.	Residential	66.5	63.6	61.8
Live Oak Avenue				
South of Riverside Ave.	Residential	66.0	63.6	62.0
Alder Avenue				
Between Riverside Ave. & Casa Grande Dr.	Residential / School	68.3	65.3	63.5
Between Casa Grande Dr. & Casmalia St.	Residential	67.1	64.1	62.3
Between Easton St. & Baseline Rd.	Residential	69.7	67.2	65.7
South of Baseline Rd.	Residential	68.8	66.3	64.8
Locust Avenue				
South of Riverside Ave.	Residential	67.4	64.4	62.6
Linden Avenue				
South of Riverside Ave.	Residential	62.6	60.2	58.6

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Table 7 (Continued)

Existing Vehicular Traffic Noise Levels

Roadway Segment	Adjacent Noise Sensitive Land Use	Existing CNEL (dBA) at Referenced Distances from Roadway Right-of-Way[a]		
		Adjacent	25 Feet	50 Feet
Ayala Drive				
South of Riverside Ave.	Residential	69.7	66.7	65
Knollwood Avenue				
North of Riverside Ave.	Residential	61.2	58.2	56.4
Country Club Drive				
North of Riverside Ave.	Residential	65.1	62.2	60.4
Cedar Avenue				
South of Baseline Rd.	Residential	70.3	67.9	66.3
State Street				
North of Highland Ave.	Residential	66.9	64.5	62.9
Palm Avenue				
East of I-215	Residential	72.0	69.5	68.0
University Parkway				
East of I-215	Residential	70.5	68.3	66.9
Cajon Boulevard				
South of Glen Helen Parkway	Residential	66.9	64.5	62.9

[a] *Calculated based on existing traffic volumes.*

Source: PCR Services Corporation, 2007.

existing traffic volumes on the analyzed roadway segments ranged from 58.2 dBA along Knollwood Avenue to 70.8 dBA along Riverside Avenue at 25 feet from the roadway right-of-way. These CNEL noise levels are based on surface-street traffic volumes only.

4.0 IMPACT ANALYSIS & MITIGATION MEASURES

4.1 THRESHOLDS OF SIGNIFICANCE

Based on the regulatory framework described in Section 3.2, thresholds provided by the Lead Agency (preparing the project EIR document), and in accordance with significance criteria established by Appendix G of the State CEQA Guidelines, a significant impact could occur if the proposed project results in:

- Exposure of persons to or generation of noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies.
- Exposure of persons to or generate excessive ground-borne vibration or ground-borne noise levels.
- A substantial permanent increase in ambient noise levels in the vicinity of the project above levels existing without the project.
- A substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project.

4.1.1 Construction Noise

Construction noise is a short-term temporary event, is expected to occur only during daytime hours; such as 7:00 A.M. to 7:00 P.M., and is considered a common necessity for new development. There are residential uses in the Cities of Rialto and Fontana that are adjacent to the project site and could potentially be impacted by the project construction noise. While both the Cities of Rialto and Fontana do not have an established significance threshold for construction noise, compliance with the City's Municipal Code (construction hours limits as described Section 3.2.4.2) shall be considered to result in a less than significant impact for purposes of this project.

4.1.2 Operational Noise

As previously discussed, with respect to the community noise assessment, changes in noise levels of less than 3 dBA are generally not discernable to most people, while changes greater than 5 dBA are readily noticeable and would be considered a significant increase. Therefore, the significance threshold is based on human perceptibility to changes in noise levels

(increases), with consideration of existing ambient noise conditions, and City's land use noise compatibility guidelines (Table 5 on page 14). A threshold of 5 dBA is used where existing ambient noise conditions fall within the City's acceptable noise environment. Generally, the dividing line for acceptable noise is between "*normally compatible*" and "*normally incompatible*" as described Table 5. Where the existing ambient noise level is already above the City's acceptable noise zone, a more conservative 3 dBA threshold is used. Therefore, the proposed project would have a significant impact if one of the two following criteria is exceeded:

- **Criteria 1** - The proposed project would cause ambient noise levels to increase by 5 dBA CNEL or more at a sensitive receptor location and the resulting noise is 65 dBA CNEL or lower; or

- **Criteria 2** - The Proposed Project would cause ambient noise levels to increase by 3 dBA CNEL or more at a sensitive receptor location and the resulting noise exceeds 65 dBA CNEL.

In addition to the project operational noise impacts onto off-site sensitive receptors, the proposed project would normally be deemed to produce a significant or potentially significant impact if the project would:

- Place residential unit in proximity to an external noise sources, in an annual CNEL of 45 dBA or greater in any habitable room.

- Produce or expose sensitive receptors to vibrations with a motion velocity of 0.01 inches/second over the range of 1 to 100 Hz beyond the property boundaries.

4.2 CONSTRUCTION IMPACTS

The project will be built-out in four phases or neighborhoods (Neighborhoods I, II, III, and IV) with build-out occurring by 2030 or as required by an approved development agreement. It is anticipated that construction will begin in Neighborhood I, followed by development in Neighborhoods II and III. Neighborhood IV will likely be the final neighborhood to be developed. These phases may occur either sequentially or concurrently with one another and the phasing is subject to change in response to market conditions and demand

Project development activities would primarily include site preparation (grading and excavation) and construction of internal roadways and other infrastructure, driveways, and structures. In order to construct the proposed improvements, the on-site areas would be graded with a total of approximately four million cubic yards of earthwork. The cut and fill would be balanced at the project site and soil is not expected to be imported or exported. Site preparation activities typically involve the use of heavy equipment, such as scrapers, dozers, tractors, loaders

etc. Trucks would also be used to deliver equipment and building materials, and to haul away landscape and construction debris. Smaller equipment, such as jackhammers, pneumatic tools, saws, and hammers would also be used throughout the site during the construction phases.

The construction noise impact analysis assumes that all site grading and major roadway/infrastructure construction would occur prior to any on-site building construction, although these construction stages would overlap to some degree. In such an event, the overlap would cause only minimal increases in construction noise because, among other reasons, sound pressure levels are added logarithmically rather than arithmetically and construction activities would be spatially located in different areas of the project site.

4.2.1 Construction Equipment Noise Levels

Individual pieces of construction equipment that would be used for project construction produce maximum noise levels of 76 dBA to 90 dBA at a reference distance of 50 feet from the noise source, as shown in Table 8 on page 24. These maximum noise levels would occur when equipment is operating under full power conditions or during "impact" activities such as percussive pile driving. However, equipment used on construction sites often operates under less than full power condition, or part power. Actual measurements performed while equipment is performing work indicate that shift-long equivalent L_{eq} sound levels are typically 2 dBA to 15 dBA less than the maximum noise levels identified in Table 8.[10]

To more accurately characterize construction-period noise levels, the average (L_{eq}) noise level associated with each construction stage is provided in Table 9 on page 25. These average noise levels are based on the quantity, type, and usage factors for each type of equipment that would be used during each construction stage, and is typically attributable to multiple pieces of equipment operating simultaneously. As shown in Table 9, the average construction-period noise level is expected to range from 79 dBA to 89 dBA at a reference distance of 50 feet. Higher construction noise values (I.E., 89 dBA) represent older generation of equipment with minimal or either old sound suppression technologies. Today's construction equipment are equipped with "state of art" noise suppressions devices such as mufflers, sound attenuated engine enclosures and lower engine noise technologies. In the interest of conservatism, the project construction noise analysis utilizes the higher the upper level of construction noise levels, 89 dBA.

In general, the first and noisiest construction phase is site preparation (i.e., grading and excavation), which would involve movement of construction equipment to the project site, earth moving, and compaction of soils. High noise levels created during site preparation would be

[10] *Beranek and Ver, Noise and Vibration Control Engineering, Principles and Applications, p. 652, 1992.*

Table 8

Maximum Noise Levels Generated by Typical Construction Equipment

Type of Equipment	Maximum Sound Levels at Indicated Distance (dBA)[a]			
	25 feet	50 feet	100 feet	200 feet
Air Compressor	84	78	72	66
Backhoe	84	78	72	66
Concrete Mixer	85	79	73	67
Crane, Mobile	87	81	75	69
Dozer	88	82	76	70
Grader	91	85	79	73
Jack Hammer	95	89	83	77
Loader	85	79	73	67
Paver	83	77	71	65
Pneumatic Tool	91	85	79	73
Pump	87	81	75	69
Roller	86	80	74	68
Saw (concrete)	96	90	84	78
Scraper	90	84	78	72
Truck	82	76	70	64
Minimum Sound Level	82	76	70	64
Maximum Sound Level	96	90	84	78

[a] *Sound levels at 25 feet, 100 feet and 200 feet are calculated based on reference noise levels at 50 feet. Calculation assumes a drop-off rate of 6-dB per doubling of distance, which is appropriate for use in characterizing point-source (such as construction equipment) sound attenuation over a hard surface propagation path.*

Source: FHWA Roadway Construction Noise Model User's Guide, Table 1, 2006; and PCR Services Corporation, 2007.

associated with the operation of heavy-duty trucks, scrapers, dozers, graders, backhoes, and front-end loaders. The estimated noise level during site preparation is approximately 89 dBA at a distance of 50 feet from the construction site.

During the second stage of construction, foundation forms are constructed and concrete foundations are poured. Primary noise sources include heavy concrete trucks and mixers, cranes, and pneumatic drills, with an estimate average noise level of 78 dBA at 50 feet from the construction site.

The third and fourth stages consist of interior and exterior building construction, and site cleanup. Primary noise sources associated with the third phase include hammering, diesel generators, compressors, and light truck traffic. Noise levels are typically 85 dBA range at a

Table 9

Construction Stage/Phase / Process Average L_{eq} Noise Levels by Distance

Construction Stage/ Phase/ Process	Referenced Sound Level in dBA (L_{eq}) at Indicated Distance[a, b]				
	25 Feet	50 Feet[a]	100 Feet	150 Feet	200 Feet
Site Preparation / Grading	95	89	83	79	77
Foundations	84	78	72	68	66
Structural	91	85	79	75	73
Finishing	95	89	83	79	77

Notes:

[a] *Reference sound levels used for this project are based on published data from the L.A. CEQA Thresholds Guide, Exhibit I.1-2 on page I.1-9, dated 2006. . The L.A. CEQA Thresholds Guide noise levels are based on the information provided by U.S. EPA document "Noise from Construction Equipment and Operations, Building Equipment, and Home Appliances Dated 1971", as referenced in Exhibit I.1-2. The reference sound levels are with all pertinent equipment present at site, as indicated in the U.S. EPA document, Table 1-b.*

[b] *Sound levels at 25 feet, 100 feet, 150 feet and 200 feet are calculated based on the reference noise levels at 50 feet. Calculation assumes a hard surface propagation path drop-off rate of 6-dB per doubling of distance, which is appropriate for use in characterizing point-source (such as construction equipment) sound attenuation.*

Source: L.A. CEQA Thresholds Guide, 2006; U.S. EPA Noise from Construction Equipment and Operations, Building Equipment, and Home Appliances, 1971; and PCR Services Corporation, 2007.

distance of 50 feet. The fifth and final stage typically involves the use of trucks, landscape rollers and compactors, with noise levels in the 89 dBA range at 50 feet distance.

4.2.1 Grading Noise Impacts

It is assumed that on-site grading would be completed prior to building construction; therefore, future on-site residences are not expected to be exposed to noise from grading operations. Currently, the nearest existing residential uses are located along the south boundary of Neighborhood II development. Other existing residential uses are located along the south side of Neighborhoods III and IV development, along the south side of Riverside Avenue and Lytle Creek Road, respectively.

High noise levels created during grading would be associated with the operation of heavy-duty haul trucks, scrapers, graders, backhoes, front-end loaders, and water trucks. When construction equipment is operating, noise levels would be approximately 89 dBA at a distance of 50 feet from the perimeter of construction activities. Grading would occur over much of the proposed development area, with grading occurring within 25 feet of the western and southernmost boundaries.

4.2.2 Building Construction Noise Impacts

This phase includes infrastructure, building construction, finish grading, and site cleanup. Primary noise sources associated with this phase include backhoes, loaders, hammering, diesel generators, compressors, forklifts, cranes, concrete trucks (for sidewalks, driveways, and patios), and light truck traffic. Noise levels would typically range from 78 to 89 dBA range at a distance of 50 feet.

Noise levels generated during building construction would primarily affect occupants of on-site uses constructed in the project's early development phases. Any on-site location with an uninterrupted line of sight to the construction noise sources could periodically be exposed to temporary noise levels that would exceed 75 dBA at less than 150 feet.

4.3 OPERATIONAL IMPACTS

This section includes impact assessment of potential noise sources related to the long-term operations of the proposed project to neighboring noise sensitive land uses. As the project builds out, on- and off-site noise levels would increase with contributions from project-generated traffic, and from residential related activities on the project site itself. In addition, the affect of the future traffic noise environment on the proposed residential uses is also evaluated. These potential noise impacts are discussed separately below.

4.3.1 Off-Site Traffic Noise

According to the traffic study, off-site traffic attributed to the proposed project would increase over the total daily traffic traveling along the major thoroughfares within the project vicinity. This increase in roadway traffic volumes was analyzed to determine if any traffic-related noise impacts would result from project development. Potential noise impacts due to project related off-site traffic were analyzed by estimating the increase in noise levels due to project-related traffic (year 2030, full build-out) compared with the existing (2007) traffic noise conditions. This is a conservative analysis, as the project would be phased with an anticipated build-out in 2030 and the ambient noise would also increase due to increase traffic (from anticipated ambient growth and other approved projects). Table 10 on page 27 provides the calculated CNEL for the analyzed roadway segments under the existing conditions, existing conditions with development of the proposed project and the increase attributed to project-generated traffic volumes relative to the existing conditions. The highest increase in traffic noise would be along roadway segments that surrounding or entering to the project site. As indicated in Table 10, the following four roadway segments would have a noise increase, Project full build-out compared with current ambient sound levels, ranged from 3.5 to 5.7 dBA CNEL due to project-related traffic.

Table 10

Off-Site Traffic Noise Analysis (Project Impact)

Roadway Segment	Calculated Traffic Noise Levels at 25 feet from Roadway Right-of-Way, CNEL (dBA)		
	Existing (2007) Conditions	**Existing with Project[a]**	**Project Increment**, dBA
Lytle Creek Road			
West of Sierra Ave.	62.3	65.8	3.5
Riverside Avenue			
Between Sierra Ave. & Alder Ave.	68.4	72.8	4.4
Between Alder Ave. & Locust Ave.	67.9	72.0	4.1
Between Locust Ave. & Linden Ave.	69.3	71.8	2.5
Between Linden Ave. & Knollwood Ave.	70.2	73.0	2.8
Between Knollwood Ave. & Country Club Dr.	70.8	72.5	1.7
East of Country Club Dr.	70.6	72.5	1.9
Between Easton St. & Baseline Rd.	69.9	70.3	0.4
South of Baseline Rd.	69.8	70.1	0.3
Baseline Road			
West of Sierra Ave.	67.2	67.3	0.1
Between Sierra Ave. & Alder Ave.	68.1	68.2	0.1
Between Alder Ave. & Ayala Dr.	69.3	69.4	0.1
Between Ayala Dr. & Riverside Ave.	70.3	70.2	-0.1
East of Riverside Ave.	70.0	70.0	0.0
Sierra Avenue			
South of Summit Ave.	69.2	69.4	0.2
North of Baseline Rd.	68.7	69.0	0.3
South of Baseline Rd.	68.2	68.5	0.3
Summit Avenue			
Between I-15 & Sierra Ave.	69.8	70.0	0.2
Casa Grande Drive			
West of Alder Ave.	61.0	62.6	1.6
East of Alder Ave.	63.6	65.0	1.4
Live Oak Avenue			
South of Riverside Ave.	63.6	66.1	2.5
Alder Avenue			
Between Riverside Ave. & Casa Grande Dr.	65.3	67.8	2.5
Between Casa Grande Dr. & Casmalia St.	64.1	66.9	2.8
Between Easton St. & Baseline Rd.	67.2	68.0	0.8
South of Baseline Rd.	66.3	67.0	0.7
Locust Avenue			
South of Riverside Ave.	64.4	65.3	0.9
Linden Avenue			
South of Riverside Ave.	60.2	62.1	1.9

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Table 10 (Continued)

Off-Site Traffic Noise Analysis (Project Impact)

Roadway Segment	Calculated Traffic Noise Levels at 25 feet from Roadway Right-of-Way, CNEL (dBA)		
	Existing (2007) Conditions	**Existing with Project[a]**	**Project Increment**, dBA
Ayala Drive			
South of Riverside Ave.	66.7	68.4	1.7
Between Easton St. & Baseline Rd.	70.5	71.3	0.8
Knollwood Avenue			
North of Riverside Ave.	58.2	60.2	2.0
Country Club Drive			
North of Riverside Ave.	62.2	67.9	5.7
Cedar Avenue			
South of Baseline Rd.	67.9	67.9	0.0
State Street			
North of Highland Ave.	64.5	64.9	0.4
Palm Avenue			
East of I-215	69.5	69.7	0.2
University Parkway			
East of I-215	68.3	68.4	0.1
Cajon Boulevard			
South of Glen Helen Pkwy.	64.5	65.4	0.9

[a] *Noise level due to existing plus project build-out traffic volumes.*

Source: PCR Services Corporation, 2008.

- Lytle Creek Road west of Sierra Avenue;
- Riverside Avenue between Sierra Avenue & Alder Avenue;
- Riverside Avenue between Alder Avenue & Locust Avenue; and
- Country Club Drive north of Riverside Drive.

All other roadway segments would be less than the 3.0 dBA CNEL increase in noise levels. The increase in noise levels due to project-related full build-out traffic would be less than significant impact under Significance Criterion 1.[11] However, noise levels at noise sensitive uses along Lytle Creek Road, Riverside Drive, and Country Club Drive, would exceed the project's

[11] *Criterion 1 relates to an increase by 5 dBA CNEL or more at a sensitive receptor location and the resulting noise is 65 dBA CNEL or lower.*

3 dBA significance threshold and would be considered unacceptable under the City and County guidelines (i.e., 65 dBA CNEL) noise standard for sensitive uses. The proposed Mitigation Measure N-5 (described below) would reduce the exterior noise at the future residential development to meet City's noise standard. There are existing sound walls at the existing residential uses along the south side of Riverside Drive between Sierra Avenue and Locust Avenue, which would provide noise reduction from traffic Riverside Drive. There are no feasible mitigation measures for the existing residential uses along Lytle Creek Road (west of Sierra Avenue) and Country Club Drive (north of Riverside Drive). Therefore, project noise impacts at these locations would be considered significant under Significance Criterion 2.[12]

The cumulative noise impacts due to roadway traffic have been assessed based on the level difference between noise generated by existing and future traffic volumes projected at the project build-out (Year 2030). The future traffic volumes at project build-out include ambient growth, known proposed or potential projects in the proximity of the project area, and the proposed project. Table 11 on page 30 provides the calculated CNEL for the analyzed roadway segments for the following scenarios: existing conditions, future (year 2030) without development of the project; future (year 2030) with project full build-out; the increase attributed to project-generated traffic, and the cumulative increase above existing noise levels. As indicated in Table 11, the following eight roadway segments would have a cumulative noise increase ranged from 3.1 to 7.2 dBA CNEL, which would exceed the project's 3.0 dBA significance threshold and would be considered significant impacts, under Significance Criterion 2. The cumulative traffic noise increase at all other roadways would be less than the 3.0 dBA significance threshold, which would be considered less than significant.

- Lytle Creek Road west of Sierra Avenue – Cumulative increase 7.2 dBA, project's contribution 0.8 dBA);
- Riverside Avenue between Sierra Avenue & Alder Avenue – Cumulative increase 4.3 dBA, project's contribution 2.9 dBA);
- Riverside Avenue between Alder Avenue & Locust Avenue – Cumulative increase 4.2 dBA, project's contribution 3.1 dBA;
- Casa Grande Drive west of Alder Avenue – Cumulative increase 5.0 dBA, project's contribution 0.3 dBA);
- Alder Avenue between Casa Grande Drive & Casmalia Street – Cumulative increase 5.2 dBA, project's contribution 0.5 dBA);

[12] *Criterion 2 relates to an increase by 3 dBA CNEL or more at a sensitive receptor location and the resulting noise exceeds 65 dBA CNEL.*

Table 11

Off-Site Traffic Noise Analysis (Cumulative)

Roadway Segment	Calculated Traffic Noise Levels at 25 feet from Roadway Right-of-Way, CNEL (dBA)			Project Increment [a], dBA	Cumulative Increment [b], dBA
	Existing Conditions	Future No Project	Future with Project		
Lytle Creek Road					
West of Sierra Ave.	62.3	68.7	69.5	0.8	7.2
Riverside Avenue					
Between Sierra Ave. & Alder Ave.	68.4	69.8	72.7	2.9	4.3
Between Alder Ave. & Locust Ave.	67.9	69.0	72.1	3.1	4.2
Between Locust Ave. & Linden Ave.	69.3	69.8	71.9	2.1	2.6
Between Linden Ave. & Knollwood Ave.	70.2	70.6	72.6	2.0	2.4
Between Knollwood Ave. & Country Club Dr.	70.8	70.9	71.8	0.9	1.0
East of Country Club Dr.	70.6	69.7	71.1	1.4	0.5
Between Easton St. & Baseline Rd.	69.9	70.3	70.0	-0.3	0.1
South of Baseline Rd.	69.8	70.1	69.7	-0.4	-0.1
Baseline Road					
West of Sierra Ave.	67.2	67.9	67.3	-0.6	0.1
Between Sierra Ave. & Alder Ave.	68.1	68.7	68.1	-0.6	0.0
Between Alder Ave. & Ayala Dr.	69.3	68.7	68.2	-0.5	-1.1
Between Ayala Dr. & Riverside Ave.	70.3	69.7	68.9	-0.8	-1.4
East of Riverside Ave.	70.0	70.3	70.0	-0.3	0.1
Sierra Avenue					
South of Summit Ave.	69.2	69.9	69.4	-0.5	0.2
North of Baseline Rd.	68.7	70.2	69.8	-0.4	1.1
South of Baseline Rd.	68.2	70.0	69.5	-0.5	1.3
Summit Avenue					
Between I-15 & Sierra Ave.	69.8	69.4	68.9	-0.5	-0.9
Casa Grande Drive					
West of Alder Ave.	61.0	65.7	66.0	0.3	5.0
East of Alder Ave.	63.6	63.6	64.3	0.7	0.7
Live Oak Avenue					
South of Riverside Ave.	63.6	64.6	66.2	1.6	2.6
Alder Avenue					
Between Riverside Ave. & Casa Grande Dr.	65.3	64.5	66.7	2.2	1.4
Between Casa Grande Dr. & Casmalia St.	64.1	68.8	69.3	0.5	5.2
Between Easton St. & Baseline Rd.	67.2	69.1	68.9	-0.2	1.7
South of Baseline Rd.	66.3	69.1	68.8	-0.3	2.5
Locust Avenue					
South of Riverside Ave.	64.4	61.7	63.1	1.4	-1.3

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Table 11 (Continued)

Off-Site Traffic Noise Analysis

Roadway Segment	Calculated Traffic Noise Levels at 25 feet from Roadway Right-of-Way, CNEL (dBA)			Project Increment [a], dBA	Cumulative Increment [b], dBA
	Existing Conditions	Future No Project	Future with Project		
Linden Avenue					
South of Riverside Ave.	60.2	59.0	60.7	1.7	0.5
Ayala Drive					
South of Riverside Ave.	66.7	67.2	67.8	0.6	1.1
Between Easton St. & Baseline Rd.	70.5	70.9	70.9	0.0	0.4
Knollwood Avenue					
North of Riverside Ave.	58.2	58.4	59.7	1.3	1.5
Country Club Drive					
North of Riverside Ave.	62.2	62.9	67.3	4.4	5.1
Cedar Avenue					
South of Baseline Rd.	67.9	70.6	69.9	-0.7	2.0
State Street					
North of Highland Ave.	64.5	68.8	68.3	-0.5	3.8
Palm Avenue					
East of I-215	69.5	70.4	69.8	-0.6	0.3
University Parkway					
East of I-215	68.3	70.1	69.5	-0.6	1.2
Cajon Boulevard					
South of Glen Helen Pkwy.	64.5	67.9	67.6	-0.3	3.1

[a] *Increase relative to traffic noise levels associated with ambient growth without the project compared with ambient growth plus project development.*

[b] *Cumulative increase relative to existing traffic noise levels, resulting from ambient growth and related projects, plus project development.*

Source: PCR Services Corporation, 2007.

- Country Club Drive north of Riverside Drive – Cumulative increase 5.1 dBA, project's contribution 4.4 dBA);
- State Street north of Highland Avenue – Cumulative increase 3.8 dBA, project's contribution -0.5 dBA); and
- Cajon Boulevard south of Glen Helen Parkway - Cumulative increase 3.1 dBA, project's contribution -0.3 dBA).

While significant cumulative noise impacts would result at eight off-site roadway segments (as described above**)**, the project's contribution to the cumulative impacts at six of these off-site roadway segments would be less than the 3.0 dBA thresholds of significance. Therefore, the project's contribution to cumulative noise impacts is considered less than significant. However, the two roadway segments, Riverside Avenue, between Alder Avenue and Locust Avenue and Country Club Drive, north of Riverside Avenue, would have a project related noise increase of 3.1 dBA and 4.4 dBA CNEL, respectively, which would exceed the project's 3.0 dBA significance threshold. As described above, the proposed Mitigation Measure N-5 (described below) would reduce the exterior noise at the future residential development to meet City's noise standard. There are existing sound walls at the existing residential uses along the south side of Riverside Drive between Sierra Avenue and Locust Avenue, which would provide noise reduction from traffic Riverside Drive. Noise mitigation, such as sound walls would not be feasible for the existing residential uses along Country Club Drive, as these homes are fronting the street and addition of sound wall would interfere with the property's access. Main vehicular access to and from these home is provided via driveways along Country Club Drive.

4.3.2 On-Site Noise

Future residents of Lytle Creek Ranch would generate and would be exposed to typical urban on-site noise sources, including people, air conditioning units, lawn care equipment, domestic animals, etc. These noise sources contribute to the ambient noise levels experienced in all similarly-developed areas and typically do not exceed the noise standards for the types of land uses proposed on the Lytle Creek Ranch site. In addition, these noise sources are consistent with adjacent uses in the project vicinity and nearest off-site residences to the project site would experience project-related noise levels consistent with noise levels generated with those existing residences. Therefore, residential-related on-site noise impacts would be less than significant.

Noise from schools and parks would be generated by a variety of sources including voices, public address systems, parking lot use, and most notably sports activities. If located adjacent to residential uses, noise levels from schools and parks may exceed the exterior noise standards presented in the City's Municipal Code for adjacent residential uses. It should be noted that public schools and parks are commonly located near residential areas, in many cases without compatibility problems. Public schools and parks are often designed to incorporate features that make them compatible with adjoining land uses such that noise levels do not exceed the standards set forth in the City Municipal Code. These design features can include, but are not necessarily limited to constructing classrooms buildings such that they serve as a buffer between play fields and residences, locating student pick-up and drop-off areas as far away from residences as feasible and erecting noise attenuation barriers. Nonetheless, as site specific designs for public school and park uses are not available and the adjacencies of noise sensitive uses are not known, it is concluded that school and park uses could generate noise levels in excess of the standards set forth in the City's Municipal Code for residential uses if proper

design consideration and features are not put in place. Therefore, noise impacts on residential uses from school and park activities are considered significant and mitigation measures are required.

4.3.3 Noise Impacts on Future Uses

The existing and future traffic surrounding/within the project site would affect the proposed development. Table 12 on page 34, provides the projected traffic noise levels for roadway segments adjacent to the proposed developments at a reference distances of 25 feet, 50 feet and 100 feet from the edge of a given roadway. As project building layouts and site development plans are not available at this stage of planning for the Lytle Creek Ranch project, the noise model assumes straight line attenuations/reductions in noise levels of 3 dBA per doubling distance (distance from the edge of the roadway to the a road centerline) with no intervening structures. Although the phasing of development by land use and location is not defined, some attenuation of noise levels would occur as intervening structures are built. As indicated on Table 12, the project site would be exposed to noise levels that range from 65.2 dBA CNEL (at 25 feet distance) along Live Oak Ave. (new internal roadway) to 83.5 dBA CNEL along the I-15, which exceed the City's exterior noise standard of 65 dBA CNEL for noise sensitive land uses such as residential development and school. Less noise sensitive uses, such as office buildings and commercial retails would be compatible up to 75 dBA CNEL and 80 dBA CNEL, respectively. Incorporation of the mitigation measures below would reduce potential impacts as described above to a less than significant level.

In addition to the exterior noise impacts, the interior noise environment of new residential construction, attributable to exterior noise sources, shall be limited to 45 dBA CNEL. New residential constructions, typically include the use of stucco walls, double pane windows, solid entrance doors with seals, would provide minimum 20 dBA exterior/interior noise reduction. This assumed that the windows are closed and air ventilation is provided. Where the exterior noise levels exceed 65 dBA CNEL, specially manufactured sound rated windows and/or doors, can be used to achieve the interior noise levels.

4.4 MITIGATION MEASURES

4.4.1 Construction Noise

Based on the above analysis, construction activities would generate noise that exceeds the ambient noise levels at noise sensitive receptors adjacent to the project site.. Therefore, the following mitigation measures are recommended to reduce the construction noise levels.

Table 12

Roadway Noise Levels at Project Site

Roadway Segment	Applicable Project Area	Calculated Traffic Noise Levels at Reference Distance from Roadway, CNEL (dBA)		
		Adjacent	25 feet	50 feet
I-15				
Between Sierra Ave. & Glen Helen Pkwy	Neighborhoods I, III & IV	86.0	83.5	81.9
Glen Helen Parkway				
Between Lytle Creek Rd. & I-15	Neighborhoods I & IV	68.5	66.1	64.5
Lytle Creek Road				
West of Glen Helen Pkwy	Neighborhood IV	73.4	70.9	69.4
East of Glen Helen Pkwy	Neighborhood IV	71.9	69.5	67.9
Sierra Avenue				
Between Lytle Creek Rd. & I-15	Neighborhood IV	73.1	70.7	69.1
Riverside Avenue				
Between Sierra Ave. & Alder Ave.	Neighborhood III	75.1	72.7	71.1
Between Alder Ave. & Locust Ave.	Neighborhood III	74.5	72.1	70.5
Between Locust Ave. & Linden Ave.	Neighborhood III	74.3	71.9	70.3
Live Oak Avenue				
North of Riverside Ave.	Neighborhood III	67.7	65.2	63.7
Alder Avenue				
North of Riverside Ave.	Neighborhood III	69.4	67.0	65.4
Locust Avenue				
North of Riverside Ave.	Neighborhood III	68.5	66.1	64.5
Linden Avenue				
North of Riverside Ave.	Neighborhood II	69.6	67.1	65.6
Country Club Drive				
North of Riverside Ave.	Neighborhood II	70.3	67.3	65.6

Source: PCR Services Corporation, 2007.

N-1: In order to ensure compliance with the noise ordinance of the Cities of Fontana and Rialto Municipal Code, construction activities shall be restricted to the following hours:

- October 1st through April 30th - between 7:00 A.M. and 5:30 P.M. on Weekdays and 8:00 A.M. to 5 P.M. on Saturdays.

- May 1st through September 30th - between 7:00 A.M. and 6:00 P.M. on Weekdays and 8:00 A.M. to 5 P.M. on Saturdays.

N-2: Noise-generating equipment operated at the project site shall be equipped with effective noise control devises, i.e., mufflers, lagging, and/or motor enclosures. All equipment shall be properly maintained to assure that no additional noise, due to worn or improperly maintained parts, would be generated.

N-3: Construction activities shall be scheduled, as much as possible, to avoid operating several pieces of loud equipment simultaneously.

N-4: Effective temporary noise barriers shall be used and relocated, as needed, whenever possible, to block line-of-sight between the construction equipment and the noise-sensitive receptors.

4.4.2 Operation Noise

The following mitigation measures are recommended to reduce the operational related noise impacts from the proposed project:

N-5: Noise barrier shall be constructed along the residential lots and schools that are adjacent to the I-15 Freeway, Lytle Creek Road, Glen Helen Parkway, Sierra Avenue and Riverside Avenue. Depending on the final lots grade elevations relative to the roadway elevations, noise barrier height of approximately 5 to 8 feet would be required the reduce the traffic noise to 65 dBA CNEL at outdoor noise sensitive uses, including residential backyards/courtyards and school playgrounds. A higher noise barrier will be required to mitigate the I-15 Freeway noise. Overall height of noise barrier can be achieved by solid walls, earthen berms or combination of walls and earthen berms. As final site and grading plans are not available at this stage of the project, the final noise barrier height shall be assessed when the final site and grading plans are completed. Therefore, prior to the issuance of grading permits, an acoustical analysis report shall be prepared by a qualified acoustical consultant/ engineer and submitted to the City Engineer by the developer. The report shall specify the noise barriers' height, location, and types capable of achieving the desired mitigation affect.

N-6: The upper levels of residential unit lots adjacent to I-15 Freeway could be exposed to noise levels in excess of the City's noise standard, even with noise barrier. Therefore, it is recommended that no balconies be constructed for residential units facing the I-15 Freeway or provide balconies with a noise barrier to reduce the freeway noise to 65 dBA CNEL. Transparent barrier materials such as plexiglass can be used as noise barrier.

N-7: State Building Code, City of Rialto and County of San Bernardino require that interior noise environment of residential structures (habitable rooms) and school classrooms shall be limit to 45 dBA CNEL. Prior to the issuance of building permit, an acoustical analysis shall be prepared by a qualified acoustical consultant for all new residential and school developments that are within 65 dBA CNEL or higher, for the purpose of documenting that an acceptable interior noise level of 45 dB L_{dn} (or CNEL) or below will be achieved with the windows and doors closed. The report shall be submitted at plan check to the City for approval

N–8: Schools and parks shall be designed in such a manner that:

a) Locate and orient vehicle access points away from residential and/or noise sensitive parcels.

b) Locate loading and shipping facilities away from adjacent noise sensitive uses;

c) Minimize the use of outdoor speakers and amplifiers; and

d) Incorporate fences, walls landscaping and other noise buffers and barriers between incompatible uses, as appropriate.

N–9: Commercial office buildings that are located adjacent to the I-15 Freeway shall be provided with noise barrier (with sufficient height) or buffer zone (with sufficient distance) to reduce the freeway noise levels to 75 dBA CNEL or lower. Overall height of noise barrier can be achieved by solid walls, earthen berms or combination of walls and earthen berms. As final site and grading plans are not available at this stage of the project, the final noise barrier height shall be assessed when the final site and grading plans and proposed building layouts are completed.

N–10: Prior to the issuance of building permit for commercial buildings, an acoustical analysis shall be prepared by a qualified acoustical consultant for all new commercial developments that an acceptable interior noise level of 45 dB L_{dn} (or CNEL) or below, as required by the County's noise standards. The report shall be submitted at plan check to the County/City Building Department for approval.

4.4.3 Level of Significance after Mitigation

With incorporation of the above mitigation measures, construction noise levels would still substantially increase ambient noise levels at noise sensitive receptors within 100 feet from the construction site. However, noise levels will be experienced for short-durations as only

portions of the project site will be under construction at any one time. The majority of the time construction noise levels at sensitive locations will be much lower due to reduced construction activity and the phasing of construction (i.e., construction noise levels at a given location will be reduced as construction activities conclude or move to another more distant location of the site). Regardless, short-term construction noise would be less than significant because all construction activity would proceed in compliance with existing City requirements and proposed conditions of approval (Mitigation Measure N-1). In addition, Mitigation Measures N-2 through N-4 would pro-actively reduce construction generated noise levels to the extent feasible.

With implementation of Mitigation Measures N-5, N-6, and N-9, the exterior noise environments at proposed developments will be reduced to meet the City's and County's noise standards and will reduce the noise impact to less than significant. Implementation of Mitigation Measures N-7 and N-10 will ensure that interior noise environments of residential, school and commercial office structures meet the State, County and City noise insulation requirements. In addition, implementation of Mitigation Measure N-8, noise impacts from the proposed schools and parks onto adjacent residential uses would be reduced to a less than significant level. Thus, would reduce the noise impact to less than significant.

With respect to off-site traffic, the project would contribute a maximum noise level increase 5.7 dBA along roadway segments adjacent to the project site, which would be a significant impact under Significance Criterion 2. Although, Mitigation Measure N-5 would reduce the off-site traffic noise to new developments along the roadway segments adjacent to the project site to a less than significant level. There would be no feasible mitigation measures for the existing residential uses along Country Club Drive since vehicular access to and from the single-family residential uses is provided via driveways along Country Club Drive and construction of noise barrier wall at these locations would interfere with the property's access. Therefore, off-site traffic noise levels would result in significant and unavoidable impacts, for the existing developments along Country Club drive.

APPENDIX A
NOISE CALCULATION WORKSHEETS

PRELIMINARY WORKING DRAFT – Work in Progress

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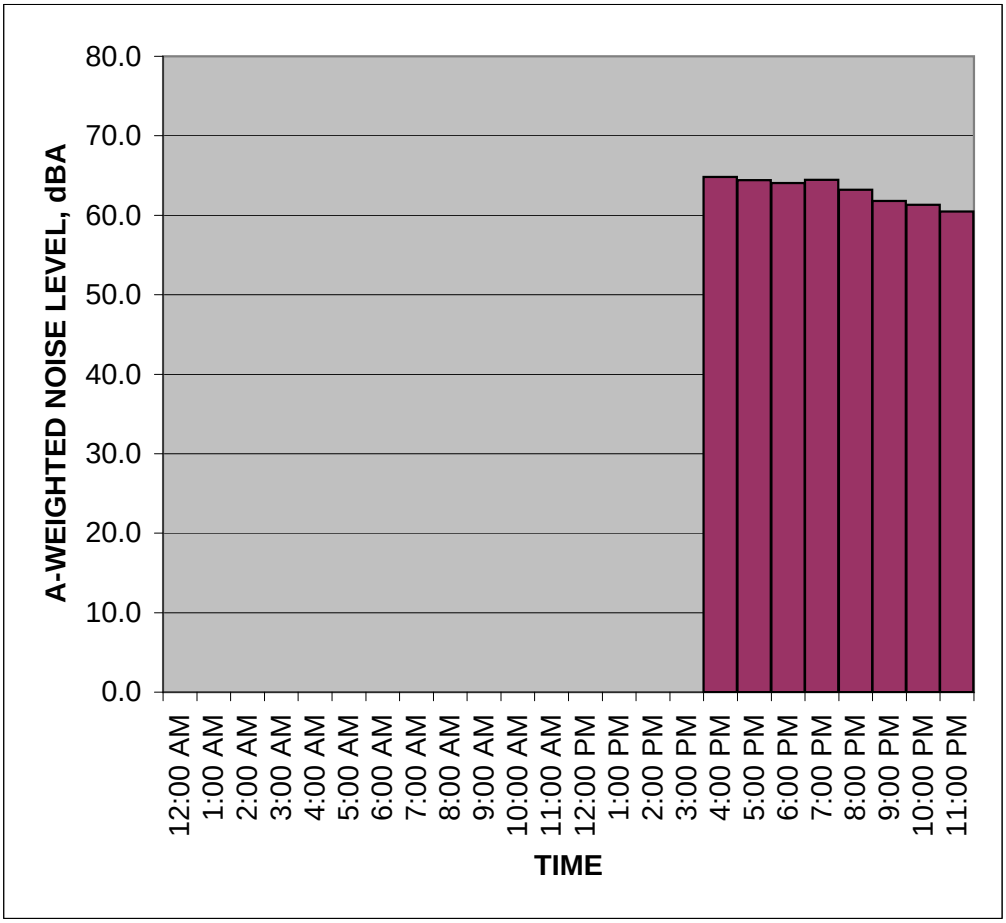
Measured Ambient Noise Levels

Project: Lytle Creek Ranch
Location: R1 - Riverside Ave. (Project South Property Line)
Sources: Ambient

Date: June 1, 2006

TIME	HNL, dB(A)
12:00 AM	0.0
1:00 AM	0.0
2:00 AM	0.0
3:00 AM	0.0
4:00 AM	0.0
5:00 AM	0.0
6:00 AM	0.0
7:00 AM	0.0
8:00 AM	0.0
9:00 AM	0.0
10:00 AM	0.0
11:00 AM	0.0
12:00 PM	0.0
1:00 PM	0.0
2:00 PM	0.0
3:00 PM	0.0
4:00 PM	64.8
5:00 PM	64.4
6:00 PM	64.0
7:00 PM	64.5
8:00 PM	63.2
9:00 PM	61.8
10:00 PM	61.3
11:00 PM	60.5
CNEL, dB(A):	**68.2**



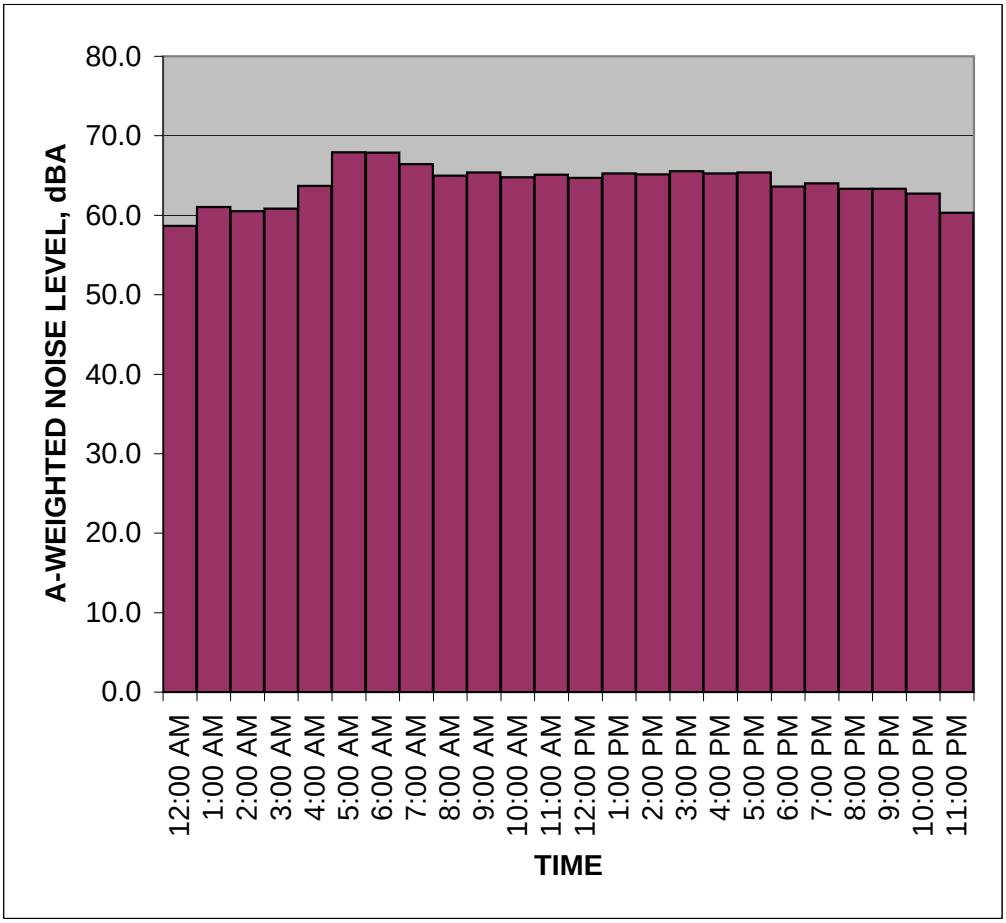
NOTES: Partial 24-hr measurement

Measured Ambient Noise Levels

Project: Lytle Creek Ranch
Location: R1 - Riverside Ave. (Project South Property Line)
Sources: Ambient

Date: June 2, 2006

TIME	HNL, dB(A)
12:00 AM	58.7
1:00 AM	61.0
2:00 AM	60.5
3:00 AM	60.8
4:00 AM	63.7
5:00 AM	67.9
6:00 AM	67.9
7:00 AM	66.4
8:00 AM	65.0
9:00 AM	65.4
10:00 AM	64.8
11:00 AM	65.1
12:00 PM	64.7
1:00 PM	65.3
2:00 PM	65.1
3:00 PM	65.5
4:00 PM	65.3
5:00 PM	65.4
6:00 PM	63.6
7:00 PM	64.0
8:00 PM	63.3
9:00 PM	63.3
10:00 PM	62.7
11:00 PM	60.3
CNEL, dB(A):	**70.7**



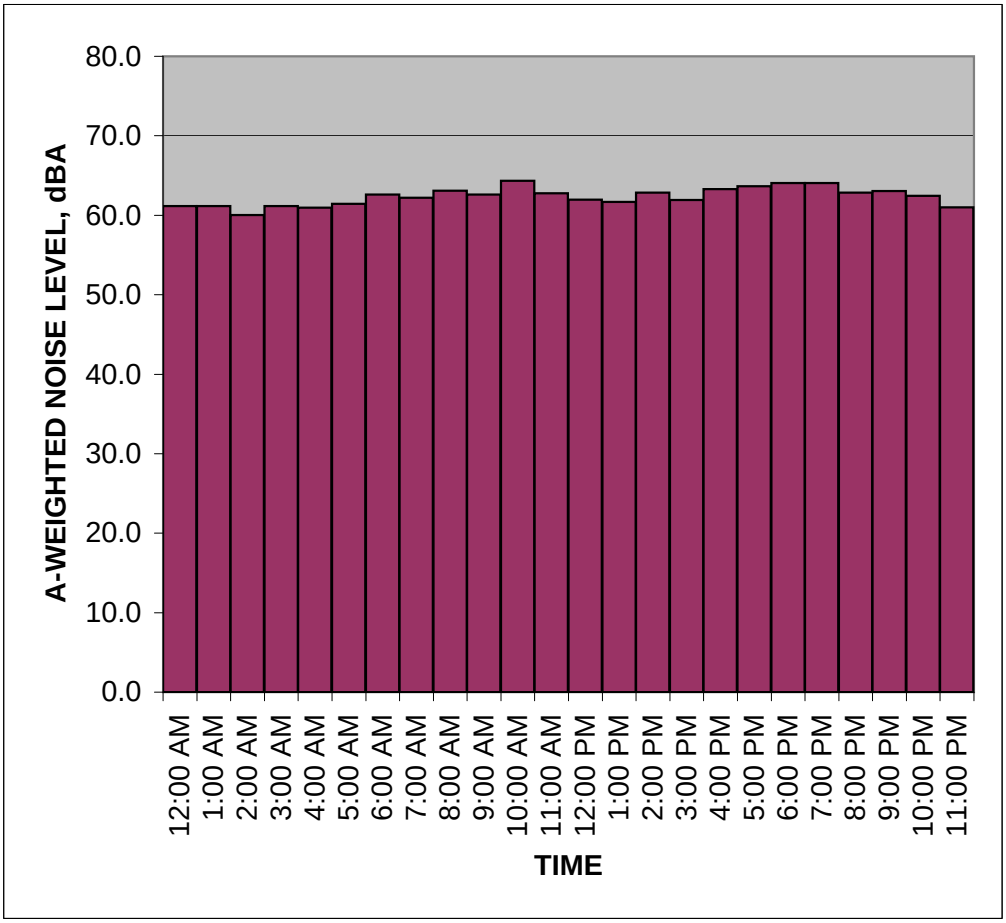
NOTES:

Measured Ambient Noise Levels

Project: Lytle Creek Ranch
Location: R1 - Riverside Ave. (Project South Property Line)
Sources: Ambient

Date: June 3, 2006

TIME	HNL, dB(A)
12:00 AM	61.1
1:00 AM	61.2
2:00 AM	60.0
3:00 AM	61.2
4:00 AM	61.0
5:00 AM	61.4
6:00 AM	62.6
7:00 AM	62.2
8:00 AM	63.1
9:00 AM	62.6
10:00 AM	64.3
11:00 AM	62.8
12:00 PM	62.0
1:00 PM	61.7
2:00 PM	62.8
3:00 PM	61.9
4:00 PM	63.3
5:00 PM	63.7
6:00 PM	64.1
7:00 PM	64.1
8:00 PM	62.8
9:00 PM	63.1
10:00 PM	62.5
11:00 PM	61.0
CNEL, dB(A):	**68.5**



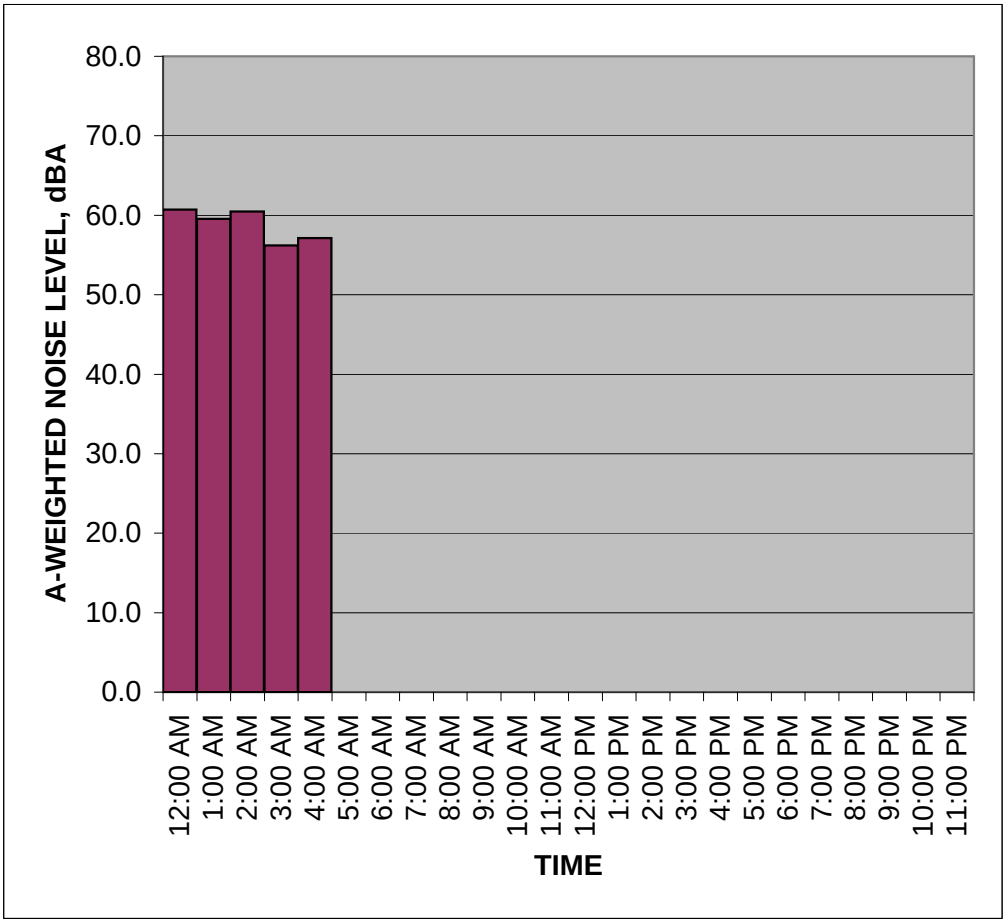
NOTES:

Measured Ambient Noise Levels

Project: Lytle Creek Ranch
Location: R1 - Riverside Ave. (Project South Property Line)
Sources: Ambient

Date: June 4, 2006

TIME	HNL, dB(A)
12:00 AM	60.7
1:00 AM	59.5
2:00 AM	60.5
3:00 AM	56.2
4:00 AM	57.2
5:00 AM	0.0
6:00 AM	0.0
7:00 AM	0.0
8:00 AM	0.0
9:00 AM	0.0
10:00 AM	0.0
11:00 AM	0.0
12:00 PM	0.0
1:00 PM	0.0
2:00 PM	0.0
3:00 PM	0.0
4:00 PM	0.0
5:00 PM	0.0
6:00 PM	0.0
7:00 PM	0.0
8:00 PM	0.0
9:00 PM	0.0
10:00 PM	0.0
11:00 PM	0.0
CNEL, dB(A):	**69.2**



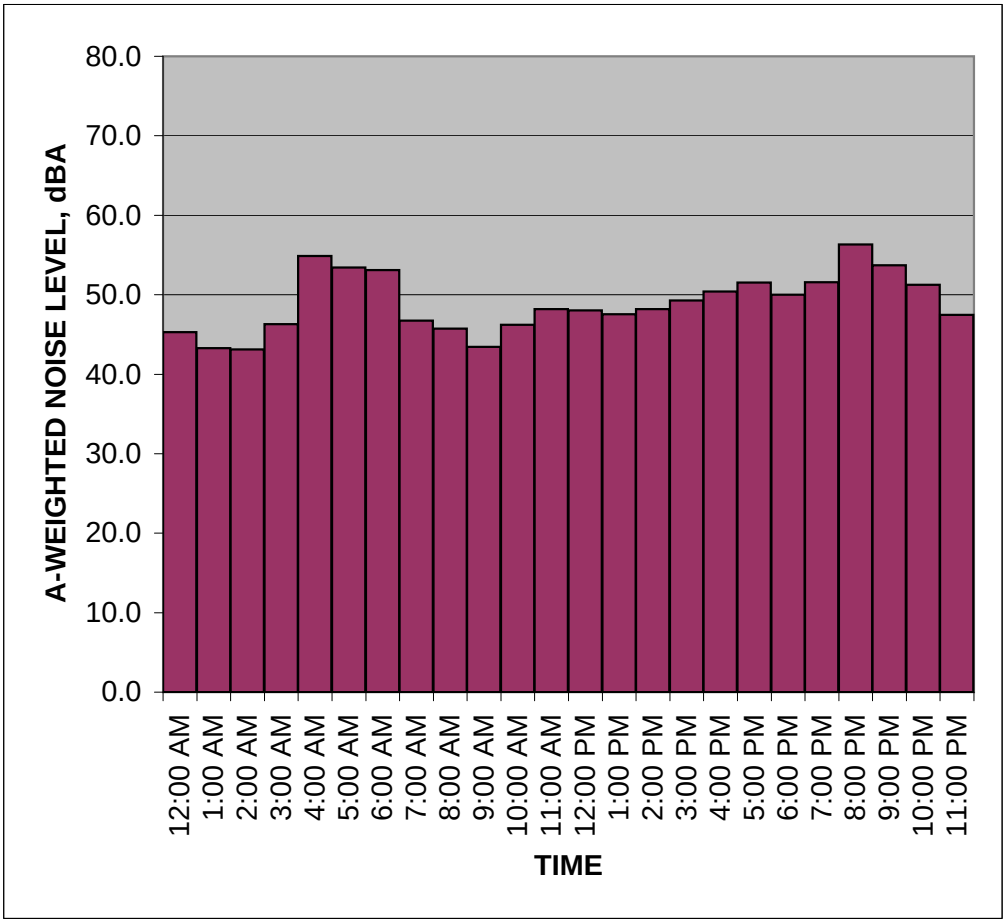
NOTES:

Measured Ambient Noise Levels

Project: Lytle Creek Ranch
Location: R2 - Project Neighborhood II
Sources: Ambient

Date: June 2, 2006

TIME	HNL, dB(A)
12:00 AM	45.3
1:00 AM	43.3
2:00 AM	43.1
3:00 AM	46.3
4:00 AM	54.9
5:00 AM	53.4
6:00 AM	53.1
7:00 AM	46.8
8:00 AM	45.7
9:00 AM	43.4
10:00 AM	46.2
11:00 AM	48.2
12:00 PM	48.0
1:00 PM	47.5
2:00 PM	48.2
3:00 PM	49.3
4:00 PM	50.4
5:00 PM	51.5
6:00 PM	50.0
7:00 PM	51.6
8:00 PM	56.3
9:00 PM	53.7
10:00 PM	51.3
11:00 PM	47.5
CNEL, dB(A):	**57.6**



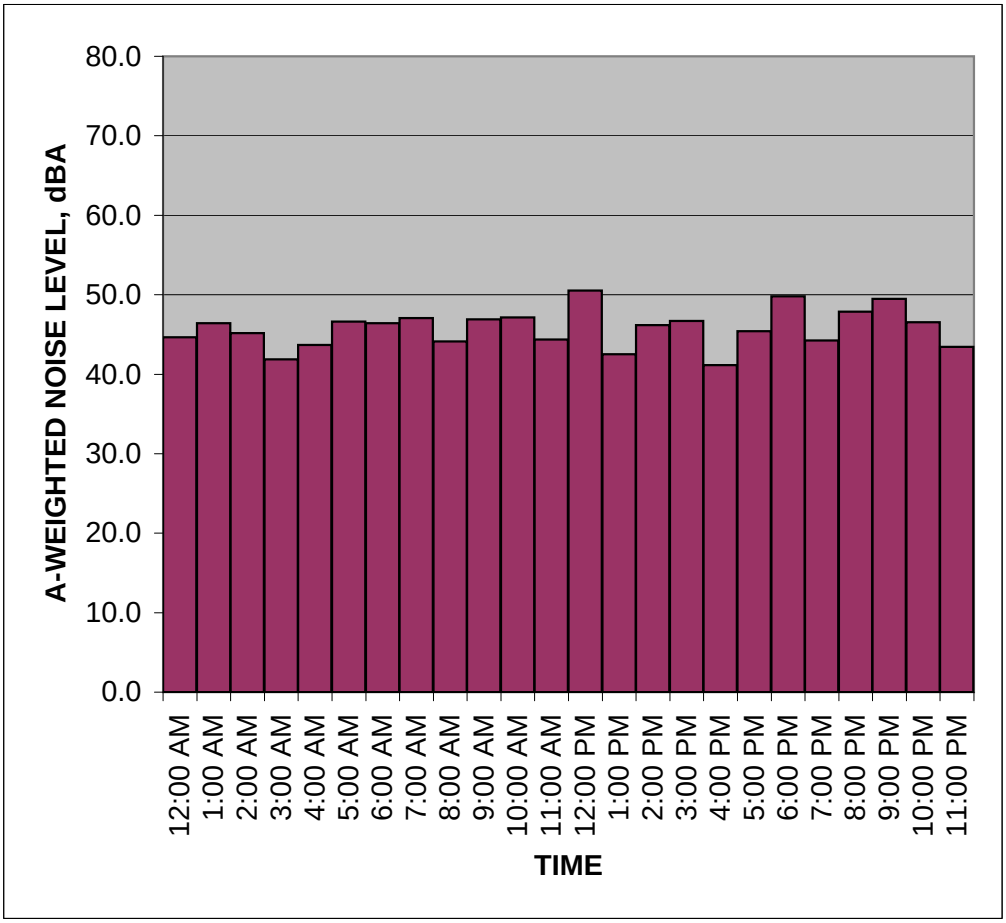
NOTES:

Measured Ambient Noise Levels

Project: Lytle Creek Ranch
Location: R2 - Project Neighborhood II
Sources: Ambient

Date: June 3, 2006

TIME	HNL, dB(A)
12:00 AM	44.7
1:00 AM	46.4
2:00 AM	45.2
3:00 AM	41.9
4:00 AM	43.7
5:00 AM	46.6
6:00 AM	46.4
7:00 AM	47.1
8:00 AM	44.1
9:00 AM	46.9
10:00 AM	47.2
11:00 AM	44.4
12:00 PM	50.5
1:00 PM	42.5
2:00 PM	46.2
3:00 PM	46.7
4:00 PM	41.1
5:00 PM	45.4
6:00 PM	49.8
7:00 PM	44.3
8:00 PM	47.9
9:00 PM	49.5
10:00 PM	46.5
11:00 PM	43.5
CNEL, dB(A):	**52.4**



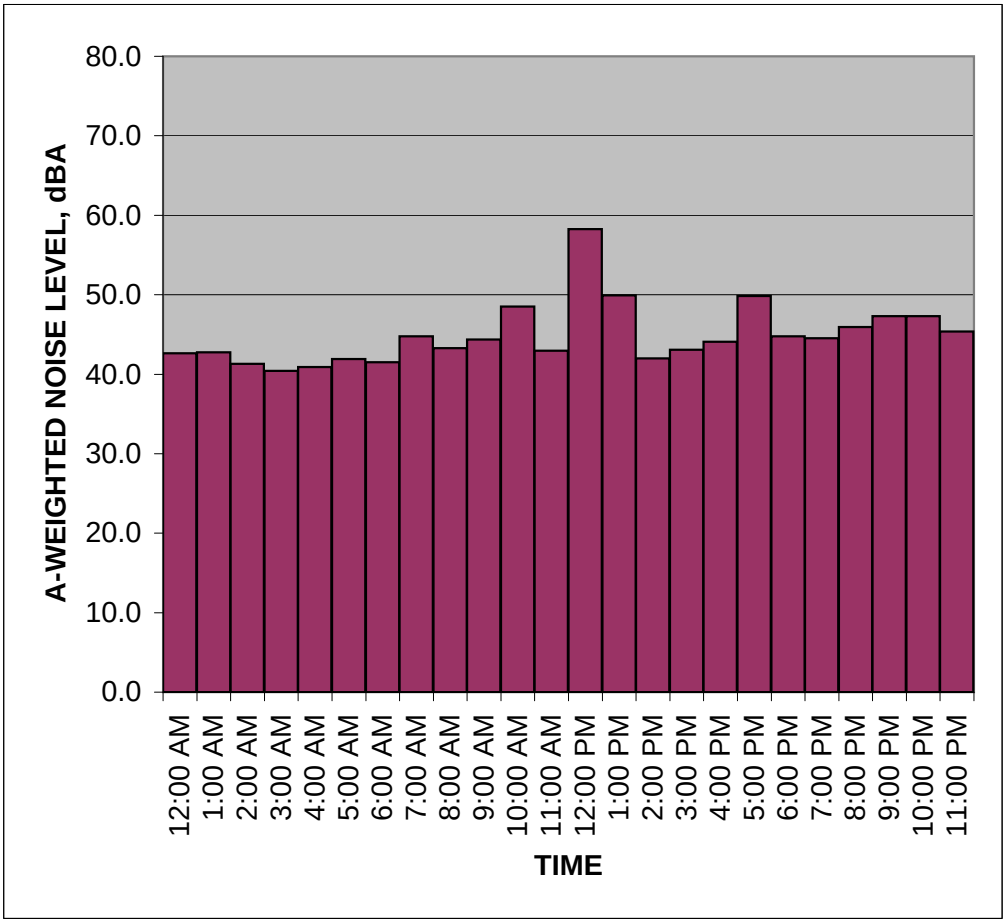
NOTES:

Measured Ambient Noise Levels

Project: Lytle Creek Ranch
Location: R2 - Project Neighborhood II
Sources: Ambient

Date: June 4, 2006

TIME	HNL, dB(A)
12:00 AM	42.6
1:00 AM	42.8
2:00 AM	41.3
3:00 AM	40.4
4:00 AM	40.9
5:00 AM	41.9
6:00 AM	41.5
7:00 AM	44.8
8:00 AM	43.3
9:00 AM	44.4
10:00 AM	48.5
11:00 AM	43.0
12:00 PM	58.3
1:00 PM	49.9
2:00 PM	42.0
3:00 PM	43.1
4:00 PM	44.1
5:00 PM	49.8
6:00 PM	44.8
7:00 PM	44.5
8:00 PM	45.9
9:00 PM	47.3
10:00 PM	47.3
11:00 PM	45.4
CNEL, dB(A):	**51.6**



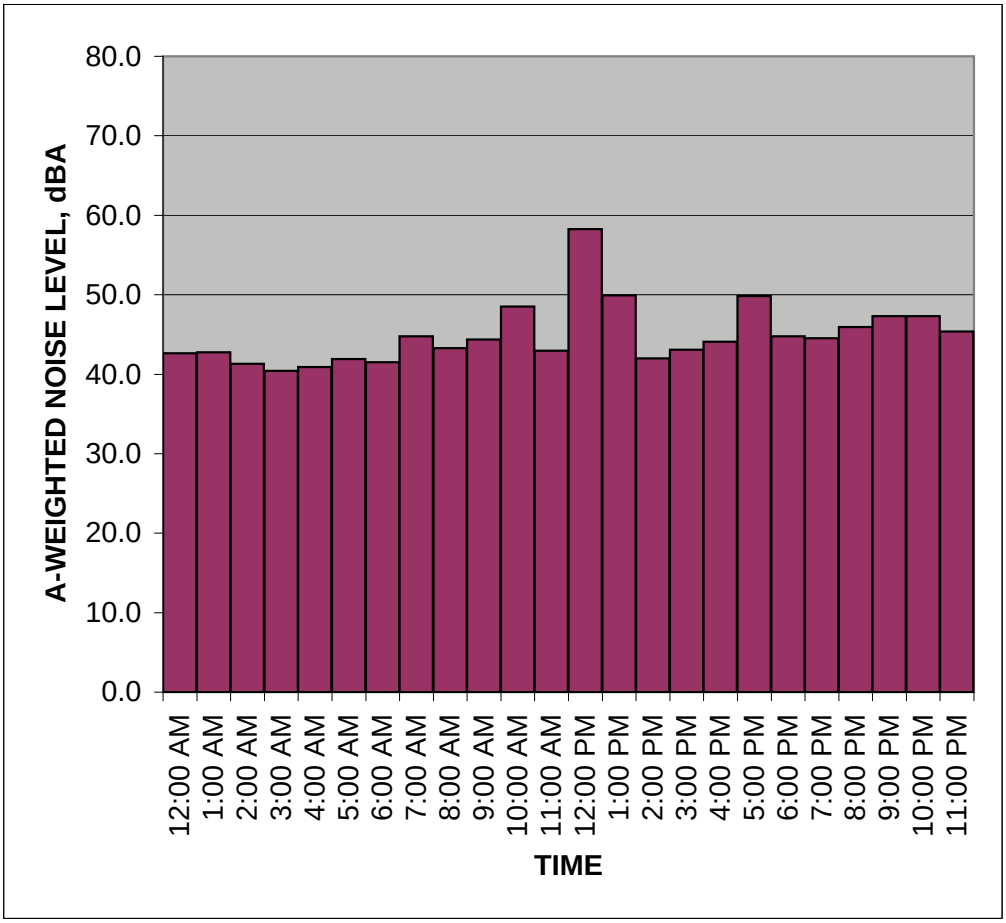
NOTES:

Measured Ambient Noise Levels

Project: Lytle Creek Ranch
Location: R2 - Project Neighborhood II
Sources: Ambient

Date: June 4, 2006

TIME	HNL, dB(A)
12:00 AM	42.6
1:00 AM	42.8
2:00 AM	41.3
3:00 AM	40.4
4:00 AM	40.9
5:00 AM	41.9
6:00 AM	41.5
7:00 AM	44.8
8:00 AM	43.3
9:00 AM	44.4
10:00 AM	48.5
11:00 AM	43.0
12:00 PM	58.3
1:00 PM	49.9
2:00 PM	42.0
3:00 PM	43.1
4:00 PM	44.1
5:00 PM	49.8
6:00 PM	44.8
7:00 PM	44.5
8:00 PM	45.9
9:00 PM	47.3
10:00 PM	47.3
11:00 PM	45.4
CNEL, dB(A):	**51.6**



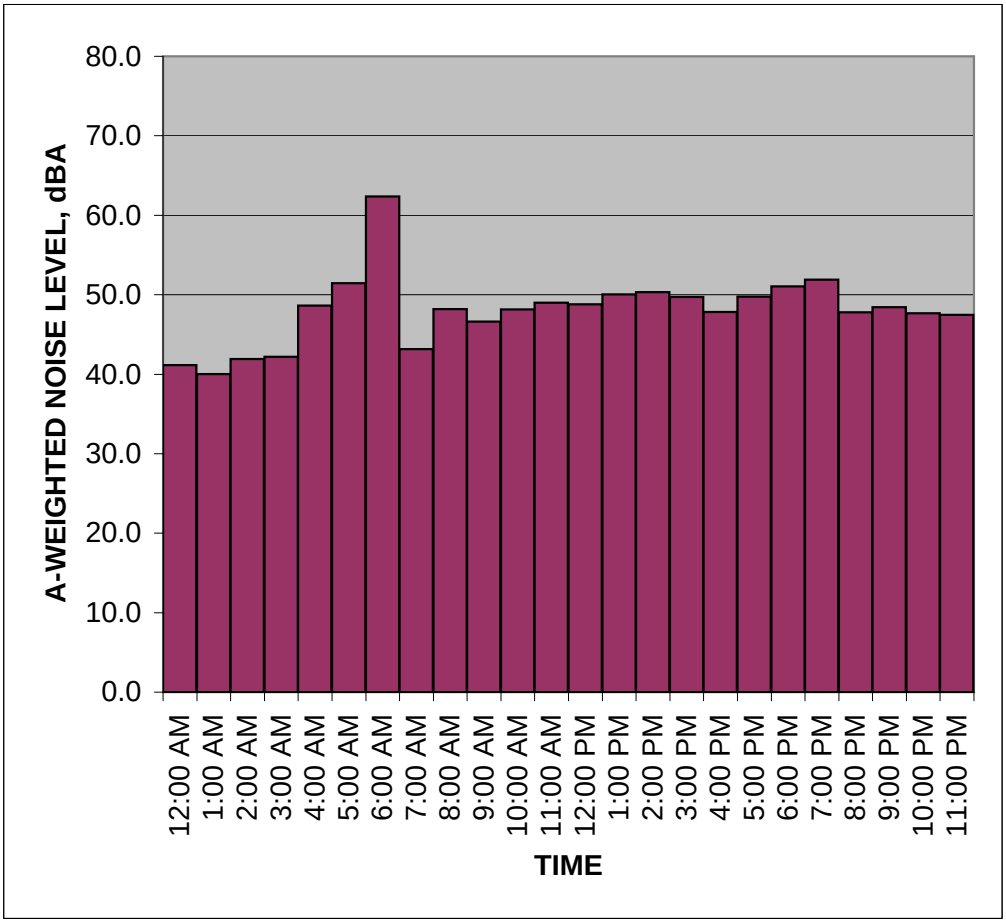
NOTES:

Measured Ambient Noise Levels

Project: Lytle Creek Ranch
Location: R2 - Project Neighborhood II
Sources: Ambient

Date: June 5, 2006

TIME	HNL, dB(A)
12:00 AM	41.2
1:00 AM	40.0
2:00 AM	41.9
3:00 AM	42.2
4:00 AM	48.6
5:00 AM	51.5
6:00 AM	62.4
7:00 AM	43.2
8:00 AM	48.2
9:00 AM	46.6
10:00 AM	48.1
11:00 AM	49.0
12:00 PM	48.8
1:00 PM	50.1
2:00 PM	50.3
3:00 PM	49.7
4:00 PM	47.8
5:00 PM	49.8
6:00 PM	51.0
7:00 PM	51.9
8:00 PM	47.8
9:00 PM	48.4
10:00 PM	47.7
11:00 PM	47.5
CNEL, dB(A):	**59.8**



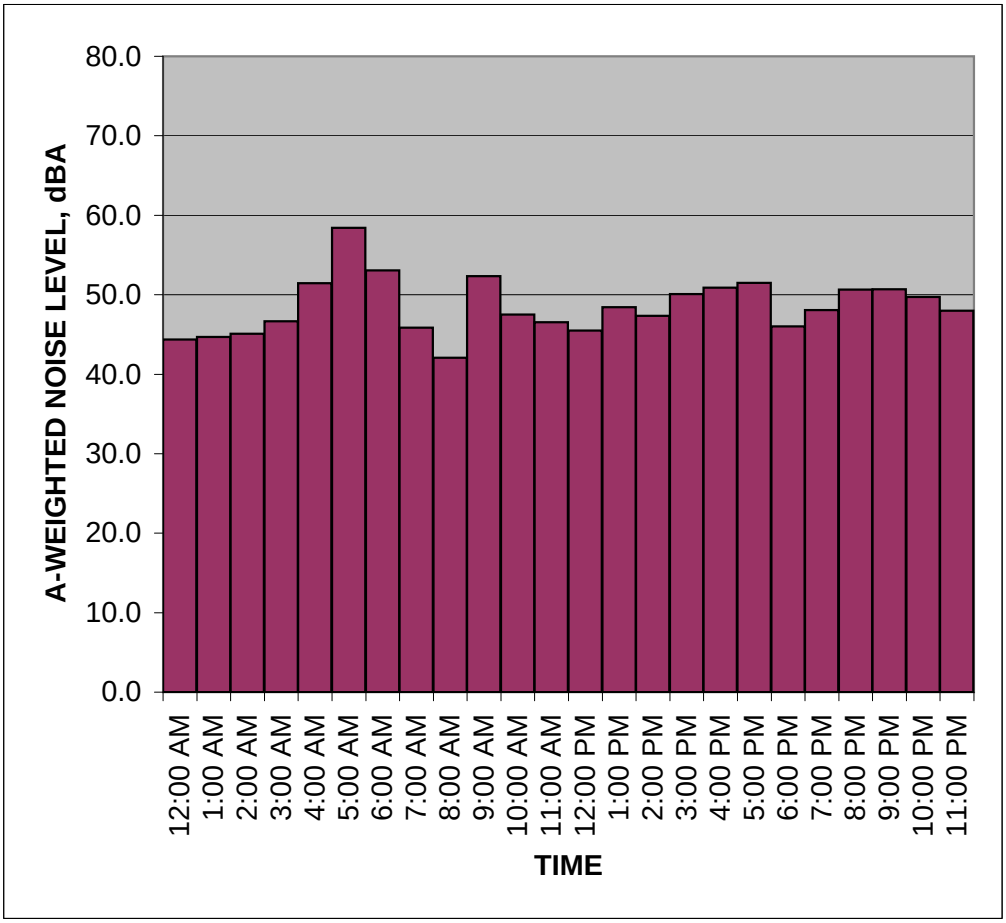
NOTES:

Measured Ambient Noise Levels

Project: Lytle Creek Ranch
Location: R3 - Project Neighborhood III (East)
Sources: Ambient

Date: June 2, 2006

TIME	HNL, dB(A)
12:00 AM	44.4
1:00 AM	44.7
2:00 AM	45.1
3:00 AM	46.7
4:00 AM	51.5
5:00 AM	58.4
6:00 AM	53.1
7:00 AM	45.9
8:00 AM	42.1
9:00 AM	52.4
10:00 AM	47.5
11:00 AM	46.5
12:00 PM	45.5
1:00 PM	48.4
2:00 PM	47.3
3:00 PM	50.1
4:00 PM	50.9
5:00 PM	51.5
6:00 PM	46.0
7:00 PM	48.1
8:00 PM	50.7
9:00 PM	50.7
10:00 PM	49.7
11:00 PM	48.0
CNEL, dB(A):	**58.0**



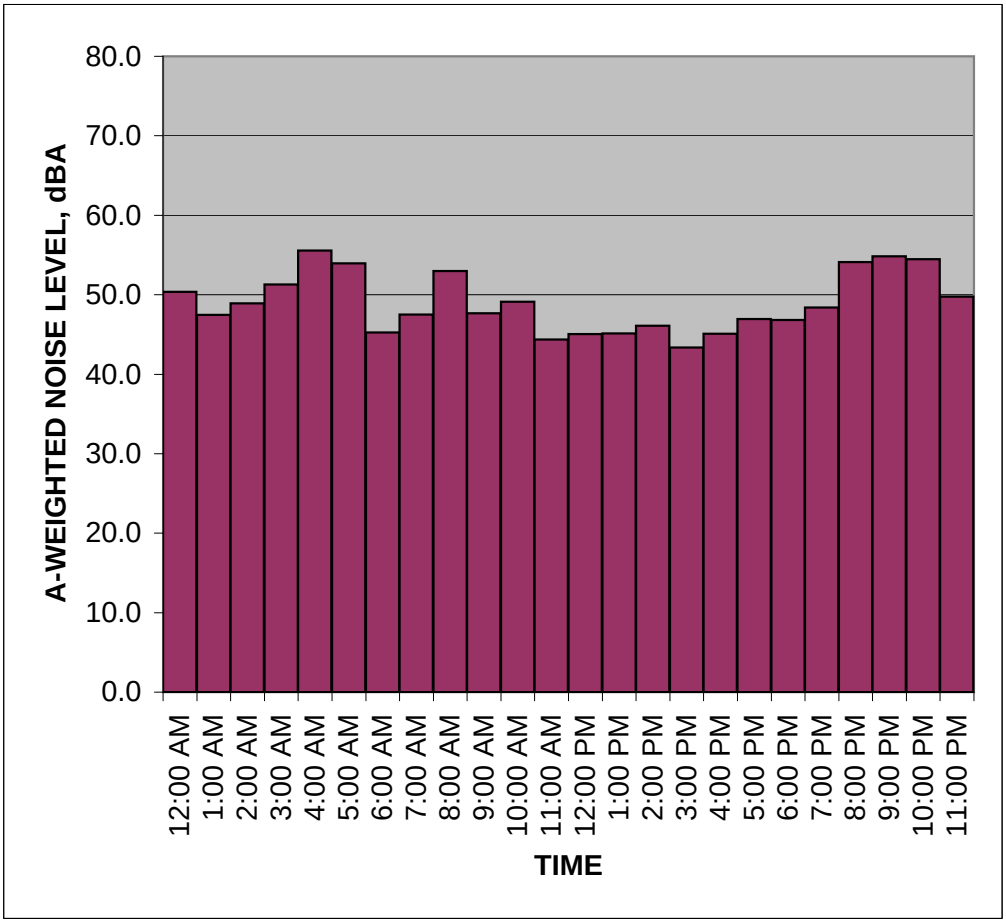
NOTES:

Measured Ambient Noise Levels

Project: Lytle Creek Ranch
Location: R3 - Project Neighborhood III (East)
Sources: Ambient

Date: June 3, 2006

TIME	HNL, dB(A)
12:00 AM	50.4
1:00 AM	47.5
2:00 AM	48.9
3:00 AM	51.3
4:00 AM	55.6
5:00 AM	54.0
6:00 AM	45.3
7:00 AM	47.5
8:00 AM	53.0
9:00 AM	47.7
10:00 AM	49.1
11:00 AM	44.4
12:00 PM	45.1
1:00 PM	45.1
2:00 PM	46.1
3:00 PM	43.4
4:00 PM	45.1
5:00 PM	46.9
6:00 PM	46.8
7:00 PM	48.4
8:00 PM	54.1
9:00 PM	54.8
10:00 PM	54.5
11:00 PM	49.8
CNEL, dB(A):	**58.4**



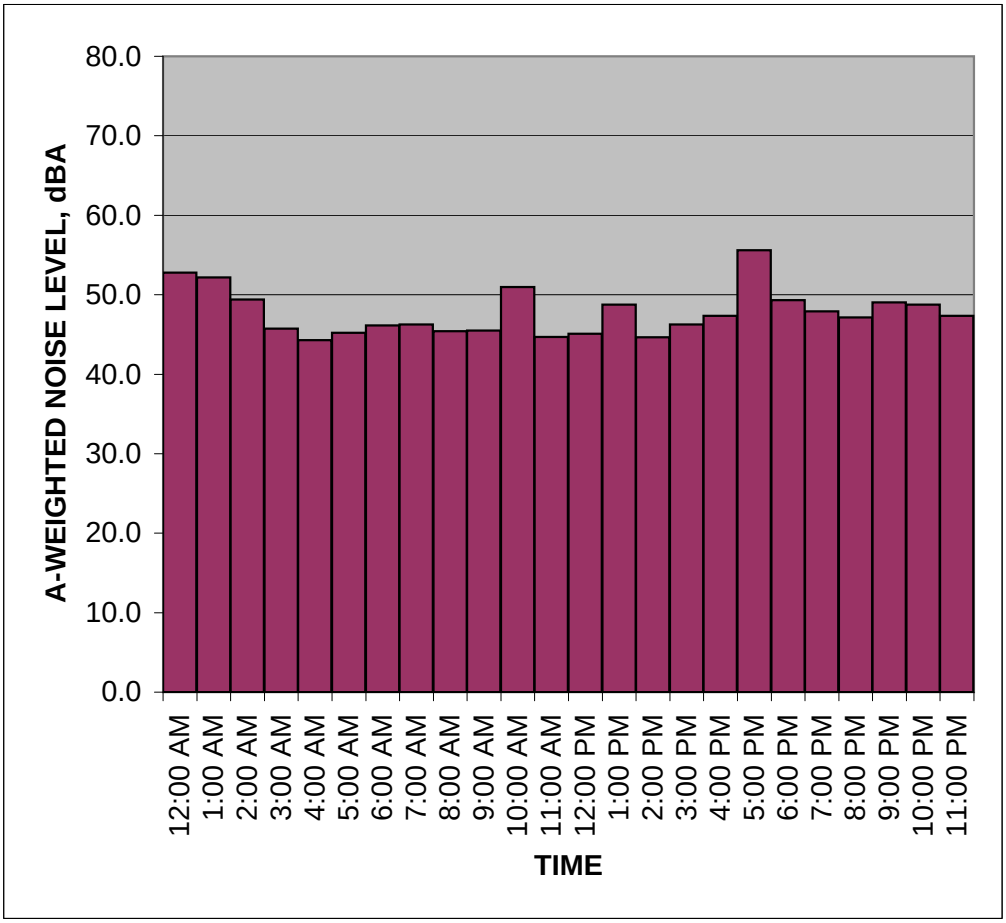
NOTES:

Measured Ambient Noise Levels

Project: Lytle Creek Ranch
Location: R3 - Project Neighborhood III (East)
Sources: Ambient

Date: June 4, 2006

TIME	HNL, dB(A)
12:00 AM	52.8
1:00 AM	52.2
2:00 AM	49.4
3:00 AM	45.7
4:00 AM	44.3
5:00 AM	45.2
6:00 AM	46.1
7:00 AM	46.3
8:00 AM	45.4
9:00 AM	45.5
10:00 AM	51.0
11:00 AM	44.7
12:00 PM	45.1
1:00 PM	48.8
2:00 PM	44.6
3:00 PM	46.3
4:00 PM	47.3
5:00 PM	55.6
6:00 PM	49.3
7:00 PM	47.9
8:00 PM	47.1
9:00 PM	49.0
10:00 PM	48.7
11:00 PM	47.4
CNEL, dB(A):	**55.6**



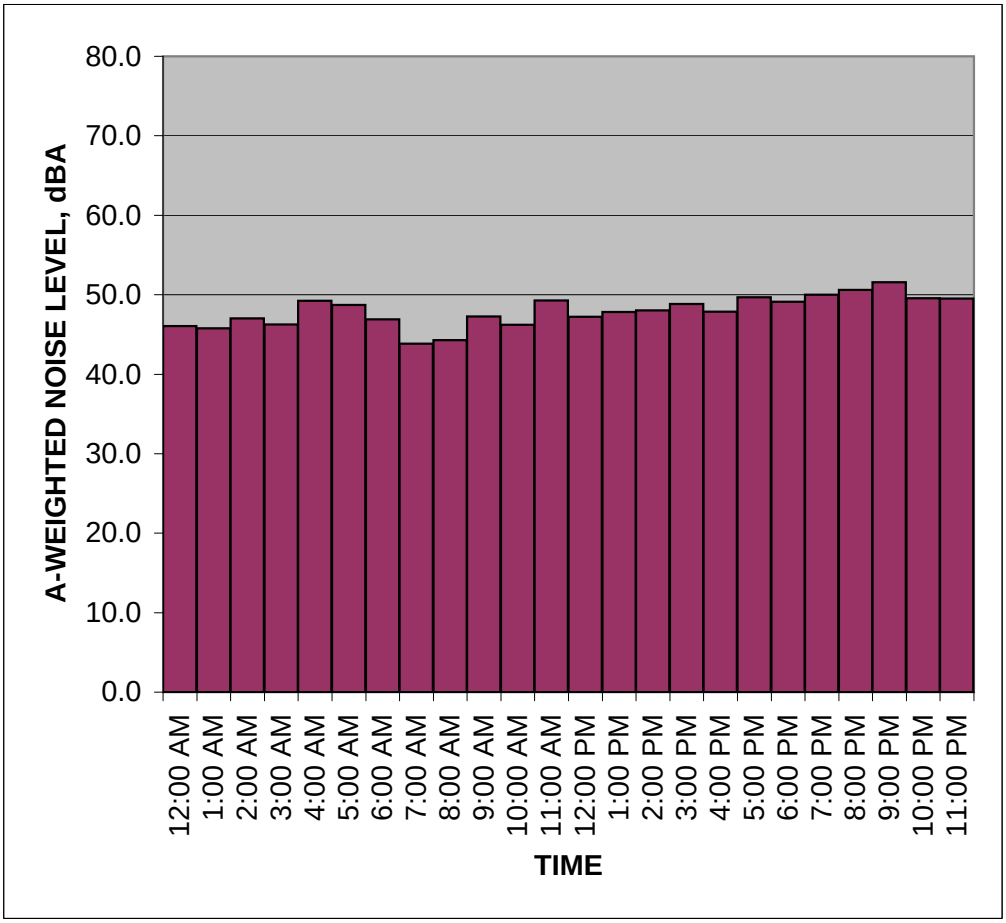
NOTES:

Measured Ambient Noise Levels

Project: Lytle Creek Ranch
Location: R3 - Project Neighborhood III (East)
Sources: Ambient

Date: June 5, 2006

TIME	HNL, dB(A)
12:00 AM	46.1
1:00 AM	45.8
2:00 AM	47.0
3:00 AM	46.3
4:00 AM	49.2
5:00 AM	48.7
6:00 AM	46.9
7:00 AM	43.8
8:00 AM	44.3
9:00 AM	47.3
10:00 AM	46.2
11:00 AM	49.3
12:00 PM	47.2
1:00 PM	47.8
2:00 PM	48.0
3:00 PM	48.8
4:00 PM	47.9
5:00 PM	49.7
6:00 PM	49.1
7:00 PM	50.0
8:00 PM	50.6
9:00 PM	51.6
10:00 PM	49.6
11:00 PM	49.5
CNEL, dB(A):	**54.9**



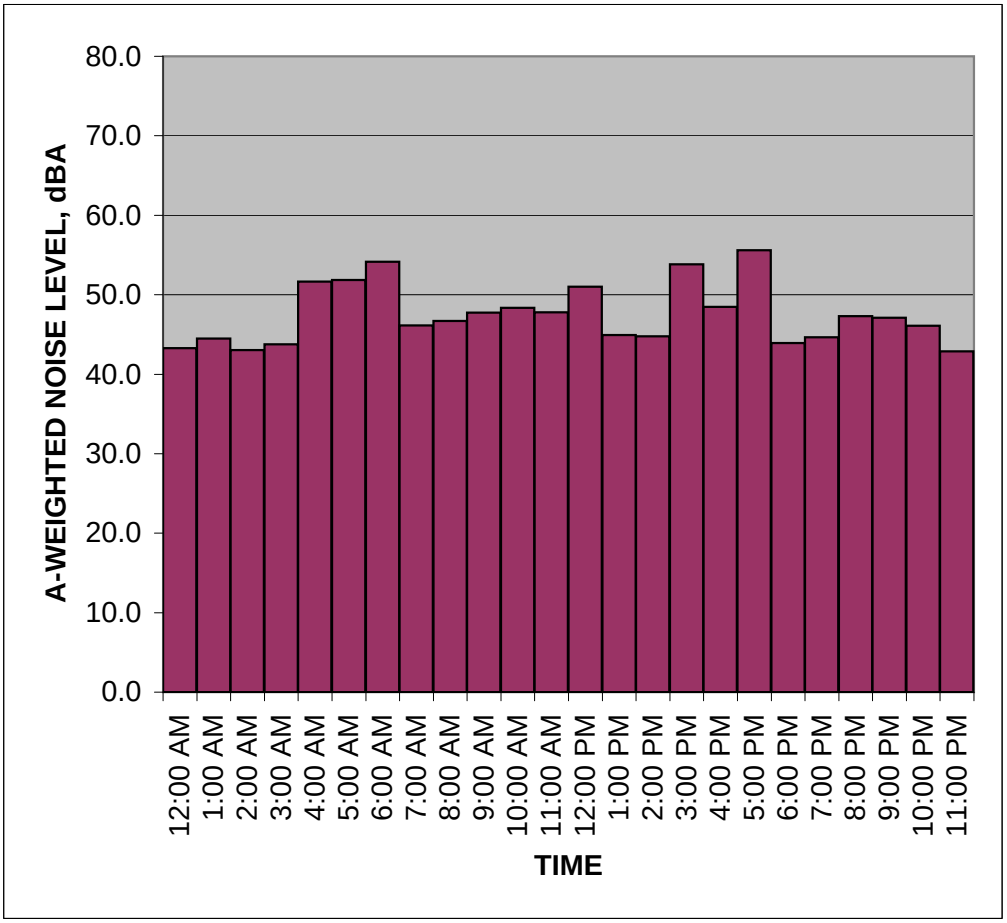
NOTES:

Measured Ambient Noise Levels

Project: Lytle Creek Specific Plan
Location: R4 - Project Neighborhood III (North)
Sources: Ambient

Date: June 2, 2006

TIME	HNL, dB(A)
12:00 AM	43.3
1:00 AM	44.5
2:00 AM	43.1
3:00 AM	43.8
4:00 AM	51.7
5:00 AM	51.9
6:00 AM	54.2
7:00 AM	46.1
8:00 AM	46.7
9:00 AM	47.7
10:00 AM	48.4
11:00 AM	47.8
12:00 PM	51.0
1:00 PM	44.9
2:00 PM	44.8
3:00 PM	53.8
4:00 PM	48.5
5:00 PM	55.6
6:00 PM	43.9
7:00 PM	44.7
8:00 PM	47.3
9:00 PM	47.1
10:00 PM	46.1
11:00 PM	42.9
CNEL, dB(A):	**55.6**



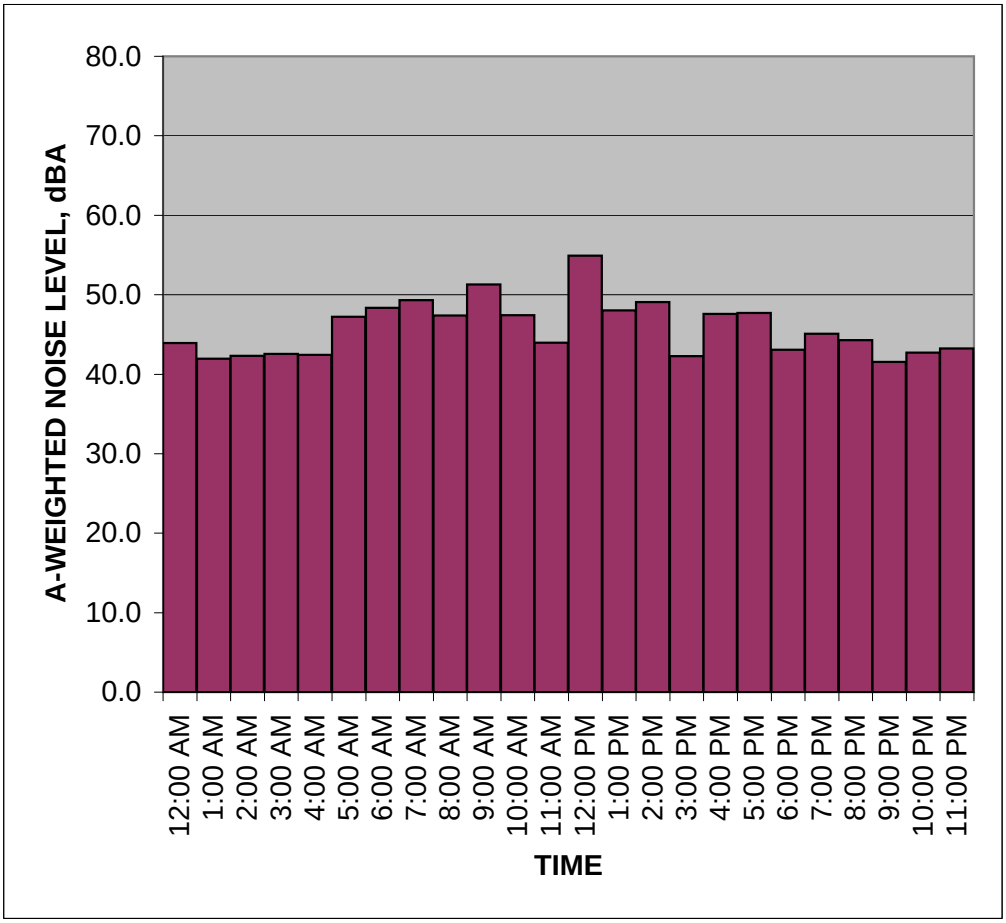
NOTES:

Measured Ambient Noise Levels

Project: Lytle Creek Specific Plan
Location: R4 - Project Neighborhood III (North)
Sources: Ambient

Date: June 3, 2006

TIME	HNL, dB(A)
12:00 AM	43.9
1:00 AM	42.0
2:00 AM	42.3
3:00 AM	42.6
4:00 AM	42.5
5:00 AM	47.2
6:00 AM	48.3
7:00 AM	49.3
8:00 AM	47.4
9:00 AM	51.3
10:00 AM	47.4
11:00 AM	44.0
12:00 PM	54.9
1:00 PM	48.1
2:00 PM	49.1
3:00 PM	42.3
4:00 PM	47.6
5:00 PM	47.7
6:00 PM	43.1
7:00 PM	45.1
8:00 PM	44.3
9:00 PM	41.6
10:00 PM	42.7
11:00 PM	43.3
CNEL, dB(A):	**51.9**



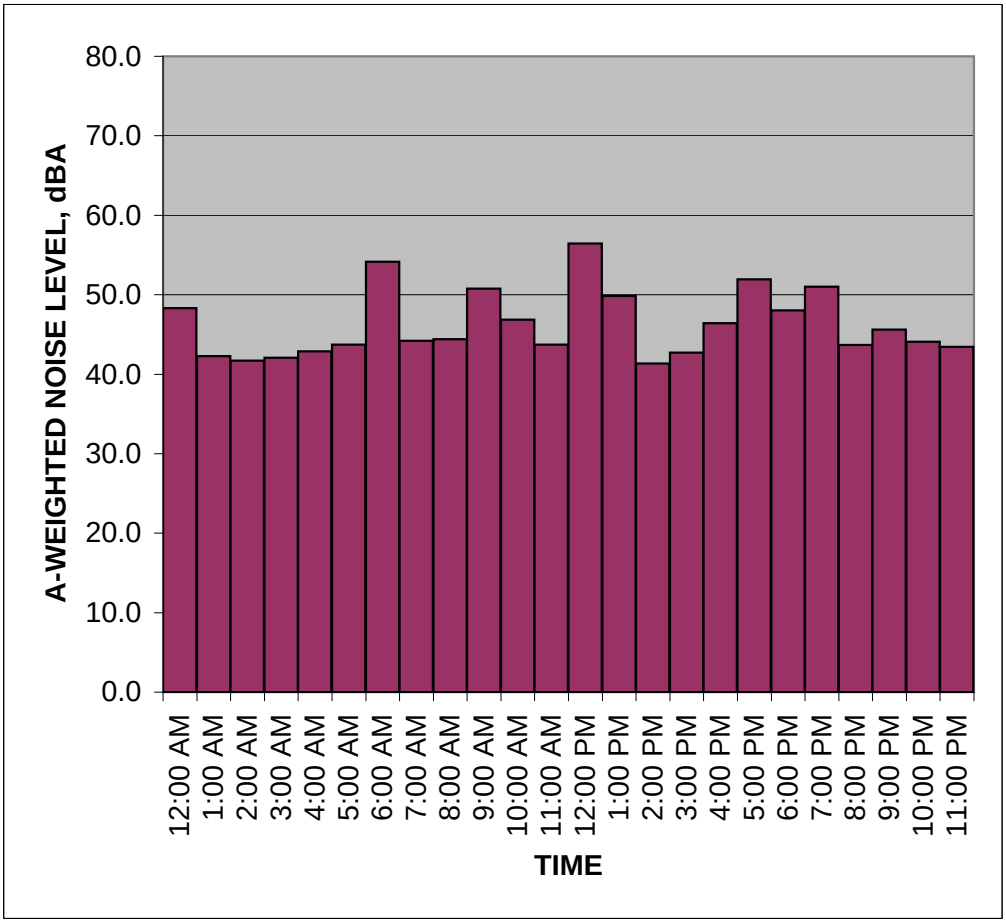
NOTES:

Measured Ambient Noise Levels

Project: Lytle Creek Specific Plan
Location: R4 - Project Neighborhood III (North)
Sources: Ambient

Date: June 4, 2006

TIME	HNL, dB(A)
12:00 AM	48.3
1:00 AM	42.3
2:00 AM	41.7
3:00 AM	42.1
4:00 AM	42.9
5:00 AM	43.7
6:00 AM	54.2
7:00 AM	44.2
8:00 AM	44.4
9:00 AM	50.8
10:00 AM	46.9
11:00 AM	43.7
12:00 PM	56.5
1:00 PM	49.9
2:00 PM	41.4
3:00 PM	42.7
4:00 PM	46.4
5:00 PM	51.9
6:00 PM	48.0
7:00 PM	51.0
8:00 PM	43.7
9:00 PM	45.6
10:00 PM	44.1
11:00 PM	43.4
CNEL, dB(A):	**54.2**



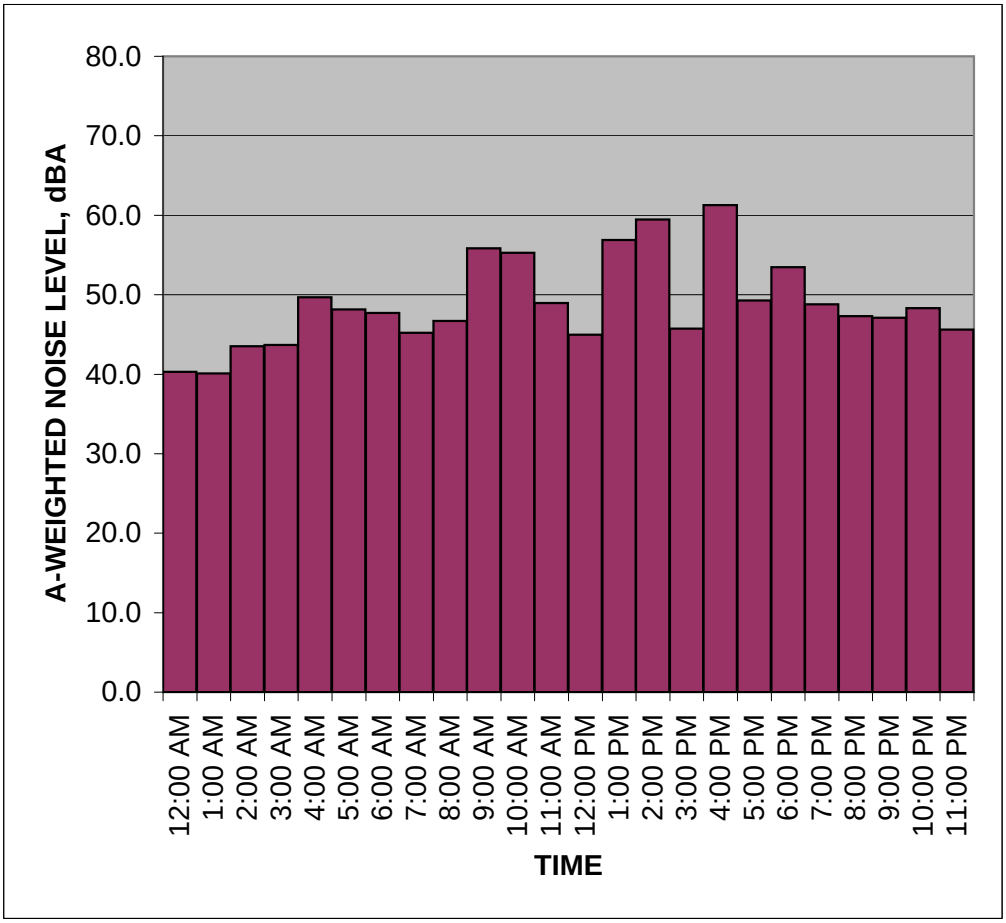
NOTES:

Measured Ambient Noise Levels

Project: Lytle Creek Specific Plan
Location: R4 - Project Neighborhood III (North)
Sources: Ambient

Date: June 5, 2006

TIME	HNL, dB(A)
12:00 AM	40.3
1:00 AM	40.1
2:00 AM	43.5
3:00 AM	43.7
4:00 AM	49.7
5:00 AM	48.2
6:00 AM	47.7
7:00 AM	45.2
8:00 AM	46.7
9:00 AM	55.8
10:00 AM	55.3
11:00 AM	49.0
12:00 PM	45.0
1:00 PM	56.9
2:00 PM	59.5
3:00 PM	45.7
4:00 PM	61.3
5:00 PM	49.3
6:00 PM	53.5
7:00 PM	48.8
8:00 PM	47.3
9:00 PM	47.1
10:00 PM	48.3
11:00 PM	45.6
CNEL, dB(A):	**55.5**



NOTES:

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Existing										
	Speed	Traffic Volumes			Leq			CNEL		
Roadway/Segment	MPH	AM	PM	ADT	ROW	25 Feet	50 Feet	ROW	25 Feet	50 Feet
Lytle Creek Rd w/o Glen Helen Pkwy	35				-	-	-	-	-	-
Lytle Creek Rd between Glen Helen Pkwy & Sierra Ave.	35	52	355	5917	63.6	61.1	59.6	64.8	62.3	60.8
Glen Helen Pkwy between Lytle Creek Rd & I-15	35	6	10	167	48.1	45.6	44.1	49.3	46.8	45.3
Glen Helen Pkwy between I-15 & Cajon Blvd.	35	164	601	10017	65.8	63.4	61.8	67.1	64.6	63.1
Sierra Ave. between Lytle Creek Rd & I-15	35	395	394	6575	64.0	61.6	60.0	65.2	62.8	61.2
Existing With Project										
	Speed	Traffic Volumes			Leq			CNEL		
Roadway/Segment	MPH	AM	PM	ADT	ROW	25 Feet	50 Feet	ROW	25 Feet	50 Feet
Lytle Creek Rd w/o Glen Helen Pkwy	35	612	1011	16850	68.1	65.7	64.1	69.3	66.9	65.3
Lytle Creek Rd between Glen Helen Pkwy & Sierra Ave.	35	396	788	13125	67.0	64.6	63.0	68.2	65.8	64.2
Glen Helen Pkwy between Lytle Creek Rd & I-15	35	310	492	8192	65.0	62.5	61.0	66.2	63.7	62.2
Glen Helen Pkwy between I-15 & Cajon Blvd.	35	343	840	13992	67.3	64.8	63.3	68.5	66.1	64.5
Sierra Ave. between Lytle Creek Rd & I-15	35	1009	1237	20608	69.0	66.5	65.0	70.2	67.7	66.2

CNEL

Summary	25 ft. from ROW		At ROW	
Roadway/Segment	Project Increment	Cumulative Increment	Project Increment	Cumulative Increment
Lytle Creek Rd w/o Glen Helen Pkwy	-	-	-	-
Lytle Creek Rd between Glen Helen Pkwy & Sierra Ave.	3.5	-	3.4	-
Glen Helen Pkwy between Lytle Creek Rd & I-15	16.9	-	16.9	-
Glen Helen Pkwy between I-15 & Cajon Blvd.	1.5	-	1.4	-
Sierra Ave. between Lytle Creek Rd & I-15	4.9	-	5.0	-

	% of ADT			
Vehicle Type	Day	Eve	Night	Sub total
Auto	78.4%	9.8%	9.8%	98.0%
Medium Truck	0.8%	0.1%	0.1%	1.0%
Heavy Truck	0.8%	0.1%	0.1%	1.0%
	80.0%	10.0%	10.0%	100.0%

Existing										
	Speed	Traffic Volumes			Leq			CNEL		
Roadway/Segment	MPH	AM	PM	ADT	ROW	25 Feet	50 Feet	ROW	25 Feet	50 Feet
Riverside Ave between Sierra Ave & Alder Ave	40	908	1052	17525	69.7	67.2	65.7	70.9	68.4	66.9
Riverside Ave between Alder Ave & Locust Ave	40	925	760	15417	69.1	66.7	65.1	70.3	67.9	66.3
Riverside Ave between Locust Ave & Linden Ave	40	1271	977	21175	70.5	68.0	66.5	71.7	69.3	67.7
Riverside Ave between Linden Ave & Knollwood Ave.	40	1587	1415	26450	71.4	69.0	67.4	72.7	70.2	68.7
Live Oak Ave. n/o Riverside Ave.	35			#VALUE!	-	-	-	-	-	-

Existing With Project										
	Speed	Traffic Volumes			Leq			CNEL		
Roadway/Segment	MPH	AM	PM	ADT	ROW	25 Feet	50 Feet	ROW	25 Feet	50 Feet
Riverside Ave between Sierra Ave & Alder Ave	40	2074	2891	48183	74.1	71.6	70.1	75.3	72.8	71.3
Riverside Ave between Alder Ave & Locust Ave	40	2096	2401	40017	73.2	70.8	69.2	74.5	72.0	70.5
Riverside Ave between Locust Ave & Linden Ave	40	2174	2301	38350	73.1	70.6	69.1	74.3	71.8	70.3
Riverside Ave between Linden Ave & Knollwood Ave.	40	2549	3021	50350	74.2	71.8	70.2	75.5	73.0	71.5
Live Oak Ave. n/o Riverside Ave.	35	516	806	13433	67.1	64.7	63.1	68.3	65.9	64.3

CNEL

Summary	25 ft. from ROW		At ROW	
Roadway/Segment	Project Increment	Cumulative Increment	Project Increment	Cumulative Increment
Riverside Ave between Sierra Ave & Alder Ave	4.4	-	4.4	-
Riverside Ave between Alder Ave & Locust Ave	4.1	-	4.2	-
Riverside Ave between Locust Ave & Linden Ave	2.5	-	2.6	-
Riverside Ave between Linden Ave & Knollwood Ave.	2.8	-	2.8	-
Live Oak Ave. n/o Riverside Ave.	-	-	-	-

	% of ADT			
Vehicle Type	Day	Eve	Night	Sub total
Auto	78.4%	9.8%	9.8%	98.0%
Medium Truck	0.8%	0.1%	0.1%	1.0%
Heavy Truck	0.8%	0.1%	0.1%	1.0%
	80.0%	10.0%	10.0%	100.0%

Existing										
	Speed	Traffic Volumes			Leq			CNEL		
Roadway/Segment	MPH	AM	PM	ADT	ROW	25 Feet	50 Feet	ROW	25 Feet	50 Feet
Riverside Ave between Knollwood Ave & Country Club Dr	40	1802	1589	30025	72.0	69.6	68.0	73.2	70.8	69.2
Riverside Ave e/o Country Club Dr	40	1729	1659	28817	71.8	69.4	67.8	73.0	70.6	69.0
Ayala Dr. s/o Riverside Ave.	35	846	714	14100	68.5	65.5	63.8	69.7	66.7	65.0
Knollwood Ave. n/o Riverside Ave.	35	119	93	1983	60.0	57.0	55.2	61.2	58.2	56.4
Country Club Dr. n/o Riverside Ave.	35	296	188	4933	63.9	60.9	59.2	65.1	62.2	60.4
Existing With Project										
	Speed	Traffic Volumes			Leq			CNEL		
Roadway/Segment	MPH	AM	PM	ADT	ROW	25 Feet	50 Feet	ROW	25 Feet	50 Feet
Riverside Ave between Knollwood Ave & Country Club Dr	40	2528	2709	45150	73.8	71.3	69.8	75.0	72.5	71.0
Riverside Ave e/o Country Club Dr	40	2519	2679	44650	73.7	71.3	69.7	74.9	72.5	70.9
Ayala Dr. s/o Riverside Ave.	35	1159	1250	20833	70.2	67.2	65.4	71.4	68.4	66.7
Knollwood Ave. n/o Riverside Ave.	35	188	175	3133	61.9	59.0	57.2	63.2	60.2	58.4
Country Club Dr. n/o Riverside Ave.	35	939	1120	18667	69.7	66.7	65.0	70.9	67.9	66.2

CNEL

Summary	25 ft. from ROW		At ROW	
Roadway/Segment	Project Increment	Cumulative Increment	Project Increment	Cumulative Increment
Riverside Ave between Knollwood Ave & Country Club Dr	1.7	-	1.8	-
Riverside Ave e/o Country Club Dr	1.9	-	1.9	-
Ayala Dr. s/o Riverside Ave.	1.7	-	1.7	-
Knollwood Ave. n/o Riverside Ave.	2.0	-	2.0	-
Country Club Dr. n/o Riverside Ave.	5.7	-	5.8	-

	% of ADT			
Vehicle Type	Day	Eve	Night	Sub total
Auto	78.4%	9.8%	9.8%	98.0%
Medium Truck	0.8%	0.1%	0.1%	1.0%
Heavy Truck	0.8%	0.1%	0.1%	1.0%
	80.0%	10.0%	10.0%	100.0%

Existing										
	Speed	Traffic Volumes			Leq			CNEL		
Roadway/Segment	MPH	AM	PM	ADT	ROW	25 Feet	50 Feet	ROW	25 Feet	50 Feet
Live Oak Ave. s/o Riverside Ave.	35	471	438	7850	64.8	62.3	60.8	66.0	63.6	62.0
Alder Ave. n/o Riverside Ave.	35			#VALUE!	-	-	-	-	-	-
Locust Ave. n/o Riverside Ave.	35			#VALUE!	-	-	-	-	-	-
Linden Ave. n/o Riverside Ave.	35			#VALUE!	-	-	-	-	-	-
Linden Ave. s/o Riverside Ave.	35	191	216	3600	61.4	59.0	57.4	62.6	60.2	58.6
Existing With Project										
	Speed	Traffic Volumes			Leq			CNEL		
Roadway/Segment	MPH	AM	PM	ADT	ROW	25 Feet	50 Feet	ROW	25 Feet	50 Feet
Live Oak Ave. s/o Riverside Ave.	35	687	849	14150	67.3	64.9	63.3	68.6	66.1	64.6
Alder Ave. n/o Riverside Ave.	35	722	1209	20150	68.9	66.4	64.9	70.1	67.6	66.1
Locust Ave. n/o Riverside Ave.	35	903	980	16333	68.0	65.5	64.0	69.2	66.7	65.2
Linden Ave. n/o Riverside Ave.	35	471	1250	20833	69.0	66.6	65.0	70.2	67.8	66.2
Linden Ave. s/o Riverside Ave.	35	266	335	5583	63.3	60.9	59.3	64.5	62.1	60.5

CNEL

Summary	25 ft. from ROW		At ROW	
Roadway/Segment	Project Increment	Cumulative Increment	Project Increment	Cumulative Increment
Live Oak Ave. s/o Riverside Ave.	2.5	-	2.6	-
Alder Ave. n/o Riverside Ave.	-	-	-	-
Locust Ave. n/o Riverside Ave.	-	-	-	-
Linden Ave. n/o Riverside Ave.	-	-	-	-
Linden Ave. s/o Riverside Ave.	1.9	-	1.9	-

% of ADT				
Vehicle Type	Day	Eve	Night	Sub total
Auto	78.4%	9.8%	9.8%	98.0%
Medium Truck	0.8%	0.1%	0.1%	1.0%
Heavy Truck	0.8%	0.1%	0.1%	1.0%
	80.0%	10.0%	10.0%	100.0%

Existing										
	Speed	Traffic Volumes			Leq			CNEL		
Roadway/Segment	MPH	AM	PM	ADT	ROW	25 Feet	50 Feet	ROW	25 Feet	50 Feet
Alder Ave. between Riverside Ave. & Casa Grande Dr.	35	310	610	10167	67.1	64.1	62.3	68.3	65.3	63.5
Alder Ave. between Casa Grande Dr. & Casmalia	35	235	461	7683	65.8	62.9	61.1	67.1	64.1	62.3
Casa Grande Dr. w/o Alder Ave.	35	226	170	3767	62.7	59.8	58.0	64.0	61.0	59.2
Casa Grande Dr. e/o Alder Ave.	35	409	392	6817	65.3	62.3	60.6	66.5	63.6	61.8
Locust Ave. s/o Riverside Ave.	35	496	303	8267	66.2	63.2	61.4	67.4	64.4	62.6
Existing With Project										
	Speed	Traffic Volumes			Leq			CNEL		
Roadway/Segment	MPH	AM	PM	ADT	ROW	25 Feet	50 Feet	ROW	25 Feet	50 Feet
Alder Ave. between Riverside Ave. & Casa Grande Dr.	35	588	1096	18258	69.6	66.6	64.9	70.8	67.8	66.1
Alder Ave. between Casa Grande Dr. & Casmalia	35	468	885	14742	68.7	65.7	63.9	69.9	66.9	65.2
Casa Grande Dr. w/o Alder Ave.	35	318	328	5467	64.4	61.4	59.6	65.6	62.6	60.9
Casa Grande Dr. e/o Alder Ave.	35	516	572	9533	66.8	63.8	62.1	68.0	65.0	63.3
Locust Ave. s/o Riverside Ave.	35	609	520	10150	67.0	64.1	62.3	68.3	65.3	63.5

CNEL

Summary	25 ft. from ROW		At ROW	
Roadway/Segment	Project Increment	Cumulative Increment	Project Increment	Cumulative Increment
Alder Ave. between Riverside Ave. & Casa Grande Dr.	2.5	-	2.5	-
Alder Ave. between Casa Grande Dr. & Casmalia	2.8	-	2.8	-
Casa Grande Dr. w/o Alder Ave.	1.6	-	1.6	-
Casa Grande Dr. e/o Alder Ave.	1.4	-	1.5	-
Locust Ave. s/o Riverside Ave.	0.9	-	0.9	-

% of ADT				
Vehicle Type	Day	Eve	Night	Sub total
Auto	78.4%	9.8%	9.8%	98.0%
Medium Truck	0.8%	0.1%	0.1%	1.0%
Heavy Truck	0.8%	0.1%	0.1%	1.0%
	80.0%	10.0%	10.0%	100.0%

Existing										
	Speed	Traffic Volumes			Leq			CNEL		
Roadway/Segment	MPH	AM	PM	ADT	ROW	25 Feet	50 Feet	ROW	25 Feet	50 Feet
Sierra Ave. s/o Summit Ave.	35	1369	1719	28650	70.4	68.0	66.4	71.6	69.2	67.6
Summit Ave. between I-15 and Sierra Ave.	35	1453	1990	33167	71.0	68.6	67.0	72.3	69.8	68.3
Sierra Ave. n/o Baseline Rd	35	1318	1531	25517	69.9	67.5	65.9	71.1	68.7	67.1
Sierra Ave. s/o Baseline Rd	35	1228	1362	22700	69.4	67.0	65.4	70.6	68.2	66.6
Baseline Rd. w/o Sierra Ave.	35	577	1085	18083	68.4	66.0	64.4	69.6	67.2	65.6
Existing With Project										
	Speed	Traffic Volumes			Leq			CNEL		
Roadway/Segment	MPH	AM	PM	ADT	ROW	25 Feet	50 Feet	ROW	25 Feet	50 Feet
Sierra Ave. s/o Summit Ave.	35	1420	1796	29933	70.6	68.2	66.6	71.8	69.4	67.8
Summit Ave. between I-15 and Sierra Ave.	35	1501	2083	34708	71.2	68.8	67.2	72.5	70.0	68.5
Sierra Ave. n/o Baseline Rd	35	1405	1656	27600	70.2	67.8	66.2	71.5	69.0	67.5
Sierra Ave. s/o Baseline Rd	35	1302	1463	24383	69.7	67.3	65.7	70.9	68.5	66.9
Baseline Rd. w/o Sierra Ave.	35	589	1108	18467	68.5	66.1	64.5	69.7	67.3	65.7

CNEL

Summary	25 ft. from ROW		At ROW	
Roadway/Segment	Project Increment	Cumulative Increment	Project Increment	Cumulative Increment
Sierra Ave. s/o Summit Ave.	0.2	-	0.2	-
Summit Ave. between I-15 and Sierra Ave.	0.2	-	0.2	-
Sierra Ave. n/o Baseline Rd	0.3	-	0.4	-
Sierra Ave. s/o Baseline Rd	0.3	-	0.3	-
Baseline Rd. w/o Sierra Ave.	0.1	-	0.1	-

% of ADT				
Vehicle Type	Day	Eve	Night	Sub total
Auto	78.4%	9.8%	9.8%	98.0%
Medium Truck	0.8%	0.1%	0.1%	1.0%
Heavy Truck	0.8%	0.1%	0.1%	1.0%
	80.0%	10.0%	10.0%	100.0%

Existing										
	Speed	Traffic Volumes			Leq			CNEL		
Roadway/Segment	MPH	AM	PM	ADT	ROW	25 Feet	50 Feet	ROW	25 Feet	50 Feet
Alder Ave. between Easton St. & Baseline Rd.	35	888	1098	18292	68.5	66.0	64.5	69.7	67.2	65.7
Alder Ave. s/o Baseline St.	35	512	896	14933	67.6	65.1	63.6	68.8	66.3	64.8
Baseline St. between Sierra Ave. & Alder Ave.	35	918	1345	22417	69.3	66.9	65.3	70.6	68.1	66.6
Baseline St. between Alder Ave. & Ayala Dr	35	1236	1780	29658	70.6	68.1	66.6	71.8	69.3	67.8
Baseline St. between Ayala Dr & Riverside Ave	35	1506	2217	36950	71.5	69.1	67.5	72.7	70.3	68.7
Existing With Project										
	Speed	Traffic Volumes			Leq			CNEL		
Roadway/Segment	MPH	AM	PM	ADT	ROW	25 Feet	50 Feet	ROW	25 Feet	50 Feet
Alder Ave. between Easton St. & Baseline Rd.	35	1013	1310	21833	69.2	66.8	65.2	70.4	68.0	66.4
Alder Ave. s/o Baseline St.	35	603	1047	17450	68.3	65.8	64.3	69.5	67.0	65.5
Baseline St. between Sierra Ave. & Alder Ave.	35	929	1367	22783	69.4	67.0	65.4	70.6	68.2	66.6
Baseline St. between Alder Ave. & Ayala Dr	35	1256	1830	30500	70.7	68.2	66.7	71.9	69.4	67.9
Baseline St. between Ayala Dr & Riverside Ave	35	1526	2178	36300	71.4	69.0	67.4	72.6	70.2	68.6

CNEL

Summary	25 ft. from ROW		At ROW	
Roadway/Segment	Project Increment	Cumulative Increment	Project Increment	Cumulative Increment
Alder Ave. between Easton St. & Baseline Rd.	0.8	-	0.7	-
Alder Ave. s/o Baseline St.	0.7	-	0.7	-
Baseline St. between Sierra Ave. & Alder Ave.	0.1	-	0.0	-
Baseline St. between Alder Ave. & Ayala Dr	0.1	-	0.1	-
Baseline St. between Ayala Dr & Riverside Ave	-0.1	-	-0.1	-

% of ADT				
Vehicle Type	Day	Eve	Night	Sub total
Auto	78.4%	9.8%	9.8%	98.0%
Medium Truck	0.8%	0.1%	0.1%	1.0%
Heavy Truck	0.8%	0.1%	0.1%	1.0%
	80.0%	10.0%	10.0%	100.0%

Existing										
	Speed	Traffic Volumes			Leq			CNEL		
Roadway/Segment	MPH	AM	PM	ADT	ROW	25 Feet	50 Feet	ROW	25 Feet	50 Feet
Ayala Dr. between Easton St. & Baseline St.	35	1512	2353	39217	71.8	69.3	67.8	73.0	70.5	69.0
Cedar Ave. s/o Baseline St.	35	1029	1273	21217	69.1	66.7	65.1	70.3	67.9	66.3
Riverside Ave. between Easton St. & Baseline St.	35	1431	2049	34150	71.2	68.7	67.2	72.4	69.9	68.4
Riverside Ave. s/o Baseline St	35	1369	1972	32867	71.0	68.6	67.0	72.2	69.8	68.2
Baseline St. e/o Riverside Ave.	35	1587	2063	34383	71.2	68.8	67.2	72.4	70.0	68.4
Existing With Project										
	Speed	Traffic Volumes			Leq			CNEL		
Roadway/Segment	MPH	AM	PM	ADT	ROW	25 Feet	50 Feet	ROW	25 Feet	50 Feet
Ayala Dr. between Easton St. & Baseline St.	35	1659	2772	46192	72.5	70.0	68.5	73.7	71.3	69.7
Cedar Ave. s/o Baseline St.	35	1147	1288	21467	69.2	66.7	65.2	70.4	67.9	66.4
Riverside Ave. between Easton St. & Baseline St.	35	1581	2234	37225	71.5	69.1	67.5	72.8	70.3	68.8
Riverside Ave. s/o Baseline St	35	1483	2117	35283	71.3	68.9	67.3	72.5	70.1	68.5
Baseline St. e/o Riverside Ave.	35	1633	2084	34733	71.2	68.8	67.2	72.5	70.0	68.5

CNEL

Summary	25 ft. from ROW		At ROW	
Roadway/Segment	Project Increment	Cumulative Increment	Project Increment	Cumulative Increment
Ayala Dr. between Easton St. & Baseline St.	0.8	-	0.7	-
Cedar Ave. s/o Baseline St.	0.0	-	0.1	-
Riverside Ave. between Easton St. & Baseline St.	0.4	-	0.4	-
Riverside Ave. s/o Baseline St	0.3	-	0.3	-
Baseline St. e/o Riverside Ave.	0.0	-	0.1	-

	% of ADT			
Vehicle Type	Day	Eve	Night	Sub total
Auto	78.4%	9.8%	9.8%	98.0%
Medium Truck	0.8%	0.1%	0.1%	1.0%
Heavy Truck	0.8%	0.1%	0.1%	1.0%
	80.0%	10.0%	10.0%	100.0%

Existing										
	Speed	Traffic Volumes			Leq			CNEL		
Roadway/Segment	MPH	AM	PM	ADT	ROW	25 Feet	50 Feet	ROW	25 Feet	50 Feet
State St. n/o Highland Ave.	35	544	580	9667	65.7	63.2	61.7	66.9	64.5	62.9
Palm Ave. e/o I-215	35	1841	1859	30983	70.7	68.3	66.7	72.0	69.5	68.0
University Pkwy e/o I-215	35	1379	1568	26133	69.3	67.1	65.7	70.5	68.3	66.9
Cajon Blvd. s/o Glen Helen Pkwy	35	149	582	9700	65.7	63.3	61.7	66.9	64.5	62.9
0	35				-	-	-	-	-	-

Existing With Project										
	Speed	Traffic Volumes			Leq			CNEL		
Roadway/Segment	MPH	AM	PM	ADT	ROW	25 Feet	50 Feet	ROW	25 Feet	50 Feet
State St. n/o Highland Ave.	35	586	647	10783	66.2	63.7	62.2	67.4	64.9	63.4
Palm Ave. e/o I-215	35	1871	1918	31967	70.9	68.4	66.9	72.1	69.7	68.1
University Pkwy e/o I-215	35	1387	1582	26367	69.3	67.2	65.7	70.5	68.4	66.9
Cajon Blvd. s/o Glen Helen Pkwy	35	264	715	11917	66.6	64.2	62.6	67.8	65.4	63.8
0	35				-	-	-	-	-	-

CNEL

Summary	25 ft. from ROW		At ROW	
Roadway/Segment	Project Increment	Cumulative Increment	Project Increment	Cumulative Increment
State St. n/o Highland Ave.	0.4	-	0.5	-
Palm Ave. e/o I-215	0.2	-	0.1	-
University Pkwy e/o I-215	0.1	-	0.0	-
Cajon Blvd. s/o Glen Helen Pkwy	0.9	-	0.9	-
0	-	-	-	-

% of ADT				
Vehicle Type	Day	Eve	Night	Sub total
Auto	78.4%	9.8%	9.8%	98.0%
Medium Truck	0.8%	0.1%	0.1%	1.0%
Heavy Truck	0.8%	0.1%	0.1%	1.0%
	80.0%	10.0%	10.0%	100.0%

Existing										
	Speed	Traffic Volumes			Leq			CNEL		
Roadway/Segment	MPH	AM	PM	ADT	ROW	25 Feet	50 Feet	ROW	25 Feet	50 Feet
Lytle Creek Rd w/o Glen Helen Pkwy	35			#VALUE!	-	-	-	-	-	-
Lytle Creek Rd between Glen Helen Pkwy & Sierra Ave.	35	52	355	5917	63.6	61.1	59.6	64.8	62.3	60.8
Glen Helen Pkwy between Lytle Creek Rd & I-15	35	6	10	167	48.1	45.6	44.1	49.3	46.8	45.3
Glen Helen Pkwy between I-15 & Cajon Blvd.	35	164	601	10017	65.8	63.4	61.8	67.1	64.6	63.1
Sierra Ave. between Lytle Creek Rd & I-15	35	395	394	6575	64.0	61.6	60.0	65.2	62.8	61.2
Future No Project										
	Speed	Traffic Volumes			Leq			CNEL		
Roadway/Segment	MPH	AM	PM	ADT	ROW	25 Feet	50 Feet	ROW	25 Feet	50 Feet
Lytle Creek Rd w/o Glen Helen Pkwy	35	1259	1984	33067	71.0	68.6	67.0	72.2	69.8	68.2
Lytle Creek Rd between Glen Helen Pkwy & Sierra Ave.	35	985	1532	25525	69.9	67.5	65.9	71.1	68.7	67.1
Glen Helen Pkwy between Lytle Creek Rd & I-15	35	389	500	8325	65.0	62.6	61.0	66.3	63.8	62.3
Glen Helen Pkwy between I-15 & Cajon Blvd.	35	660	1080	18000	68.4	65.9	64.4	69.6	67.2	65.6
Sierra Ave. between Lytle Creek Rd & I-15	35	1896	1978	32967	71.0	68.6	67.0	72.2	69.8	68.2
Future With Project										
	Speed	Traffic Volumes			Leq			CNEL		
Roadway/Segment	MPH	AM	PM	ADT	ROW	25 Feet	50 Feet	ROW	25 Feet	50 Feet
Lytle Creek Rd w/o Glen Helen Pkwy	35	1871	2995	42786	72.1	69.7	68.1	73.4	70.9	69.4
Lytle Creek Rd between Glen Helen Pkwy & Sierra Ave.	35	1354	2142	30593	70.7	68.2	66.7	71.9	69.5	67.9
Glen Helen Pkwy between Lytle Creek Rd & I-15	35	696	986	14086	67.3	64.9	63.3	68.5	66.1	64.5
Glen Helen Pkwy between I-15 & Cajon Blvd.	35	839	1319	18836	68.6	66.1	64.6	69.8	67.4	65.8
Sierra Ave. between Lytle Creek Rd & I-15	35	2511	2821	40300	71.9	69.4	67.9	73.1	70.7	69.1

CNEL

Summary	25 ft. from ROW		At ROW	
Roadway/Segment	Project Increment	Cumulative Increment	Project Increment	Cumulative Increment
Lytle Creek Rd w/o Glen Helen Pkwy	1.1	-	1.2	-
Lytle Creek Rd between Glen Helen Pkwy & Sierra Ave.	0.8	7.2	0.8	7.1
Glen Helen Pkwy between Lytle Creek Rd & I-15	2.3	19.3	2.2	19.2
Glen Helen Pkwy between I-15 & Cajon Blvd.	0.2	2.8	0.2	2.7
Sierra Ave. between Lytle Creek Rd & I-15	0.9	7.9	0.9	7.9

	% of ADT			
Vehicle Type	Day	Eve	Night	Sub total
Auto	78.4%	9.8%	9.8%	98.0%
Medium Truck	0.8%	0.1%	0.1%	1.0%
Heavy Truck	0.8%	0.1%	0.1%	1.0%
	80.0%	10.0%	10.0%	100.0%

Existing										
	Speed	Traffic Volumes			Leq			CNEL		
Roadway/Segment	MPH	AM	PM	ADT	ROW	25 Feet	50 Feet	ROW	25 Feet	50 Feet
Riverside Ave between Sierra Ave & Alder Ave	40	908	1052	17525	69.7	67.2	65.7	70.9	68.4	66.9
Riverside Ave between Alder Ave & Locust Ave	40	925	760	15417	69.1	66.7	65.1	70.3	67.9	66.3
Riverside Ave between Locust Ave & Linden Ave	40	1271	977	21175	70.5	68.0	66.5	71.7	69.3	67.7
Riverside Ave between Linden Ave & Knollwood Ave.	40	1587	1415	26450	71.4	69.0	67.4	72.7	70.2	68.7
Live Oak Ave. n/o Riverside Ave.	35			#VALUE!	-	-	-	-	-	-
Future No Project										
	Speed	Traffic Volumes			Leq			CNEL		
Roadway/Segment	MPH	AM	PM	ADT	ROW	25 Feet	50 Feet	ROW	25 Feet	50 Feet
Riverside Ave between Sierra Ave & Alder Ave	40	1263	1429	23808	71.0	68.5	67.0	72.2	69.8	68.2
Riverside Ave between Alder Ave & Locust Ave	40	1180	1194	19892	70.2	67.8	66.2	71.4	69.0	67.4
Riverside Ave between Locust Ave & Linden Ave	40	1430	1403	23833	71.0	68.6	67.0	72.2	69.8	68.2
Riverside Ave between Linden Ave & Knollwood Ave.	40	1719	1569	28642	71.8	69.3	67.8	73.0	70.6	69.0
Live Oak Ave. n/o Riverside Ave.	35			#VALUE!	-	-	-	-	-	-
Future With Project										
	Speed	Traffic Volumes			Leq			CNEL		
Roadway/Segment	MPH	AM	PM	ADT	ROW	25 Feet	50 Feet	ROW	25 Feet	50 Feet
Riverside Ave between Sierra Ave & Alder Ave	40	2429	3268	46686	73.9	71.5	69.9	75.1	72.7	71.1
Riverside Ave between Alder Ave & Locust Ave	40	2351	2835	40500	73.3	70.9	69.3	74.5	72.1	70.5
Riverside Ave between Locust Ave & Linden Ave	40	2333	2727	38957	73.1	70.7	69.1	74.3	71.9	70.3
Riverside Ave between Linden Ave & Knollwood Ave.	40	2680	3175	45357	73.8	71.3	69.8	75.0	72.6	71.0
Live Oak Ave. n/o Riverside Ave.	35	516	806	11514	66.4	64.0	62.4	67.7	65.2	63.7

CNEL

Summary	25 ft. from ROW		At ROW	
Roadway/Segment	Project Increment	Cumulative Increment	Project Increment	Cumulative Increment
Riverside Ave between Sierra Ave & Alder Ave	2.9	4.3	2.9	4.2
Riverside Ave between Alder Ave & Locust Ave	3.1	4.2	3.1	4.2
Riverside Ave between Locust Ave & Linden Ave	2.1	2.6	2.1	2.6
Riverside Ave between Linden Ave & Knollwood Ave.	2.0	2.4	2.0	2.3
Live Oak Ave. n/o Riverside Ave.	-	-	-	-

	% of ADT			
Vehicle Type	Day	Eve	Night	Sub total
Auto	78.4%	9.8%	9.8%	98.0%
Medium Truck	0.8%	0.1%	0.1%	1.0%
Heavy Truck	0.8%	0.1%	0.1%	1.0%
	80.0%	10.0%	10.0%	100.0%

Existing										
	Speed	Traffic Volumes			Leq			CNEL		
Roadway/Segment	MPH	AM	PM	ADT	ROW	25 Feet	50 Feet	ROW	25 Feet	50 Feet
Riverside Ave between Knollwood Ave & Country Club Dr	40	1802	1589	30025	72.0	69.6	68.0	73.2	70.8	69.2
Riverside Ave e/o Country Club Dr	40	1729	1659	28817	71.8	69.4	67.8	73.0	70.6	69.0
Ayala Dr. s/o Riverside Ave.	35	846	714	14100	68.5	65.5	63.8	69.7	66.7	65.0
Knollwood Ave. n/o Riverside Ave.	35	119	93	1983	60.0	57.0	55.2	61.2	58.2	56.4
Country Club Dr. n/o Riverside Ave.	35	296	188	4933	63.9	60.9	59.2	65.1	62.2	60.4
Future No Project										
	Speed	Traffic Volumes			Leq			CNEL		
Roadway/Segment	MPH	AM	PM	ADT	ROW	25 Feet	50 Feet	ROW	25 Feet	50 Feet
Riverside Ave between Knollwood Ave & Country Club Dr	40	1858	1572	30958	72.1	69.7	68.1	73.3	70.9	69.3
Riverside Ave e/o Country Club Dr	40	1405	1270	23417	70.9	68.5	66.9	72.1	69.7	68.1
Ayala Dr. s/o Riverside Ave.	35	954	665	15900	69.0	66.0	64.3	70.2	67.2	65.5
Knollwood Ave. n/o Riverside Ave.	35	126	98	2100	60.2	57.2	55.5	61.4	58.4	56.7
Country Club Dr. n/o Riverside Ave.	35	355	205	5917	64.7	61.7	60.0	65.9	62.9	61.2
Future With Project										
	Speed	Traffic Volumes			Leq			CNEL		
Roadway/Segment	MPH	AM	PM	ADT	ROW	25 Feet	50 Feet	ROW	25 Feet	50 Feet
Riverside Ave between Knollwood Ave & Country Club Dr	40	2584	2692	38457	73.1	70.6	69.1	74.3	71.8	70.3
Riverside Ave e/o Country Club Dr	40	2195	2290	32714	72.4	69.9	68.4	73.6	71.1	69.6
Ayala Dr. s/o Riverside Ave.	35	1267	1201	18100	69.6	66.6	64.8	70.8	67.8	66.1
Knollwood Ave. n/o Riverside Ave.	35	195	180	2786	61.4	58.5	56.7	62.6	59.7	57.9
Country Club Dr. n/o Riverside Ave.	35	998	1137	16243	69.1	66.1	64.4	70.3	67.3	65.6

CNEL

Summary	25 ft. from ROW		At ROW	
Roadway/Segment	Project Increment	Cumulative Increment	Project Increment	Cumulative Increment
Riverside Ave between Knollwood Ave & Country Club Dr	0.9	1.0	1.0	1.1
Riverside Ave e/o Country Club Dr	1.4	0.5	1.5	0.6
Ayala Dr. s/o Riverside Ave.	0.6	1.1	0.6	1.1
Knollwood Ave. n/o Riverside Ave.	1.3	1.5	1.2	1.4
Country Club Dr. n/o Riverside Ave.	4.4	5.1	4.4	5.2

	% of ADT			
Vehicle Type	Day	Eve	Night	Sub total
Auto	78.4%	9.8%	9.8%	98.0%
Medium Truck	0.8%	0.1%	0.1%	1.0%
Heavy Truck	0.8%	0.1%	0.1%	1.0%
	80.0%	10.0%	10.0%	100.0%

Existing										
	Speed	Traffic Volumes			Leq			CNEL		
Roadway/Segment	MPH	AM	PM	ADT	ROW	25 Feet	50 Feet	ROW	25 Feet	50 Feet
Live Oak Ave. s/o Riverside Ave.	35	471	438	7850	64.8	62.3	60.8	66.0	63.6	62.0
Alder Ave. n/o Riverside Ave.				#VALUE!	-	-	-	-	-	-
Locust Ave. n/o Riverside Ave.				#VALUE!	-	-	-	-	-	-
Linden Ave. n/o Riverside Ave.				#VALUE!	-	-	-	-	-	-
Linden Ave. s/o Riverside Ave.	35	191	216	3600	61.4	59.0	57.4	62.6	60.2	58.6
Future No Project										
	Speed	Traffic Volumes			Leq			CNEL		
Roadway/Segment	MPH	AM	PM	ADT	ROW	25 Feet	50 Feet	ROW	25 Feet	50 Feet
Live Oak Ave. s/o Riverside Ave.	35	544	594	9900	65.8	63.3	61.8	67.0	64.6	63.0
Alder Ave. n/o Riverside Ave.				#VALUE!	-	-	-	-	-	-
Locust Ave. n/o Riverside Ave.				#VALUE!	-	-	-	-	-	-
Linden Ave. n/o Riverside Ave.				#VALUE!	-	-	-	-	-	-
Linden Ave. s/o Riverside Ave.	35	143	165	2750	60.2	57.8	56.2	61.4	59.0	57.4
Future With Project										
	Speed	Traffic Volumes			Leq			CNEL		
Roadway/Segment	MPH	AM	PM	ADT	ROW	25 Feet	50 Feet	ROW	25 Feet	50 Feet
Live Oak Ave. s/o Riverside Ave.	35	760	1005	14357	67.4	65.0	63.4	68.6	66.2	64.6
Alder Ave. n/o Riverside Ave.	35	722	1209	17271	68.2	65.8	64.2	69.4	67.0	65.4
Locust Ave. n/o Riverside Ave.	35	903	980	14000	67.3	64.9	63.3	68.5	66.1	64.5
Linden Ave. n/o Riverside Ave.	35	471	1250	17857	68.4	65.9	64.4	69.6	67.1	65.6
Linden Ave. s/o Riverside Ave.	35	218	284	4057	61.9	59.5	57.9	63.1	60.7	59.1

	CNEL			
Summary	**25 ft. from ROW**		**At ROW**	
Roadway/Segment	Project Increment	Cumulative Increment	Project Increment	Cumulative Increment
Live Oak Ave. s/o Riverside Ave.	1.6	2.6	1.6	2.6
Alder Ave. n/o Riverside Ave.	-	-	-	-
Locust Ave. n/o Riverside Ave.	-	-	-	-
Linden Ave. n/o Riverside Ave.	-	-	-	-
Linden Ave. s/o Riverside Ave.	1.7	0.5	1.7	0.5

	% of ADT			
Vehicle Type	Day	Eve	Night	Sub total
Auto	78.4%	9.8%	9.8%	98.0%
Medium Truck	0.8%	0.1%	0.1%	1.0%
Heavy Truck	0.8%	0.1%	0.1%	1.0%
	80.0%	10.0%	10.0%	100.0%

Existing										
	Speed	Traffic Volumes			Leq			CNEL		
Roadway/Segment	MPH	AM	PM	ADT	ROW	25 Feet	50 Feet	ROW	25 Feet	50 Feet
Alder Ave. between Riverside Ave. & Casa Grande Dr.	35	310	610	10167	67.1	64.1	62.3	68.3	65.3	63.5
Alder Ave. between Casa Grande Dr. & Casmalia	35	235	461	7683	65.8	62.9	61.1	67.1	64.1	62.3
Casa Grande Dr. w/o Alder Ave.	35	226	170	3767	62.7	59.8	58.0	64.0	61.0	59.2
Casa Grande Dr. e/o Alder Ave.	35	409	392	6817	65.3	62.3	60.6	66.5	63.6	61.8
Locust Ave. s/o Riverside Ave.	35	496	303	8267	66.2	63.2	61.4	67.4	64.4	62.6
Future No Project										
	Speed	Traffic Volumes			Leq			CNEL		
Roadway/Segment	MPH	AM	PM	ADT	ROW	25 Feet	50 Feet	ROW	25 Feet	50 Feet
Alder Ave. between Riverside Ave. & Casa Grande Dr.	35	394	509	8483	66.3	63.3	61.5	67.5	64.5	62.8
Alder Ave. between Casa Grande Dr. & Casmalia	35	885	1360	22667	70.5	67.6	65.8	71.8	68.8	67.0
Casa Grande Dr. w/o Alder Ave.	35	535	670	11167	67.5	64.5	62.7	68.7	65.7	64.0
Casa Grande Dr. e/o Alder Ave.	35	409	381	6817	65.3	62.3	60.6	66.5	63.6	61.8
Locust Ave. s/o Riverside Ave.	35	266	214	4433	63.5	60.5	58.7	64.7	61.7	59.9
Future With Project										
	Speed	Traffic Volumes			Leq			CNEL		
Roadway/Segment	MPH	AM	PM	ADT	ROW	25 Feet	50 Feet	ROW	25 Feet	50 Feet
Alder Ave. between Riverside Ave. & Casa Grande Dr.	35	672	995	14207	68.5	65.5	63.8	69.7	66.7	65.0
Alder Ave. between Casa Grande Dr. & Casmalia	35	1118	1784	25479	71.0	68.1	66.3	72.3	69.3	67.5
Casa Grande Dr. w/o Alder Ave.	35	627	828	11829	67.7	64.7	63.0	68.9	66.0	64.2
Casa Grande Dr. e/o Alder Ave.	35	516	561	8014	66.0	63.0	61.3	67.2	64.3	62.5
Locust Ave. s/o Riverside Ave.	35	379	431	6157	64.9	61.9	60.2	66.1	63.1	61.4

CNEL

Summary	25 ft. from ROW		At ROW	
Roadway/Segment	Project Increment	Cumulative Increment	Project Increment	Cumulative Increment
Alder Ave. between Riverside Ave. & Casa Grande Dr.	2.2	1.4	2.2	1.4
Alder Ave. between Casa Grande Dr. & Casmalia	0.5	5.2	0.5	5.2
Casa Grande Dr. w/o Alder Ave.	0.3	5.0	0.2	4.9
Casa Grande Dr. e/o Alder Ave.	0.7	0.7	0.7	0.7
Locust Ave. s/o Riverside Ave.	1.4	-1.3	1.4	-1.3

	% of ADT			
Vehicle Type	Day	Eve	Night	Sub total
Auto	78.4%	9.8%	9.8%	98.0%
Medium Truck	0.8%	0.1%	0.1%	1.0%
Heavy Truck	0.8%	0.1%	0.1%	1.0%
	80.0%	10.0%	10.0%	100.0%

Existing										
	Speed	Traffic Volumes			Leq			CNEL		
Roadway/Segment	MPH	AM	PM	ADT	ROW	25 Feet	50 Feet	ROW	25 Feet	50 Feet
Sierra Ave. s/o Summit Ave.	35	1369	1719	28650	70.4	68.0	66.4	71.6	69.2	67.6
Summit Ave. between I-15 and Sierra Ave.	35	1453	1990	33167	71.0	68.6	67.0	72.3	69.8	68.3
Sierra Ave. n/o Baseline Rd	35	1318	1531	25517	69.9	67.5	65.9	71.1	68.7	67.1
Sierra Ave. s/o Baseline Rd	35	1228	1362	22700	69.4	67.0	65.4	70.6	68.2	66.6
Baseline Rd. w/o Sierra Ave.	35	577	1085	18083	68.4	66.0	64.4	69.6	67.2	65.6
Future No Project										
	Speed	Traffic Volumes			Leq			CNEL		
Roadway/Segment	MPH	AM	PM	ADT	ROW	25 Feet	50 Feet	ROW	25 Feet	50 Feet
Sierra Ave. s/o Summit Ave.	35	1865	2054	34233	71.2	68.7	67.2	72.4	69.9	68.4
Summit Ave. between I-15 and Sierra Ave.	35	1503	1803	30050	70.6	68.2	66.6	71.8	69.4	67.8
Sierra Ave. n/o Baseline Rd	35	1618	2181	36350	71.4	69.0	67.4	72.7	70.2	68.7
Sierra Ave. s/o Baseline Rd	35	1560	2066	34433	71.2	68.8	67.2	72.4	70.0	68.4
Baseline Rd. w/o Sierra Ave.	35	716	1290	21500	69.2	66.7	65.2	70.4	67.9	66.4
Future With Project										
	Speed	Traffic Volumes			Leq			CNEL		
Roadway/Segment	MPH	AM	PM	ADT	ROW	25 Feet	50 Feet	ROW	25 Feet	50 Feet
Sierra Ave. s/o Summit Ave.	35	1916	2131	30443	70.7	68.2	66.7	71.9	69.4	67.9
Summit Ave. between I-15 and Sierra Ave.	35	1551	1896	27079	70.2	67.7	66.2	71.4	68.9	67.4
Sierra Ave. n/o Baseline Rd	35	1705	2306	32943	71.0	68.6	67.0	72.2	69.8	68.2
Sierra Ave. s/o Baseline Rd	35	1634	2167	30957	70.7	68.3	66.7	72.0	69.5	68.0
Baseline Rd. w/o Sierra Ave.	35	728	1313	18757	68.6	66.1	64.6	69.8	67.3	65.8

	CNEL			
Summary	**25 ft. from ROW**		**At ROW**	
Roadway/Segment	Project Increment	Cumulative Increment	Project Increment	Cumulative Increment
Sierra Ave. s/o Summit Ave.	-0.5	0.2	-0.5	0.3
Summit Ave. between I-15 and Sierra Ave.	-0.5	-0.9	-0.4	-0.9
Sierra Ave. n/o Baseline Rd	-0.4	1.1	-0.5	1.1
Sierra Ave. s/o Baseline Rd	-0.5	1.3	-0.4	1.4
Baseline Rd. w/o Sierra Ave.	-0.6	0.1	-0.6	0.2

	% of ADT			
Vehicle Type	Day	Eve	Night	Sub total
Auto	78.4%	9.8%	9.8%	98.0%
Medium Truck	0.8%	0.1%	0.1%	1.0%
Heavy Truck	0.8%	0.1%	0.1%	1.0%
	80.0%	10.0%	10.0%	100.0%

Existing										
	Speed	Traffic Volumes			Leq			CNEL		
Roadway/Segment	MPH	AM	PM	ADT	ROW	25 Feet	50 Feet	ROW	25 Feet	50 Feet
Alder Ave. between Easton St. & Baseline Rd.	35	888	1098	18292	68.5	66.0	64.5	69.7	67.2	65.7
Alder Ave. s/o Baseline St.	35	512	896	14933	67.6	65.1	63.6	68.8	66.3	64.8
Baseline St. between Sierra Ave. & Alder Ave.	35	918	1345	22417	69.3	66.9	65.3	70.6	68.1	66.6
Baseline St. between Alder Ave. & Ayala Dr	35	1236	1780	29658	70.6	68.1	66.6	71.8	69.3	67.8
Baseline St. between Ayala Dr & Riverside Ave	35	1506	2217	36950	71.5	69.1	67.5	72.7	70.3	68.7
Future No Project										
	Speed	Traffic Volumes			Leq			CNEL		
Roadway/Segment	MPH	AM	PM	ADT	ROW	25 Feet	50 Feet	ROW	25 Feet	50 Feet
Alder Ave. between Easton St. & Baseline Rd.	35	1210	1686	28100	70.3	67.9	66.3	71.5	69.1	67.5
Alder Ave. s/o Baseline St.	35	1102	1686	28100	70.3	67.9	66.3	71.5	69.1	67.5
Baseline St. between Sierra Ave. & Alder Ave.	35	930	1528	25467	69.9	67.4	65.9	71.1	68.7	67.1
Baseline St. between Alder Ave. & Ayala Dr	35	754	1551	25850	70.0	67.5	66.0	71.2	68.7	67.2
Baseline St. between Ayala Dr & Riverside Ave	35	985	1922	32025	70.9	68.4	66.9	72.1	69.7	68.1
Future With Project										
	Speed	Traffic Volumes			Leq			CNEL		
Roadway/Segment	MPH	AM	PM	ADT	ROW	25 Feet	50 Feet	ROW	25 Feet	50 Feet
Alder Ave. between Easton St. & Baseline Rd.	35	1334	1899	27121	70.2	67.7	66.2	71.4	68.9	67.4
Alder Ave. s/o Baseline St.	35	1193	1837	26243	70.0	67.6	66.0	71.2	68.8	67.2
Baseline St. between Sierra Ave. & Alder Ave.	35	941	1550	22143	69.3	66.8	65.3	70.5	68.1	66.5
Baseline St. between Alder Ave. & Ayala Dr	35	775	1602	22879	69.4	67.0	65.4	70.6	68.2	66.6
Baseline St. between Ayala Dr & Riverside Ave	35	1005	1883	26893	70.1	67.7	66.1	71.3	68.9	67.3

CNEL

Summary	25 ft. from ROW		At ROW	
Roadway/Segment	Project Increment	Cumulative Increment	Project Increment	Cumulative Increment
Alder Ave. between Easton St. & Baseline Rd.	-0.2	1.7	-0.1	1.7
Alder Ave. s/o Baseline St.	-0.3	2.5	-0.3	2.4
Baseline St. between Sierra Ave. & Alder Ave.	-0.6	0.0	-0.6	-0.1
Baseline St. between Alder Ave. & Ayala Dr	-0.5	-1.1	-0.6	-1.2
Baseline St. between Ayala Dr & Riverside Ave	-0.8	-1.4	-0.8	-1.4

	% of ADT			
Vehicle Type	Day	Eve	Night	Sub total
Auto	78.4%	9.8%	9.8%	98.0%
Medium Truck	0.8%	0.1%	0.1%	1.0%
Heavy Truck	0.8%	0.1%	0.1%	1.0%
	80.0%	10.0%	10.0%	100.0%

Existing										
	Speed	Traffic Volumes			Leq			CNEL		
Roadway/Segment	MPH	AM	PM	ADT	ROW	25 Feet	50 Feet	ROW	25 Feet	50 Feet
Ayala Dr. between Easton St. & Baseline St.	35	1512	2353	39217	71.8	69.3	67.8	73.0	70.5	69.0
Cedar Ave. s/o Baseline St.	35	1029	1273	21217	69.1	66.7	65.1	70.3	67.9	66.3
Riverside Ave. between Easton St. & Baseline St.	35	1431	2049	34150	71.2	68.7	67.2	72.4	69.9	68.4
Riverside Ave. s/o Baseline St	35	1369	1972	32867	71.0	68.6	67.0	72.2	69.8	68.2
Baseline St. e/o Riverside Ave.	35	1587	2063	34383	71.2	68.8	67.2	72.4	70.0	68.4
Future No Project										
	Speed	Traffic Volumes			Leq			CNEL		
Roadway/Segment	MPH	AM	PM	ADT	ROW	25 Feet	50 Feet	ROW	25 Feet	50 Feet
Ayala Dr. between Easton St. & Baseline St.	35	2119	2562	42700	72.1	69.7	68.1	73.4	70.9	69.4
Cedar Ave. s/o Baseline St.	35	1919	2373	39550	71.8	69.4	67.8	73.0	70.6	69.0
Riverside Ave. between Easton St. & Baseline St.	35	1772	2250	37500	71.6	69.1	67.6	72.8	70.3	68.8
Riverside Ave. s/o Baseline St	35	1514	2125	35417	71.3	68.9	67.3	72.5	70.1	68.5
Baseline St. e/o Riverside Ave.	35	938	1711	28517	70.4	67.9	66.4	71.6	69.2	67.6
Future With Project										
	Speed	Traffic Volumes			Leq			CNEL		
Roadway/Segment	MPH	AM	PM	ADT	ROW	25 Feet	50 Feet	ROW	25 Feet	50 Feet
Ayala Dr. between Easton St. & Baseline St.	35	2266	2981	42579	72.1	69.7	68.1	73.3	70.9	69.3
Cedar Ave. s/o Baseline St.	35	2037	2388	34114	71.2	68.7	67.2	72.4	69.9	68.4
Riverside Ave. between Easton St. & Baseline St.	35	1923	2435	34779	71.2	68.8	67.2	72.5	70.0	68.5
Riverside Ave. s/o Baseline St	35	1628	2270	32429	70.9	68.5	66.9	72.2	69.7	68.2
Baseline St. e/o Riverside Ave.	35	984	1732	24743	69.8	67.3	65.8	71.0	68.5	67.0

	CNEL			
Summary	**25 ft. from ROW**		**At ROW**	
Roadway/Segment	Project Increment	Cumulative Increment	Project Increment	Cumulative Increment
Ayala Dr. between Easton St. & Baseline St.	0.0	0.4	-0.1	0.3
Cedar Ave. s/o Baseline St.	-0.7	2.0	-0.6	2.1
Riverside Ave. between Easton St. & Baseline St.	-0.3	0.1	-0.3	0.1
Riverside Ave. s/o Baseline St	-0.4	-0.1	-0.3	0.0
Baseline St. e/o Riverside Ave.	-0.7	-1.5	-0.6	-1.4

	% of ADT			
Vehicle Type	Day	Eve	Night	Sub total
Auto	78.4%	9.8%	9.8%	98.0%
Medium Truck	0.8%	0.1%	0.1%	1.0%
Heavy Truck	0.8%	0.1%	0.1%	1.0%
	80.0%	10.0%	10.0%	100.0%

Existing

Roadway/Segment	Speed MPH	Traffic Volumes AM	PM	ADT	Leq ROW	25 Feet	50 Feet	CNEL ROW	25 Feet	50 Feet
State St. n/o Highland Ave.	35	544	580	9667	65.7	63.2	61.7	66.9	64.5	62.9
Palm Ave. e/o I-215	35	1841	1859	30983	70.7	68.3	66.7	72.0	69.5	68.0
University Pkwy e/o I-215	35	1379	1568	26133	69.3	67.1	65.7	70.5	68.3	66.9
Cajon Blvd. s/o Glen Helen Pkwy	35	149	582	9700	65.7	63.3	61.7	66.9	64.5	62.9
0				#VALUE!	-	-	-	-	-	-

Future No Project

Roadway/Segment	Speed MPH	Traffic Volumes AM	PM	ADT	Leq ROW	25 Feet	50 Feet	CNEL ROW	25 Feet	50 Feet
State St. n/o Highland Ave.	35	1339	1587	26450	70.1	67.6	66.1	71.3	68.8	67.3
Palm Ave. e/o I-215	35	1842	2280	38000	71.6	69.2	67.6	72.8	70.4	68.8
University Pkwy e/o I-215	35	1648	2351	39183	71.0	68.9	67.5	72.2	70.1	68.7
Cajon Blvd. s/o Glen Helen Pkwy	35	773	1268	21133	69.1	66.6	65.1	70.3	67.9	66.3
0				#VALUE!	-	-	-	-	-	-

Future With Project

Roadway/Segment	Speed MPH	Traffic Volumes AM	PM	ADT	Leq ROW	25 Feet	50 Feet	CNEL ROW	25 Feet	50 Feet
State St. n/o Highland Ave.	35	1381	1654	23629	69.6	67.1	65.6	70.8	68.3	66.8
Palm Ave. e/o I-215	35	1872	2339	33414	71.1	68.6	67.1	72.3	69.8	68.3
University Pkwy e/o I-215	35	1656	2365	33786	70.4	68.2	66.8	71.6	69.5	68.0
Cajon Blvd. s/o Glen Helen Pkwy	35	888	1401	20014	68.8	66.4	64.8	70.1	67.6	66.1
0				#VALUE!	-	-	-	-	-	-

CNEL

Summary	25 ft. from ROW		At ROW	
Roadway/Segment	Project Increment	Cumulative Increment	Project Increment	Cumulative Increment
State St. n/o Highland Ave.	-0.5	3.8	-0.5	3.9
Palm Ave. e/o I-215	-0.6	0.3	-0.5	0.3
University Pkwy e/o I-215	-0.6	1.2	-0.6	1.1
Cajon Blvd. s/o Glen Helen Pkwy	-0.3	3.1	-0.2	3.2
0	-	-	-	-

	% of ADT			
Vehicle Type	Day	Eve	Night	Sub total
Auto	78.4%	9.8%	9.8%	98.0%
Medium Truck	0.8%	0.1%	0.1%	1.0%
Heavy Truck	0.8%	0.1%	0.1%	1.0%
	80.0%	10.0%	10.0%	100.0%

Appendix III-I

CONCEPTUAL FIRE AGENCY EMERGENCY RESPONSE STUDY

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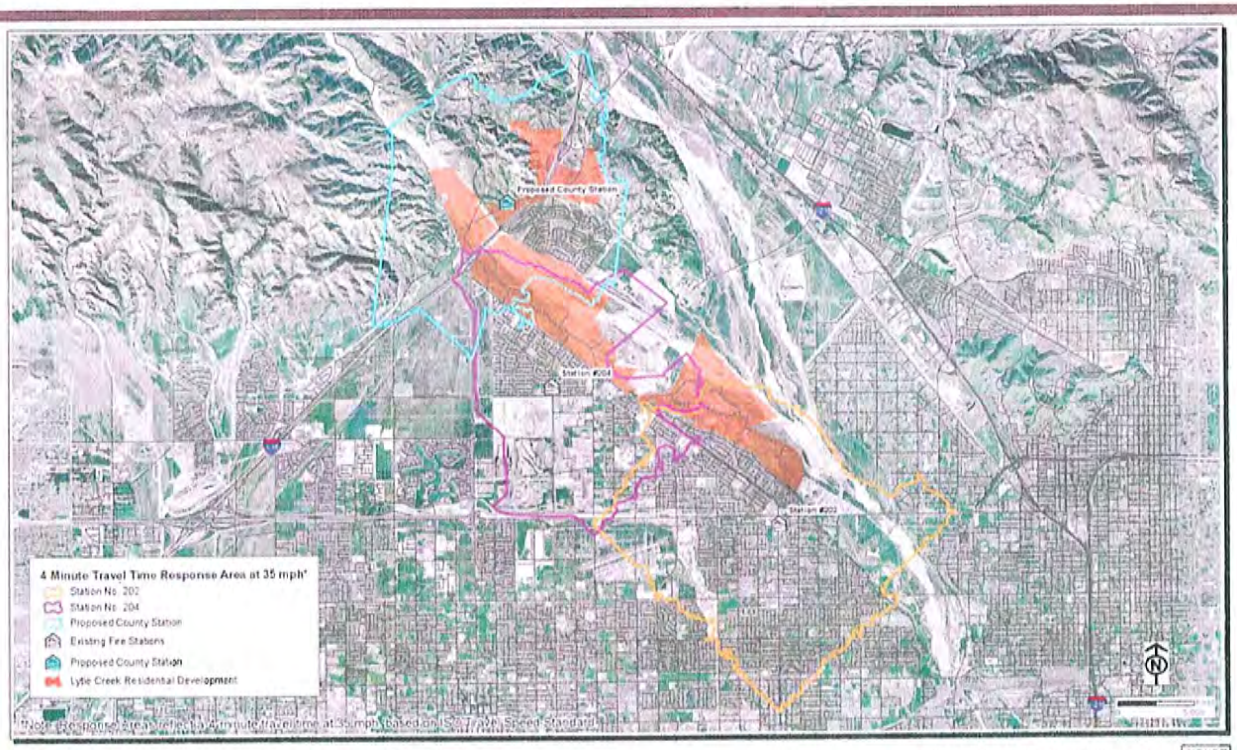
Conceptual

Fire Agencies Emergency Response Study

for the
Lytle Creek Ranch Development
Rialto, California



DUDEK HRC Hunt Research Corporation

Lytle Creek Fire Response Plan
Four Minute Response Area Analysis
FIGURE 2

February 10, 2008

by

HUNT RESEARCH CORPORATION
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6. METHODOLOGY OF THIS STUDY	4
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APPENDIX

VICINITY MAP
SITE PLAN
LAND USE PLAN
PRINT OUT OF MODELS; small and large size of Figures 1 and 2

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1.INTRODUCTION:

The purpose of this conceptual study is to determine the estimated response times and distances of the closest Fire Department Fire Engine Companies to the new Lytle Creek Ranch Development. This is a 2500-acre development that surrounds the Lytle Creek North Development in San Bernardino County. The Thomas Guide page # is 575-B-1. The development will be in the City of Rialto. The development will have a total population of about 22,699 persons (8407 SFD homes assuming 2.7 persons per home). Included in above estimated population, there will also be 1,325 Multi family dwelling units. Each apartment building would have about 10-20 dwelling units. There will be two schools. The development is generally North of Riverside Avenue, Sierra and Lytle Creek Road. It is on both sides of the Interstate 15 freeway. A County Fire Station will be built on Glen Helen Parkway, North of Lytle Creek Road, adjacent to the existing Forest Service Station, to protect the existing development. Rialto Fire Station 204 is located on 3288 N. Alder. Alder extends in to the new development. Station 204 is approximately 1 mile South of the proposed project. In addition, Rialto Fire Station 202, 1925 S Riverside Ave, would respond to portions of the new development. Station 202 is about 1 mile driving distance from the new development.

2. NATIONAL RESPONSE STANDARDS:

The National Fire Service response standard utilized by many Fire Departments, including the County of San Bernardino and the Rialto Fire Department, is National Fire Protection Association (NFPA) Standard 1710;"Standard for Organization and Deployment of Fire Suppression Operations, Emergency Medical Operations and Special Operations to the Public by Career Fire Departments". This standard is not law; it is a national recommended standard of good practice. The NFPA is a Fire Protection Association, which publishes Standards for Fire Protection, conducts research, etc.

NFPA Standard 1710; which sets forth standards for deployment of emergency Fire Department forces, has the following response standard:

- 1-minute turnout time, after receipt of the alarm by the Fire Company.
- 4 minutes response (driving) time for the first in Fire Engine to 90% of all calls.
- 4-minute response (driving) time for the first unit providing a Basic Life Support (BLS) level of care; 90% of all calls.
- 8 minutes for the first Advanced Life Support (paramedic) unit if that service is offered; 90% of all calls.

Discussion:

Most modern Fire Departments have a response standard that is similar to NFPA 1710, or that may be 5 minutes driving time, plus 1 minute turnout time and 1 minute for call processing.

The Genesis of modern objective oriented Fire Response Standards such as NFPA 1710, is that a fire in a structure can "flash over", due to the building materials and contents reaching their ignition temperature at the same time, and can cause full involvement of a room of fire origin within 5 minutes of ignition. Thus the structure may be fully involved with fire. If the structure has internal Fire Sprinklers, then the sprinklers can prevent flashover, and save lives, and therefore the Fire Department doesn't need to get to the fire prior to flashover.

In the 1960's many Fire Departments began to offer Emergency Medical Services (EMS) including Basic Life Support (EMT) and Advanced Life support (ALS). Today, most departments offer this service. Many, like Rialto, offer Paramedic service. 70 to 80% of all Fire Department emergency calls are for EMS. In order to attempt to assure a successful discharge from a hospital, emergency medical intervention should occur within about 4-6 minutes of cessation of heart action or breathing. Therefore, the Fire Departments who offer this service have the objective of arriving on scene in 4 minutes driving time for 90% of all calls.

Therefore, the standard to utilize to determine the level of response provided to a certain area should be to arrive at 90% of all calls within 4 minutes driving time. This standard has been adopted by the County Fire Department and the Rialto Fire Department. In addition to that, all new structures should have internal fire sprinkler systems.

3.FIRE DEPARTMENT COVERAGE:

One of the first due engine companies under normal circumstances would be the Fire Engine company from Rialto Station # 204 at 3288 No. Alder (Alder and Casagrande). That engine company is a 3-person Paramedic level engine company. The apparatus is a Type 1 engine. Other apparatus at the station include a water tender. The annual call volume of this fire station is about 541 calls (1.4/day). 70 to 80% are medical emergencies.

Another nearby year around fire station will be the San Bernardino County Fire Station on Glen Helen Parkway, which will be built to serve the Lytle Creek development in the County area. This station will have a four-person crew and provide a Paramedic level of EMS service. The type of apparatus at the Fire Station would be a Type 1 engine. It is understood that this station can serve the development in Rialto under the current Automatic Aid response agreement. Proper Automatic Aid agreements are very common, result in a seamless response, the same as if such Fire Companies are part of the same Fire Department.

In addition, Rialto Fire Station 202 would respond to incidents in certain parts of the new Development. They would probably be the first due engine company; most likely to the areas east of Country Club Drive.

4.LOCAL RESPONSE STANDARDS:

The San Bernardino County Fire Department (Dan Wurl; Deputy Chief) and the Rialto Fire Department both state that they use NFPA 1710 as their response standard. Review of response data received from the Rialto Fire Department indicates their average driving time to an emergency from Stations 202 or 204 is 5.39 minutes. So they are not currently meeting the NFPA 1710 standard. However, the standard has a performance objective of 90% of all calls. It is not expected that fire units will arrive in 4 minutes driving time to all calls.

5.ESTIMATED ANNUAL AND DAILY EMERGENCY CALLS TO THE DEVELOPMENT:

Data obtained from the Chula Vista Fire Department for a fire station in a new upscale development similar to the proposed Lytle Creek Development (1175 annual calls for a population of 12,000; call generation factor of 0.09 calls per person) indicated an estimated annual call volume of 2042 annual calls for the Lytle Creek development (5.59 per day) most of which will be medical emergencies.

Using data from the Rialto Fire Department, which is based on a population of 100,000 persons and 10,400 calls/year (a call generation factor of 0.10 per person) the estimated number of calls would be 2269/ year (6 per day). The Rialto data most likely overestimates the call volume to the proposed development as the data includes calls to the older parts of town, lower income areas, and the downtown area. These areas typically generate more calls than a new upscale area. In most Fire Departments the Fire Stations in the old downtown areas area the busiest. Station 204 is not a busy station. Current call volume is 541 calls per year (1.4/day). This is a low call volume and is typical of suburban residential tracts. The new County station should not be a busy fire station due to the new upscale homes in it's first in district.

Emergency response call volume for the first-due Fire Engine company to this development would probably be split between three fire stations depending on location of call; County Fire Station, Rialto Station 204 and Rialto Station 202 (202 would probably be first due to the area East of Country Club Drive). Approximately 80% of all calls would probably be Medical Emergencies. As all structures should have Fire Sprinklers, proper Wildland Urban Interface Structural protection per Chapter 7-A of the 2007 California Building Code, and proper fuel modification, structure fires should be limited to small incipient fires or those controlled or extinguished by the Fire Sprinkler system. Thus, the estimated call volume to this development would be about 2 calls per day per each of the three fire stations. Estimated total call volume for the closest Rialto Fire

Station (Station 204) including current call volume and estimated call volume to the new development, would be about 3.4 calls per day. This is a low call volume.

6.METHODOLOGY OF THIS STUDY:

The methodology of this study is to produce a GIS based map showing the response distances and times to the most distant location in the proposed development from the Closest Rialto Fire Station; Station 204 at 3288 No. Alder, Station 202, and from the future County Station on Glen Helen Parkway via Automatic Aid. The most critical response time and distance is from the closest Fire Station. If there is a solid, Automatic Aid agreement, with the Automatic Aid companies listed on the dispatch running cards (or in the dispatch center computer aided dispatch computer program) then the political boundaries should be considered seamless and the response of the closest company should be the one considered when determining response times. The reason for the 90% Performance Standard is because a fire company can be out on another call or out of the area on other business, and, frankly, it is not a 100% world.

7.FIRE DEPARTMENT RESPONSE ANALYSIS USING GEOGRAPHIC INFORMATION SYSTEMS (GIS)

Dudek and Associates, as subcontractor to Hunt Research Corporation, conducted an analysis of the travel time response coverage area for two existing fire stations and one proposed County station to supplement an assessment of fire department response capabilities specifically associated with the proposed Lytle Creek development project in the City of Rialto, California. This modeling analysis was conducted using Network Analyst tools within Geographic Information Systems (GIS) software, road data files, and project development plan data. Model outputs include distinct geographic areas, which can be reached by each of the two existing fire stations and one proposed County fire station location within a 4-minute travel time window. Travel speeds for this analysis were held constant at 35 mph, consistent with the Insurance Services Office (ISO) Public Protection Classification Program's Response Time Standard as stated by ISO. This average speed has been used by ISO for years and has been validated for ISO, as still being applicable as a predictive tool, by a study by the Rand Corporation. The speed considers average terrain, average traffic, weather, and slowing down for intersections. Model output files were utilized to generate the exhibits presented in Figures 1 and 2, which depict fire station response coverage areas assuming travel time and travel speed constraints.

Following compilation of all necessary GIS and other digital data layers to the extent received from project planners, KTGY, and obtained from the San Bernardino Associated

Governments (SANBAG) GIS data set[1], Dudek verified that all data layers were in the California State Plane Zone 5 coordinate system with units in feet. A network data set was then created utilizing ESRI's Network Analyst extension in the Arc Catalog module. The data set was created by merging the existing road centerline layer, obtained from the SANBAG GIS catalog, with the proposed Lytle Creek subdivision centerline street data, provided by project planners, and assigning parameters to the created data set. The SANBAG road data is a publicly available road data set covering San Bernardino County. This set was utilized as no road data was available from the City of Rialto at the time this analysis was conducted and no other mapping data was available from KTGY or the project applicant. Proposed road locations for the Lytle Creek project, obtained from the project planners, are based on the project land use plan and consists only of the main collector streets with stubs off the main streets indicating entrances to planning areas. The Lytle Creek roads were manually shifted and aligned with the SANBAG road network to create a cohesive road data file that included proposed subdivision roads. In this process road segments for the Lytle Creek subdivision were connected to SANBAG road segments at project access points, specifically at N. Oakdale Avenue, Country Club Drive, N. Linden Avenue, N. Locust Avenue, N. Alder Avenue, N. Live Oak Avenue, Redwood Avenue, N. Riverside Avenue, and Glen Helen Parkway. Fire station locations were also obtained from the project planners. The two existing City fire stations were geo-coded based on street addresses, while the proposed County fire station was manually placed based on its anticipated location.

Several parameters are available during the creation of a network data set and include elevation constraints, U-turn capabilities, road hierarchy (capacity, flow rates, road type), and curb approach direction. For the purposes of this analysis, no elevation constraint was applied to the data set. Elevation constraint parameters typically apply to an analysis of other network types and are not typically applied to transportation network analyses. Due to the emergency nature of the response scenarios modeled in this analysis, U-turns were permitted on every road. Road hierarchy, a classification of roads based on travel speed and other factors, makes assumptions that routes driven on primary roads will be faster due to less frequent delays and consists of three individual rank values. Class One rankings included primary roads consisting of freeways, freeway exit ramps, and freeway entrance ramps. Class Two rankings included secondary roads consisting of collector roads, secondary roads, major arterial streets, major divided arterial streets, modified major streets with medians, modified secondary streets with medians, and modified collector streets with medians. Class Three rankings included local and all other minor roads. The road network data available from SANBAG included the previously mentioned hierarchy classifications as a component of the data set. Class Three rankings were applied to all roads currently shown on KTGY maps within the proposed Lytle

[1] http://www.sanbag.ca.gov/Website/Transportation/data.htm

Creek development and were manually entered into the data set provided by project planners. The final parameter to be determined was curb approach. Curb approach determines on which side of the street the vehicle needs to approach and includes three options, left, right, or either. The 'either' option was selected for all roads in this analysis based on the emergency nature of the response situations.

Once the network data set parameters were finalized, Dudek ran a network model to depict the response area of each of the two existing fire stations (Station No. 202 and Station No. 204) within the City of Rialto and the proposed County fire station located on Glen Helen Parkway, approximately 650 feet east of Lower Lytle Creek Ridge Road. These models were generated to depict the geographical limits of the response area that can be reached by each fire station within a travel time period of 4 minutes. These models account only for travel time from the fire station location. The 4-minute response areas for each fire station were created using ESRI's Network Analyst extension and the network data set created for this project. The model outputs depicting the response area for each of the two existing and one proposed County fire station assumed a maximum speed of 35 mph, based on ISO standard. The output from each of these models is an irregularly shaped polygon depicting the extents, which can be reached from each fire station in a 4-minute travel period driving at 35 mph. Figure 1 depicts the coverage areas of Rialto Fire Station 204 and the new County Fire Station. Figure 2 depicts both Rialto Fire Stations and the new County station.

Rialto Fire Department states that their policy is to not exceed the posted speed limits when responding. Speed limits on the response routes vary. Some are large arterial roads and then there would be smaller roads within the development. Because of the lack of more detailed mapping information, including the streets within the residential proposed tracts, or maps having speed limits included for various segments, the 35 MPH national standard appears reasonable for this current study. Actual response speeds vary based on time of day, and the day in the week, and weather. Therefore, the ISO speed criteria is a reasonable criteria. Response times also vary based on the location of a fire company at the time of the call. The Engine Company may be out of the station on a call, training or Fire Prevention inspections.

8. SUMMARY:

The results of the conceptual modeling done for this study indicate that the coverage provided by the three stations appears, in concept, to cover 90 percent of the development to the extent that can be estimated based on current available mapping. If every structure in the development has the proper built in fire protection (fire sprinklers), proper structural safeguards for Wildland Urban Interface (WUI) areas per Chapter 7-A of the 2007 California Building Code and per County-wide WUI Fire Safety standards, and has

adequate fuel modification which is properly maintained, then the need for response to a structural fire can be greatly reduced, thereby reducing the impact on Fire Agencies.

Data provided in this report are conceptual estimates. More exact modeling can be done if consultant is provided with more detailed mapping which has speed limits imbedded for each segment, and which includes all streets in the new development.

Maps provided in Appendix, except for models, are courtesy of KTGY. Models were generated by Dudek and Associates; subcontractor to Hunt Research Corporation.

Appendix:

Vicinity Map
Site Plan
Land Use Plan
Print outs of models; small size and large size of Figures 1 and 2.

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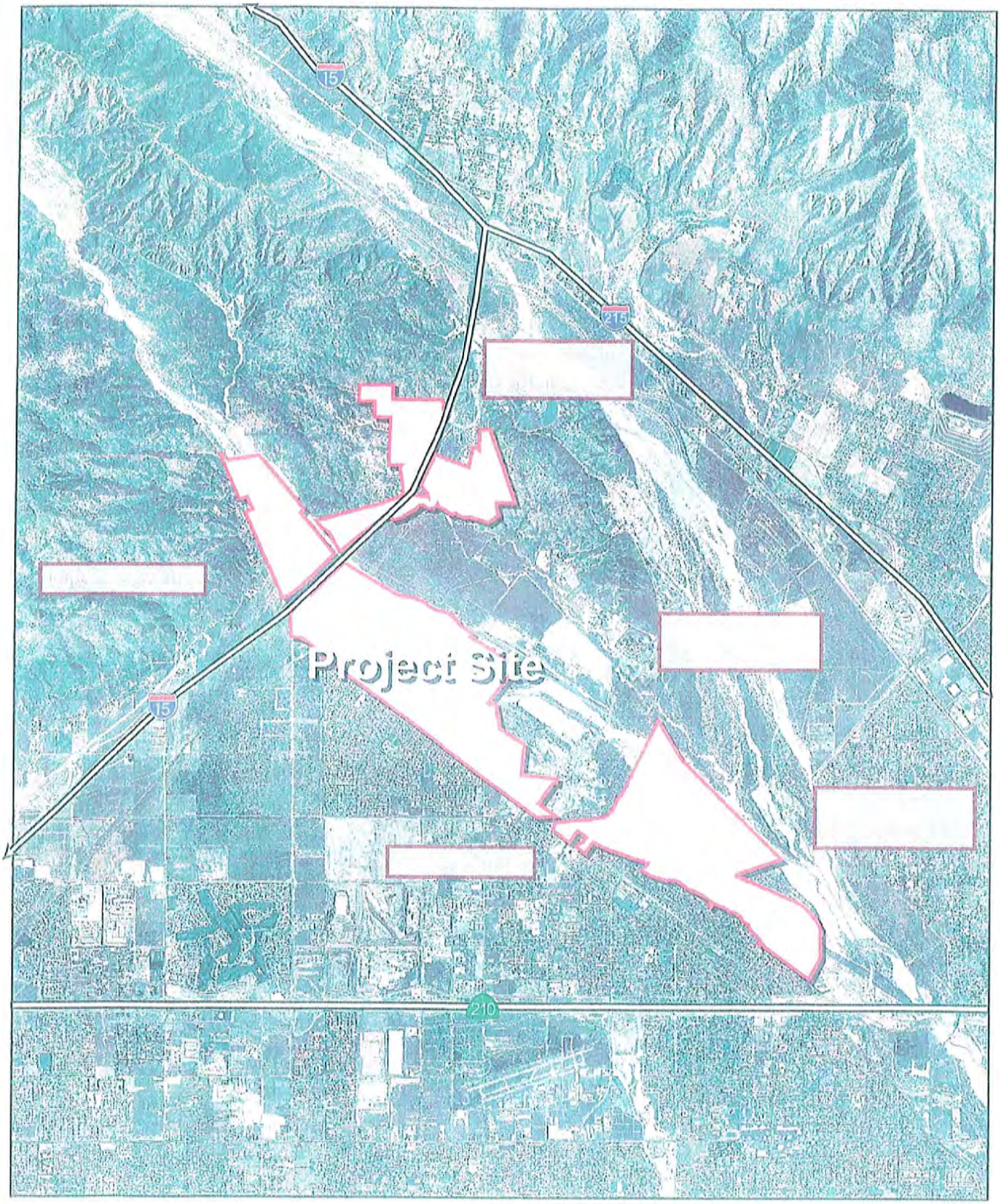
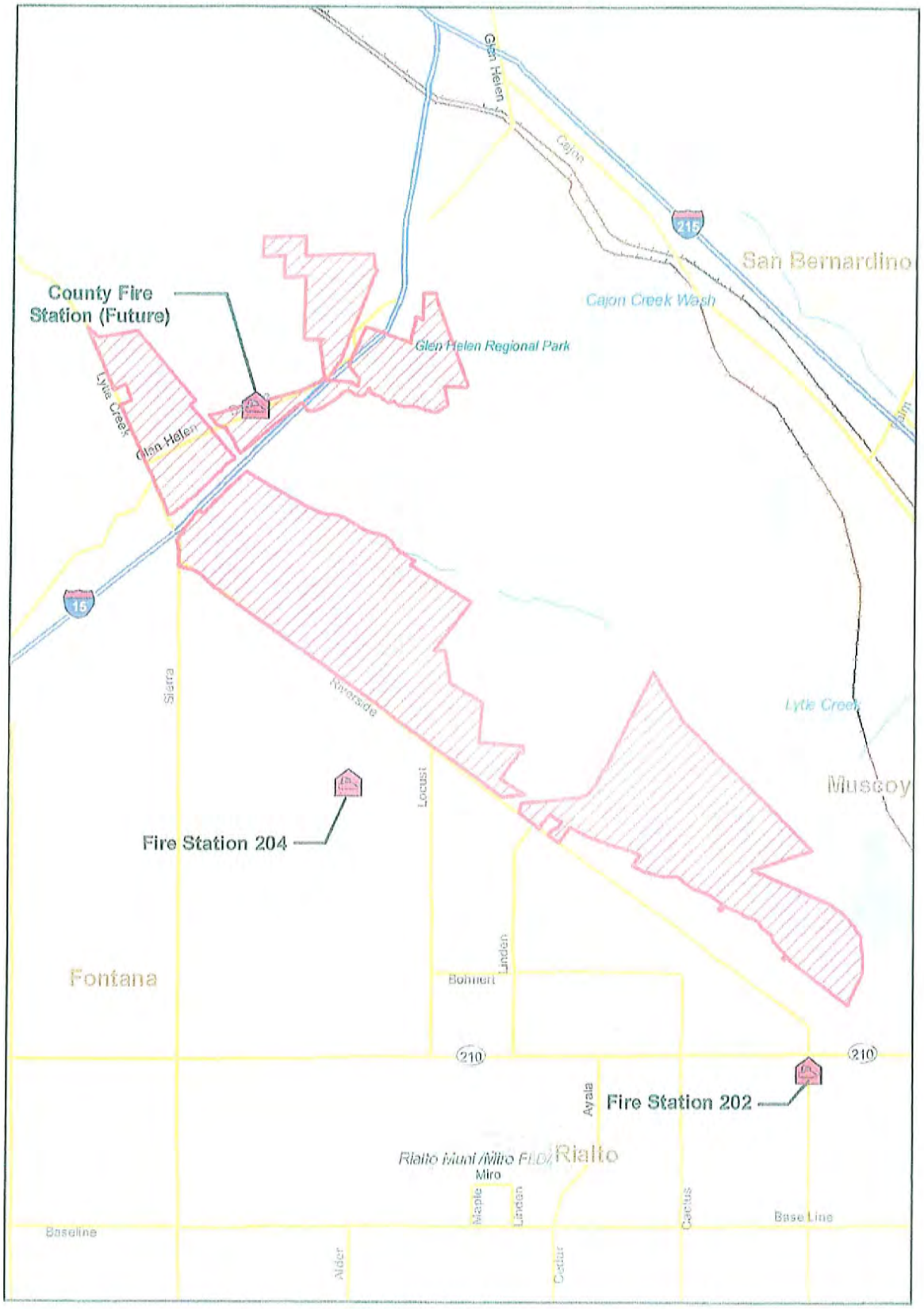


Figure 1-2

Vicinity Map


Glen Helen
Cajon
215
San Bernardino
County Fire
Station (Future)
Cajon Creek Wash
Glen Helen Regional Park
Lytle Creek
Glen Helen
15
Sierra
Riverside
Lytle Creek
Muscoy
Locust
Fire Station 204
Linden
Fontana
Bohnert
210
210
Ayala
Fire Station 202
Rialto Muni /Miro FLD/
Rialto
Miro
Maple
Linden
Cactus
Base Line
Baseline
Alder
Cedar

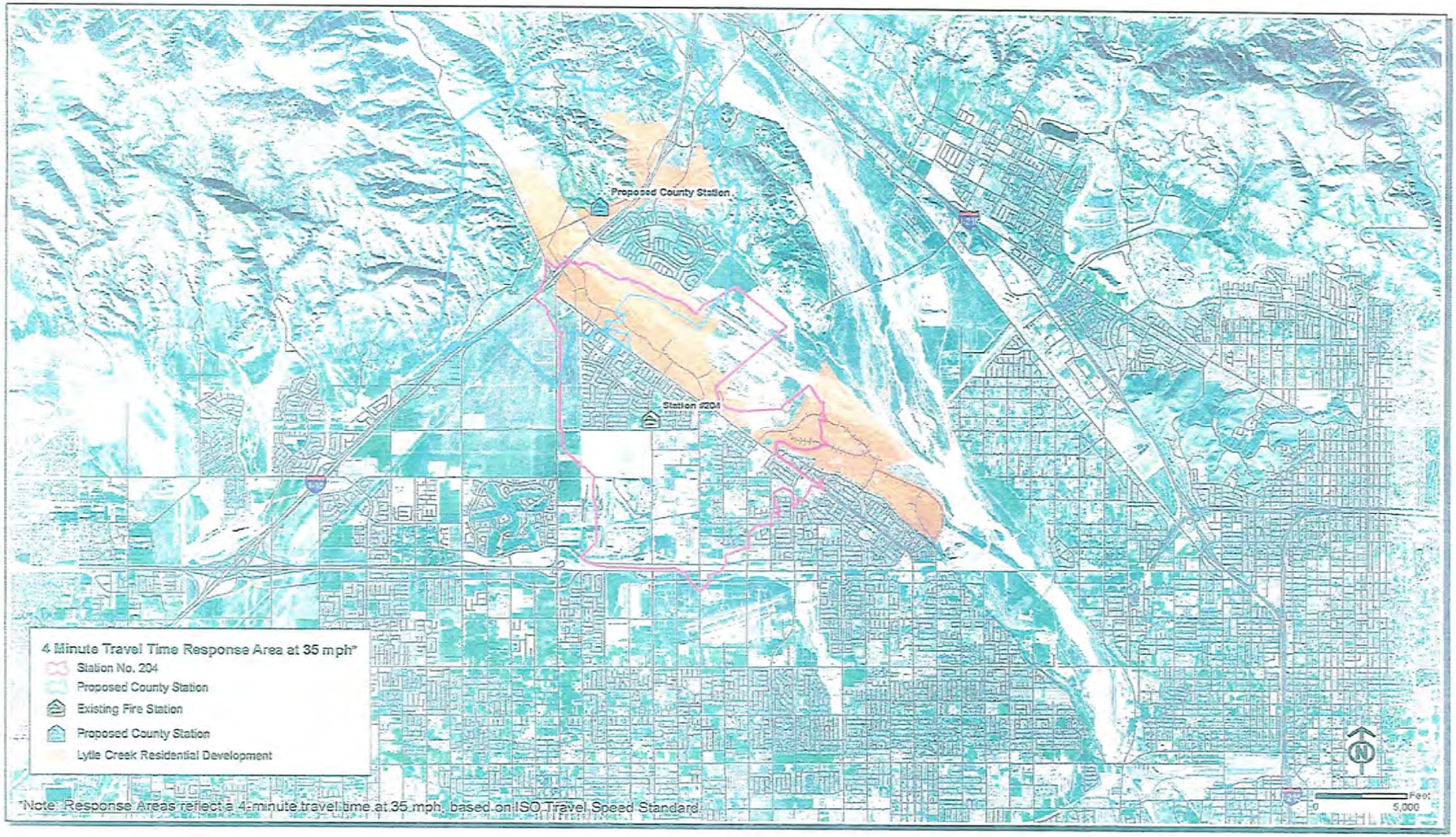
Lytle Development Joint Venture III

Lytle Creek Ranch Land Use Plan

Rialto, California

Note: Planning Areas 82-84, 93-94, 98, 100, and 102-103 will be constructed as Active Adult Housing.

January 20, 2006



DUDEK

Hunt Research Corporation

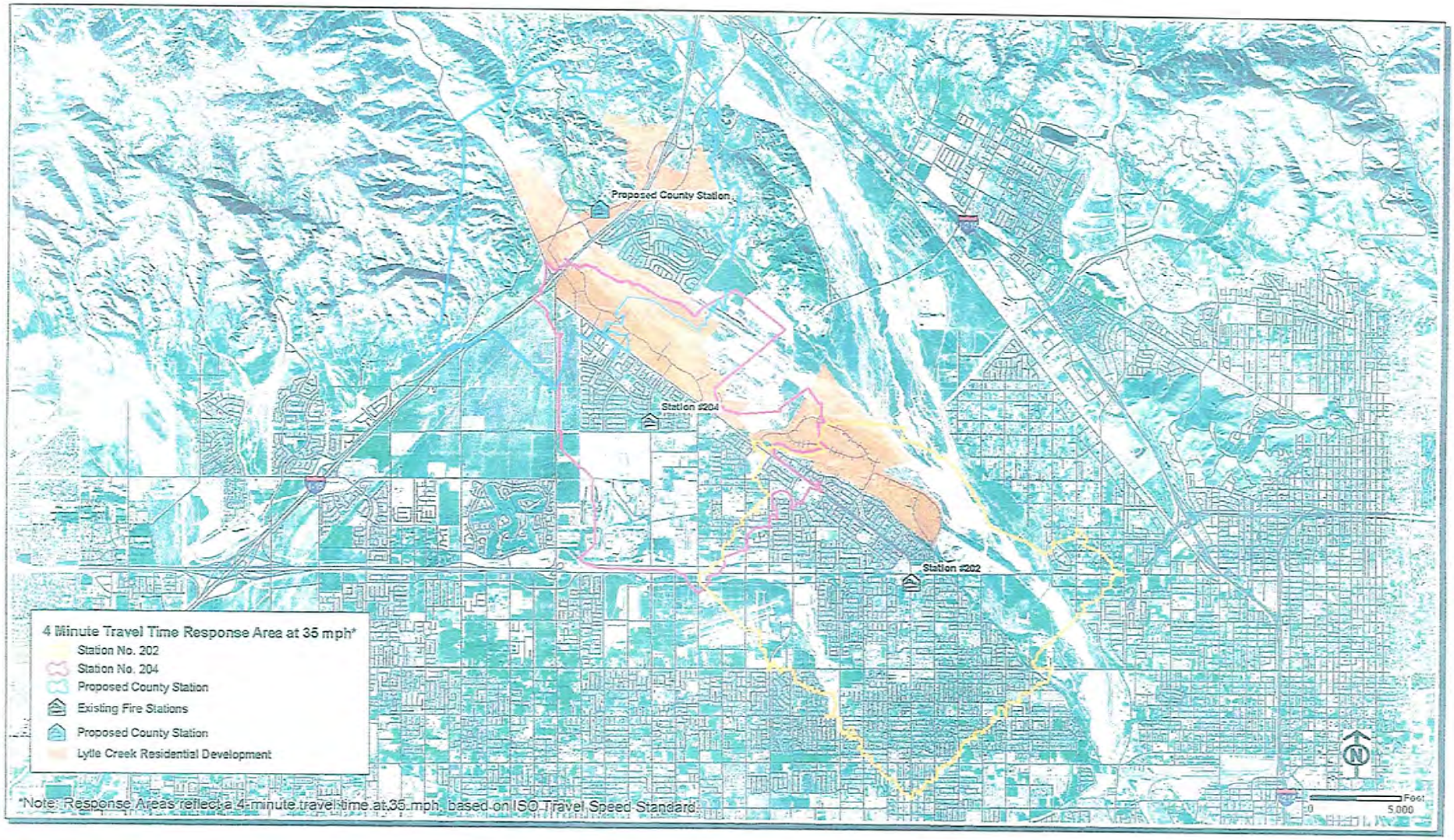
January 15, 2008

Final 2-5-08

Lytle Creek Fire Response Plan

Four Minute Response Area Analysis

FIGURE 1



DUDEK

HRC Hunt Research Corporation

January 15, 2008

FINAL 2-5-08

Lytle Creek Fire Response Plan

Four Minute Response Area Analysis

FIGURE 2

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Appendix III-J

WATER SUPPLY ASSESSMENT

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Water Supply Assessment for the Lytle Creek Ranch Development

March 4, 2008

Prepared by:

ENGINEERING RESOURCES OF SOUTHERN CALIFORNIA, INC.

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Project No. 62026.167

REGISTERED PROFESSIONAL ENGINEER
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CIVIL
STATE OF CALIFORNIA

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WEST VALLEY WATER DISTRICT

WATER SUPPLY ASSESSMENT FOR THE

LYTLE CREEK RANCH DEVELOPMENT

INTRODUCTION

The California Water Code, Division 6, Part 2.10 "Water Supply Planning to Support Existing and Planned Future Uses", Sections 10910, 10911 and 10912 requires cities and counties to include in their environmental impact reports a "Water Supply Assessment", "Identification of Water Supplies", and "Projected Demand" for proposed projects as defined in Section 10912. The city or county must request from the public water system whether the proposed project (Lytle Creek Ranch Development) was included in the agency's most recent adopted Urban Water Management Plan. If not, complete an assessment that indicates whether the public water system's total projected water supplies available during normal, single-dry, and multiple-dry water years included in its 20-year projection will meet the projected water demand associated with the proposed project, in addition to the public water system's existing and planned future uses.

The Lytle Creek Ranch Development (Development) proposes to build 8,407 dwelling units, commercial, institutional and recreational facilities in San Bernardino County, California. The Development is located in both the northern portion of the City of Rialto and land north of the city, in San Bernardino County. This area is within the water service area and sphere of influence of the West Valley Water District (District). Figure-1, shows the Districts service area boundary, sphere of influence and the location of the proposed Development.

The Development is arranged into four separate Neighborhoods, I, II, III and IV, each containing a mix of land uses. Figure-2, locates the area of each Neighborhood. The nine land use categories identified within this project, include three single-family detached residential designations, multi-family attached residential, mixed use, elementary school, open space/recreation, open space and roadways.

As defined in ***Section 10912 (a) (1)*** *of the California Water Code, a proposed residential development of more than 500 dwelling units,* must have a Water Supply Assessment included in their Environmental Impact Report. This particular project has more than 500 residential units, and therefore requires a Water Supply Assessment.

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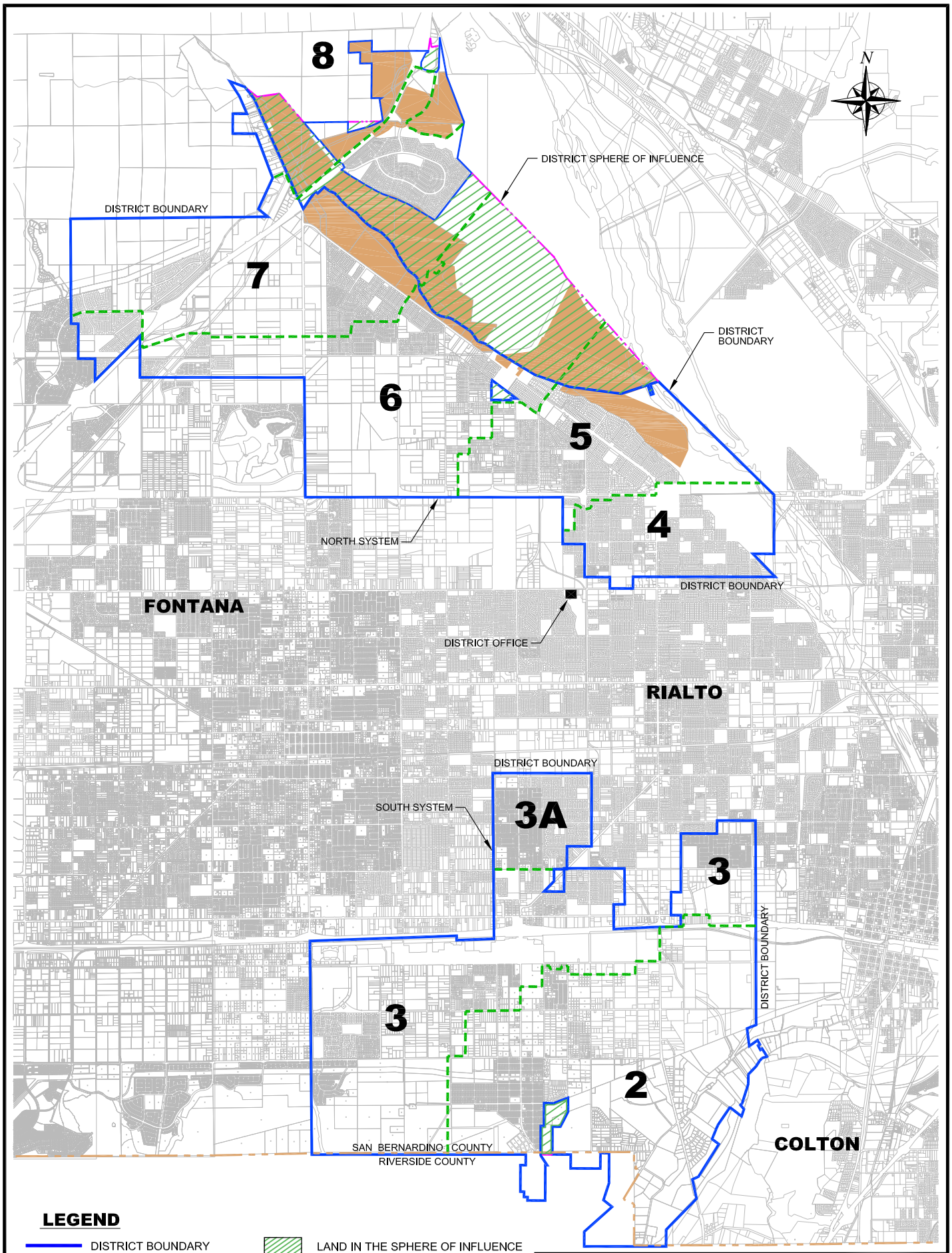
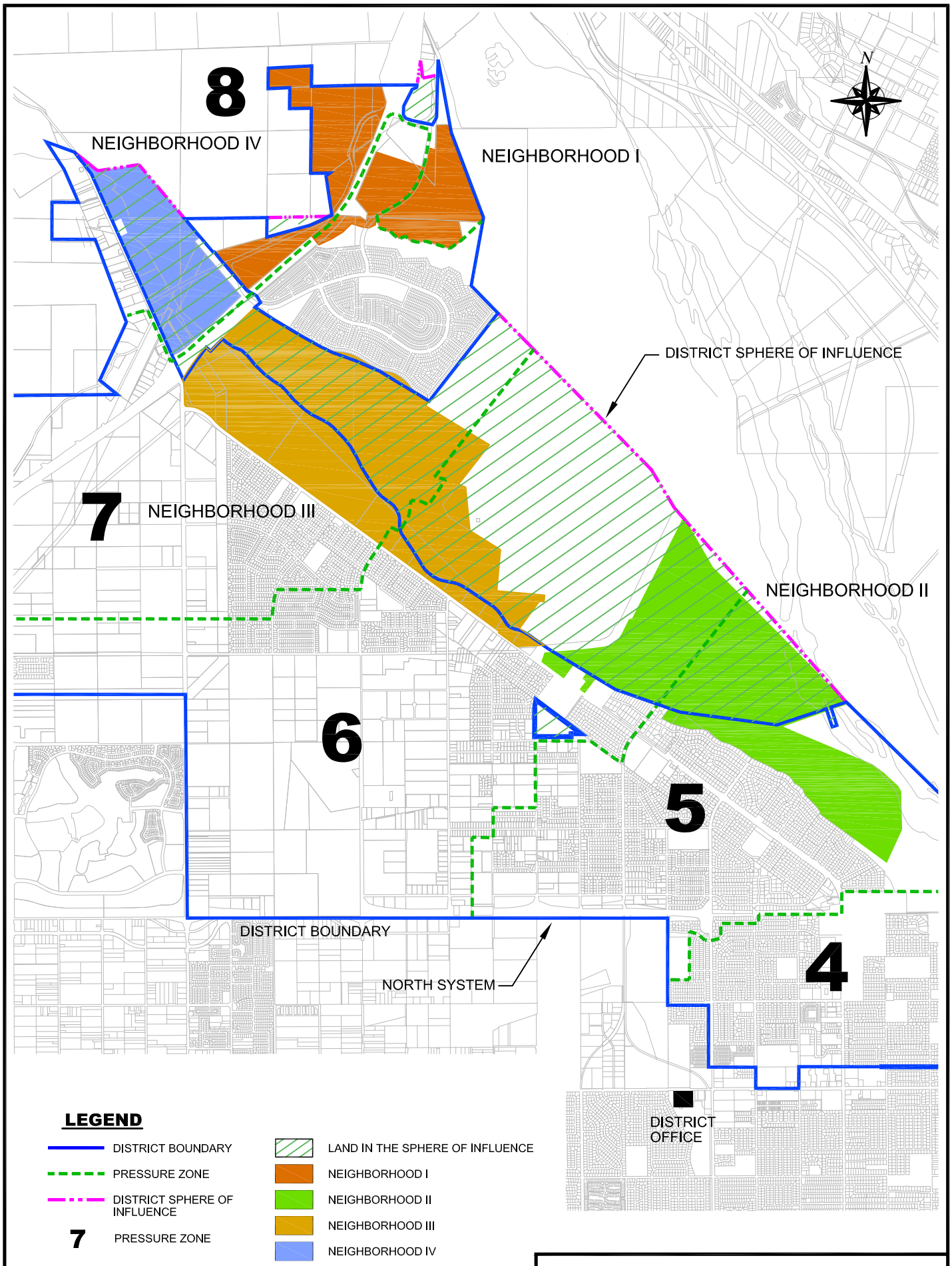


WEST VALLEY WATER DISTRICT

DISTRICT BOUNDARY MAP AND PRESSURE ZONES

FIGURE-1



ENGINEERING RESOURCES OF SOUTHERN CALIFORNIA, INC.

WEST VALLEY WATER DISTRICT

LYTLE CREEK RANCH NEIGHBORHOODS

FIGURE-2

Senate Bills (SB) 901, 221, and 610 require local planning agencies to consider the availability of water when approving a new project. SB 221 and SB 610 preclude projects from being approved without specific evaluations being performed and documented by the local water provider, demonstrating, based on "substantial evidence", that water is available.

SB 221 (Government Code, Section 66473.7), requires the conditioning of a tentative subdivision map on the applicant verifying that *"a sufficient water supply is available or, in addition, a specified finding is made by the local agency that sufficient water supplies are, or will be, available prior to completion of the project."*

SB 610 (Water Code, Sections 10910 through 10912), augments the CEQA process by requiring a detailed analysis of water availability.

REQUIREMENTS FOR ASSESSMENT

The public water system supplier must prepare and approve a "Water Supply Assessment" that contains three parts:

- Explicit identification of existing and anticipated water supply entitlements, water rights and water service contracts, demonstrated by contracts, Capital Improvement Programs, and application permits.

- If no water has been received by the source identified to supply the development, other competing purveyors that receive from the new source must be identified.

- If groundwater is a proposed supply, factors such as adjudicated rights, groundwater management practices and historical pumping must be presented to establish proper use of the resource.

The latest adopted Urban Water Management Plan may be utilized to provide the information required for the Water Supply Assessment. If the demands expected from the proposed development are not accounted for in the Urban Water Management Plan, a discussion must be included with regard to whether the water system's total projected water supplies during normal, single dry and multiple dry years during a 20 year projection from the date of this report, will meet the projected demand of the proposed project in addition to the system's existing and future uses.

The public water supplier is required to provide "written verification" of "sufficient water supplies". The verification must consider the following factors:

- The availability of water over the next 20 years.
- The applicability of any urban water shortage contingency analysis prepared per Section 10632 of the Water Code.
- The reduction in water supply allocated to a specific use by an adopted ordinance.
- The amount of water that can be reasonably relied upon from other water supply projects, such as conjunctive use, reclaimed water, water conservation, and water transfer.

In January 2006 West Valley Water District adopted an Urban Water Management Plan as required by water suppliers providing water for municipal purposes to more than 3,000 customers or supplying more than 3,000 acre feet of water annually. The Urban Water Management Plan projected water supplies to meet future demands through the year 2025. It assessed the projected demand and supply and concluded that the District has, and will have an adequate water supply to meet all demands within their service area. A copy of the Urban Water Management Plan is attached to this Water Supply Assessment.

The Urban Water Management Plan contains the following information as required in Section 10910 in the Water Code for Water Supply Assessments:

- A detailed description of each groundwater basin that supplies the District with potable water.
- Copies of the court decrees and judgments for each groundwater basin.
- A detailed description and analysis of the amount and location of groundwater pumped by the District for each groundwater basin for the last five years.
- A detailed description and analysis of the amount and location of the groundwater projected to be pumped from each groundwater basin by the District.
- An analysis of the sufficiency of each groundwater basin to meet the District's projected amounts to be pumped under normal, one year drought, and multi-year drought conditions for the next 20 years in five-year increments.

PAST AND EXISTING WATER SUPPLIES

The District has multiple existing water supply sources. Water supplies are pumped from five separate groundwater basins, and from two separate surface water sources (Lytle Creek and State Project Water). All five of the groundwater basins have been adjudicated and are managed. Replenishment of the groundwater basins utilized by the District is from local mountain runoff, State Project Water (SPW) deliveries and in some cases reclaimed water.

> ***California Water Code Section 10910***
> *(f) If a water supply for a proposed project includes groundwater, the following additional information shall be included in the water supply assessment:*
>
> > *(2) A description of any groundwater basin or basins from which the proposed project will be supplied. For those basins for which a court or the board has adjudicated the rights to pump groundwater, a copy of the order or decree adopted by the court or the board and a description of the amount of groundwater the public water system, or the city or county if either is required to comply with this part pursuant to subdivision (b), has the legal right to pump under the order or decree.*

GROUNDWATER SOURCES

The Upper Santa Ana River Watershed Integrated Regional Water Management Plan (IRWMP) was published in November 2007. The IRWMP was prepared in collaboration with several water agencies and stakeholders to address water management issues for water purveyors utilizing groundwater within the watershed. The Upper Santa Ana River watershed contains several groundwater basins including the Bunker Hill Basin, Lytle Creek Basin, Rialto Basin and the North Riverside Basin from which the District receives water. The goal of the IRWMP is to improve groundwater management and water supply reliability, especially during times of drought, by maximizing the use of imported water supplies, local surface water run off and groundwater storage.

The IRWMP proposes to increase reliability be implementing programs to recycle and conserve water and by constructing additional conveyance systems and reservoir projects. The plan discusses storing water during wet periods and banking State Project Water when available to provide the needed supply during times of drought. To improve surface water and groundwater management in the watershed, the plan outlines projects that will capture additional storm water run off by enhancing spreading grounds and recharge basins and addresses measures to ensure water quality.

With the implementation of the IRWMP, future extractions from the Bunker Hill groundwater basin during droughts may not have to be curtailed as projected in the District's Water Master Plan and Urban Water Management Plan. Assuming that the groundwater basins are managed properly, groundwater is thought to be a reliable source of supply during drought years when SPW allotments are cut back.

The following is a general analysis and summation of the information contained in the Urban Water Management Plan including groundwater basin supplies and surface water supplies for the District. Included in the appendix of the Urban Water Management Plan are excerpts from the applicable order or decree adopted by the court that identifies the District's legal right to pump within the basin and their allotted extraction.

Lytle Creek Basin

The Lytle Creek Basin was adjudicated under the 1924 Judgment No. 17,030 from the Superior Court of San Bernardino County and is managed by the Lytle Creek Water Conservation Association (made up of the successors to the stipulated parties of the judgment). The District has nine existing wells in the Lytle Creek Basin, and the right to pump and export out of the Lytle Creek Region 12,105 gallons per minute (gpm) if they are diverting their full allotment (2,290 gpm) of surface flow from Lytle Creek.

If flows from the Creek are low and the District is receiving a portion of their allotment, they can pump the difference from the wells to a combined maximum of 14,395 gpm from the basin, depending on how much water is available to pump and how much water is available to divert from Lytle Creek. The District has no restrictions on how much it can pump and serve within the Lytle Creek Region, including water that could be used to supply the Lytle Creek Ranch Development which is within that Region.

The Lytle Creek Groundwater Basin has an estimated long term safe yield of 35,000 to 45,000 acre-feet per year (af/yr). The basin is highly porous and easily replenished during heavy precipitation years. The depth to groundwater in the basin varies from 50 feet to 400 feet depending on whether it is a drought cycle or wet cycle. Well production in the basin varies as the basin levels change from year to year.

The actual amount that the District can extract from the basin yearly is dependent on the availability of groundwater levels within the basin. In the past, they have pumped between 10,000 acre feet per year in normal years and an estimated amount of 5,000 af/yr in the most severe drought periods. Actual amounts that have been pumped in the last drought cycle (1999 through 2004) ranged from a high of 7,355 af/yr in the year 2000 to a low of 6,476 af/yr for year 2004. The District and its predecessors have been utilizing the Lytle Creek Basin for water supply for nearly 100 years.

Rialto Basin

The Rialto Basin was adjudicated under the 1961 Decree No. 81,264 from the Superior Court of San Bernardino County and is managed by the Rialto Basin Management Association (made up of the stipulated parties to the judgment which include West Valley Water District, City of Rialto, City of Colton, and the San Gabriel Valley Water Company). Groundwater storage capacity of the basin is about 210,000 acre-feet, with an estimated 120,000 acre-feet for the Rialto portion of the sub-basin and about 93,000 acre-feet for the Colton portion. The basin shows quick rises of water levels during high precipitation years and slower decline over several years.

Under normal conditions, when the basin is not subject to restrictions by the adjudication, the District has unlimited extraction rights. During drought conditions when the adjudication is in affect, their extraction right ranges from 3,067 af/yr in the most severe drought periods to 6,134 af/yr during drought periods, and unlimited extraction amounts during normal precipitation years. Since the Decree was stipulated in 1961, the least amount of water supplies that have been available to the District during the last 42 years has been 6,134 af/yr. Eight existing wells are in the Rialto Basin which have the ability to extract up to 10,000 af/yr during normal conditions. The District and its predecessors have been utilizing the Rialto Basin for water supply for more than 80 years.

Bunker Hill Basin

The Bunker Hill Basin was adjudicated by the 1969 Judgment No.117,628 of the Court of Orange County and is managed by the court appointed Watermaster (San Bernardino Valley Municipal Water District and Western Municipal Water District). San Bernardino Valley Municipal Water District's (SBVMWD) primary function is to plan and develop a long-range water supply for water agencies within the Upper Santa Ana River Basins. These two agencies have adopted a Regional Water Facilities Master Plan that manages the Bunker Hill Basin.

The District has restrictions on pumping and exporting from certain areas of the basin as is defined in the 1924 Judgment for the Lytle Creek Region and as defined in a City of San Bernardino Municipal Water Department's Basin Management Ordinance. This ordinance restricts the location of new wells and amounts of overall pumping from the Bunker Hill Basin within the area defined by the Management Ordinance. The District has two existing wells in the Bunker Hill Basin within the defined area of the 1924 Judgment for the Lytle Creek Region. In addition to its two existing wells, the District has a contract with San Bernardino Valley Municipal Water District for up to 5,000 af/yr from the Bunker Hill Basin. The District has plans for over 20 mgd of capacity in transmission pipelines within the next several years from the Bunker Hill Basin to its service area. The District and its predecessors have been utilizing the Bunker Hill Basin for over 50 years.

Chino Basin

The Chino Basin was adjudicated by the 1978 Judgment No. 164,327 of the Court of San Bernardino County and is managed by the court appointed Chino Basin Watermaster. The Judgment declares that the safe yield of the Chino Basin is 140,000 acre-feet. The purpose and objective of the Chino Basin Watermaster is to "*establish a legal and practical means for making the maximum reasonable beneficial use of the waters of Chino Basin by providing the optimum economic, long-term, conjunctive utilization of surface waters, ground waters and supplemental water, to meet the requirements of water users having rights in or dependant upon Chino Basin*".

The Optimum Basin Management Plan prepared for the Chino Basin was developed to manage the basin by protecting and improving the water supplies and quantity. The Chino Basin Watermaster continues to work towards drought proofing the region, thus insuring that adequate water supplies will be available in both wet and dry years. Recharge of the Chino Basin is achieved by storm water runoff from local mountains, imported water supplies from Metropolitan Water District, from recycled water and treated water supplies.

The District has a minimum of approximately 1,000 af/yr of extraction rights. Extractions above that amount must be replenished by the Metropolitan Water District (MWD) through a program with the Chino Basin Watermaster. There is no maximum limit to pumping within the Chino Basin, as long as the replenishment charges are paid by the District. The District has two existing wells that are in the Chino Basin with the capability of pumping more than 2,000 af/yr. During extended drought periods, the District projects that it will pump and utilize additional supply as needed. The District and its predecessors have been utilizing the Chino Basin for water supply for over 40 years.

The Chino Basin consists of about 235 square miles of the Upper Santa Ana River Watershed. The Chino Basin is an alluvial valley that is mainly flat from east to west and slopes from the north to the south at a one to two percent grade. Elevations in the valley range from 2,000 feet to 500 feet at Prado Dam. It is one of the largest groundwater basins in southern California with about 5,000,000 acre-feet of water and unused storage capacity. This storage capacity could be utilized for conjunctive use of supplemental water, under the Chino Basin Watermaster's control and regulation.

North Riverside Basin

The North Riverside Basin is part of the 1969 Judgment No. 117,628, under the Bunker Hill Basin. The North Riverside Basin has an estimated 12,400 acre-feet per year available to water pumpers within SBVMWD's service area.

The District has five existing wells in the North Riverside Basin. Extractions of 3,000 af/yr to 5,000+ af/yr from the North Riverside Basin is projected without depleting the groundwater basin. The District and its predecessors have been utilizing the North Riverside Basin for water supply for more than 60 years.

In addition to the water availability data summarized for each basin above, two other issues that may affect groundwater availability in this area are the potential for drought or reduced supplies of snow melt to replenish the basins that may result from possible climate change and contamination of the groundwater basins due to historic industrial uses.

Changes in climate may affect the timing of snow melts and runoff that have historically been used to replenish the basin. The potential for warmer weather could result in smaller spring snow packs and earlier melting. To mitigate this impact on their water supplies, the District has the ability to pro-actively bank (store water in underground aquifers) SPW into the Bunker Hill and Chino Groundwater Basins when it is available, and extract this water during periods of drought. Additional banking projects are being developed by the District to capture and bank water when it is available by utilizing excess storage capacity in the basins.

Changes in climate may also affect the amount of water in surface water sources, such as Lytle Creek. One concern related to climate change has been whether increased flooding could occur due to increased severity of storms. The District is studying programs and facilities to capture as much water as possible from local sources such as Lytle Creek. It is difficult to predict with any certainty exactly how the potential for climate change could affect water supplies and whether it is reflected in decreased snow packs, or increased flooding or some combination of both, and to attempt to do so at this time would be highly speculative.

As a result of prior industrial uses in the area, the groundwater basins utilized by the District are also vulnerable to chemical contamination. Despite the presence of varying levels of contamination in certain groundwater basins, treatment measures are available to remove the volatile organic compounds that may be found in the groundwater basin thereby allowing the water to be used for potable uses. The District's operational plan includes the implementation of treatment facilities on existing and future proposed wells to provide potable water.

SURFACE WATER SOURCES

Lytle Creek

Surface water from Lytle Creek was adjudicated by the 1924 Judgment No. 17,030 as mentioned above under the Lytle Creek Basin. The District has the right to divert and export out of the Lytle Creek Region up to 2,290 gpm when it is available. They also have the right to purchase an additional 1,350 gpm from Lytle Creek flows through an agreement with the City of San Bernardino. The City of San Bernardino has the right to surface water from Lytle Creek, but due to infrastructure limitations, the City is unable to utilize its rights and divert water from the Creek. With the money the District pays to the City for its 1,350 gpm flow from Lytle Creek, the City purchases SPW. If at some point in the future, the City constructs the necessary infrastructure to utilize its Lytle Creek surface water rights, the District would use the funds currently paid to the City to purchase SPW. Surface water from Lytle Creek is treated at the District's 14.4 million gallon per day (mgd) Oliver P. Roemer Water Filtration Facility.

The District also utilizes Lytle Creek surface water flows for groundwater recharge in the Lytle Creek Basin and to supply non-potable customers. They have been able to utilize up to 5,500 af/yr during normal times from Lytle Creek surface flows and a minimum of 3,000 af/yr during severe extended drought conditions. The District and its predecessors have been utilizing Lytle Creek surface flows for water supply for more than 130 years.

State Project Water (SPW)

The District has the ability to purchase up to 20 mgd (approx. 23,000 af/yr) of SPW from the San Bernardino Valley Municipal Water District (SBVMWD) through the Lytle Turnout off the San Gabriel Feeder Pipeline. The water is utilized for groundwater recharge in the Lytle Creek Basin, to produce potable water from the District's Water Filtration Facility, and to supply non-potable customers. The District currently is utilizing non-potable raw State Project Water and decanted backwash water from its Water Filtration Facilities to supply its largest user (irrigation of the El Rancho Verde golf course). The District has been utilizing SPW through the Lytle Turnout since 1999.

Construction has just been completed on Phases I and II of a three Phase expansion of the Oliver P. Roemer Water Filtration Facility. Phase I included the installation of two contact adsorption clarification package treatment units that raised the production capacity of the facility from 9.6 to 14.4 mgd. Phase II of the upgrade expanded the treatment process capability of the plant to achieve both turbidity removal and TOC reduction.

In 2009/10 the District plans to have Phase III of the Oliver P. Roemer Water Filtration Facility in operation. Phase III consists of the construction of a new Micro Filtration Facility that will have the capability of treating 6.0 mgd of additional SPW. With the completion of this third Phase, the facility will have the ability to treat up to 20.4 mgd.

The District is currently planning to construct a new 6.0 mgd Water Filtration Facility in 2010/11 which will be located in the Villages of Lytle Creek North. This Water Filtration Facility would take SPW through the existing Glen Helen Turnout off the San Gabriel Feeder. The additional supply generated from the WFF is reflected in the District's future supply projections for the year 2015 through build out.

The District is projected to utilize between 1,600 af/yr of SPW under the most severe drought conditions for Northern California and up to 23,000 af/yr during drought conditions in Southern California, if it is available. As noted previously, when SPW is available the District has the ability to purchase this water and bank it in the Chino and Bunker Hill Groundwater basins. As will be described in this WSA, the assessment of future supplies represents the best estimate of available water supply from the various sources available to the District. In the event there is less water available from the SPW, the District will utilize alternative sources available to it, and implement allocation and conservation measures if necessary.

Another recent factor affecting SPW supplies is a recent judicial decision regarding the operations of the State Water Project. In February 2005, the U.S. Fish and Wildlife Service pursuant to the federal Endangered Species Act issued a "biological opinion" assessing the impacts of the Central Valley Project and the State Water Project to the delta smelt, a threatened fish species. This adequacy of the biological opinion was challenged in court by the Natural Resources Defense Council and other organizations. (*Natural Resources Defense Council v. Kempthorne, et al.*, USDC Case No. 05-CV-1207-OWW). In May, 2007, the federal district court determined that the biological opinion violated the requirements of the federal Endangered Species Act, and in August, 2007, the judge adopted interim measures that would result in reduced pumping operations in the Delta to protect the smelt. The restriction on pumping operations would result in a reduction or curtailment of water exports from the Delta. The exact amount of reduction is not known as it depends upon whether the year is considered a "dry year," an "average year" or "wet year;" however compliance with the judge's decision will result in some curtailment of SPW exports.

On January 28, 2008 the Draft State Water Project Delivery Reliability Report 2007 was released. The water supply estimates given in the report include potential changes in hydrology due to climate change and restrictions on pumping based on the December 2007 court order. These estimates show projected water supplies in the future if no action is done to improve water delivery reliability. Other factors affecting the reliability of SPW delivery include future regulatory requirements, population growth, water conservation, water conveyance infrastructure and recycling efforts. If progress is made to make this supply more reliable, then estimates of future deliveries will also change.

The report projects a minimum delivery of 7% of full entitlement in the year 2027 during a single dry year in Northern California. The long term average water supply is projected to be between 66% and 69% of contracted deliveries, and during a six year drought in Northern California, projections range from 33% to 36%.

PAST WELL PRODUCTION

The annual amount that the District has pumped from the groundwater basins was dependent upon system demands, system operation and the District's ability to utilize the supply based on facilities in place at the time.

> ***California Water Code Section 10910***
> *(3) A detailed description and analysis of the amount and location of groundwater pumped by the public water system, or the city or county if either is required to comply with this part pursuant to subdivision (b), for the past five years from any groundwater basin from which the proposed project will be supplied. The description and analysis shall be based on information that is reasonably available, including, but not limited to, historic use records.*

The amount of water the District has historically received for the past five years under their water rights and contracts is shown in Table 2-10 of the Urban Water Management Plan. The District's annual groundwater production ranged from 11,310 acre feet in 2000 to 15,782 acre feet in 2004. Groundwater extraction shown in that table represents production during consecutive drought years. Surface water and purchased water for the same time period was 8,938 acre feet and 6,952 acre feet respectively.

> ***California Water Code Section 10910***
> *(d) (1) The assessment required by this section shall include an identification of any existing water supply entitlements, water rights, or water service contracts relevant to the identified water supply for the proposed project, and a description of the quantities of water received in prior years by the public water system, or the city or county if either is required to comply with this part pursuant to subdivision (b), under the existing water supply entitlements, water rights, or water service contracts.*

In addition to the District's groundwater wells, the District acquired an additional water supply on January 1, 1990 when they entered into a 20 year agreement with provisions to extend up to an additional 30 years on a cost proportionate basis with the SBVMWD, City of Rialto, and Riverside Highland Water Company to drill two wells in the Bunker Hill Basin and construct a 48" diameter transmission main. This project, referred to as the Baseline Feeder, started delivering water to the District in November 1990. This agreement is for 5,000 acre-feet per year of supplemental water to the District's existing supplies. The District owns up to 20 million gallons per day of transmission capacity in the Baseline Feeder.

Table-1 lists the existing water supply sources, the District's water rights and the projected 20-year future availability of each of the water supply sources for normal water supply years, single-dry year, and multiple-dry years as projected in the Districts Urban Water Management Plan. Table-1 was based on future demands within the District's service area boundary and did not account for all of the additional demand that will be required from the District's sphere of influence. Because not all of the Lytle Creek Ranch Development's demands were included in the UWMP, the additional water needs for this project will have to be added to these projections and the District must utilize additional water supplies available in order to provide water for this project.

TABLE-1
EXISTING WATER SUPPLY SOURCES

Source	**Water Rights** Approximate Maximum to Minimum (af/yr)	**Year 2025 Projected Availability of Each Water Supply Source** (af/yr)		
		Normal Year	Single-Dry Year	Multiple-Dry Years
Groundwater Basin				
Lytle Creek	10,000+ to 5,000	10,000	9,500	7,000
Rialto	10,000+ to 3,100	10,000	9,500	3,100
Bunker Hill	No Limit	25,000	23,000	15,000
Chino	No Limit	3,000	3,000	3,000
North Riverside	5,000 to 3,000	5,000	5,000	3,000
Surface Water				
Lytle Creek	5,500 to 3,000	5,500	3,000	3,000
State Project	No Limit	23,000	23,000	23,000
TOTAL		**81,500**	**76,000**	**57,100**

The different water supply sources, in the second column in Table-1, shows ranges for yearly amounts of water supply that the District can reasonably expect from the District's water rights and their ability to utilize these water supply sources. The District's use of the different water supply sources depends on its daily demand which varies from winter to summer. If some wells are not in service for maintenance or repair, the District has the ability and right to pump its wells up to 24 hours per day.

The District has approximately 70.0 mgd production capability (Table-2) with all of its supply sources in operation. With its largest water supply source out of service (Water Filtration Facilities at 14.4 mgd), the District currently has the ability to supply up to 55.6 mgd for peak day demand with all its wells pumping 24 hours per day and its purchased water supplies.

The District's Urban Water Management Plan projects a supply of 57,100 acre-feet per year in multiple dry years in the year 2025 with a drought in Southern California only. The District anticipates that it will utilize additional amounts in the Lytle Creek, Chino Basin, and State Project water over past water supply assessments if needed.

PROJECTED ADDITIONAL PRODUCTION SUPPLIES

The District does not at this time plan to develop any new sources of water supply, other than the water supply sources listed in Table-1. Their plan is to utilize a greater amount from each source, up to their legal rights and availability from each water supply source.

> ***California Water Code Section 10910***
> *(4) A detailed description and analysis of the amount and location of groundwater that is projected to be pumped by the public water system, or the city or county if either is required to comply with this part pursuant to subdivision (b), from any basin from which the proposed project will be supplied. The description and analysis shall be based on information that is reasonably available, including, but not limited to, historic use records.*

Currently, only the Lytle Creek Basin and Lytle Creek surface water has been fully utilized by the District as a water supply source. The existing production for wells was obtained from the District's latest Water Master Plan and from production data for new wells shown in Appendix A.

CAPITAL IMPROVEMENT PROGRAM (CIP)

The District's 2004 Water Master Plan's 5-Year Capital Improvement Program (CIP) recommended additional wells to be equipped and drilled. Expansion of the Oliver P. Roemer Water Filtration Facility and the drilling of new wells in the Bunker Hill Groundwater Basin were planned for the time period of 2002 to 2005.

Table-2 lists the Capital Improvement Projects planned by the District for the time period 2007 to 2011. These future projects include drilling new ground water wells, the rehabilitation and equipping of existing wells, the Phase III expansion of the Oliver P. Roemer Water Filtration Facility and the construction of a new Water Filtration Facility.

As shown in the District's Urban Water Management Plan, the District has prepared plans, and is implementing projects that will ensure an adequate supply for their existing and future customers.

TABLE-2
FIVE YEAR CIP FOR WATER SUPPLY FACILITIES

Item WVWD Facility	**Water Supply Source**	**Year** (On line)	**Estimated Increase in Well Production** 24 hr/day (mgd)	**Estimated Well Production** 24 hr/day [1] (mgd)	**Estimated Increase in Water Filtration Facility Production** (mgd)	**Water Filtration Facility Production** (mgd)	**Purchased Water Supply from the Baseline Feeder** (mgd)	**Estimated Peak Day Demand** [2] (mgd)	**Total Production Capacity** 24 hr/day (mgd)
Current water production capacity of existing wells and Water Filtration Facility		2006/07		51.6		14.4	4.0	39.9	70.0
Equip Well #11 w/ well head treatment [3]	Rialto Basin	2006/07	0.0	51.6		14.4	4.0	39.9	70.0
Equip existing Well W-50	North Riverside Basin	2007/08	2.9	54.5		14.4	4.0	43.6	72.9
Equip Well W-39 w/ well head treatment	Chino Basin	2007/08	2.9	57.4		14.4	4.0	43.6	75.8
Drill and equip Well W-49	Rialto Basin	2007/08	2.2	59.6		14.4	4.0	43.6	78.0
Drill and equip Well W-45	Bunker Hill Basin	2008/09	2.9	62.5		14.4	4.0	46.5	80.9
Drill and equip Well W-55	Lytle Creek Basin	2009/10	1.4	63.9		14.4	4.0	51.2	82.3
Drill and equip Well W-46	Bunker Hill Basin	2009/10	2.9	66.8		14.4	4.0	51.2	85.2
Construct Phase III of the Oliver P. Roemer Water Filtration Facility - New Micro Filtration Facility	State Project Water	2009/10		66.8	6.0	20.4	4.0	51.2	91.2
Construct North Village Water Filtration Facility	State Project Water	2010/11		66.8	6.0	26.4	4.0	55.7	97.2
Equip existing Well W-40 w/ well head treatment	North Riverside Basin	2010/11	2.1	68.9		26.4	4.0	55.7	99.3

[1] Well production based on 24 hr/day, 365 days a year. See Appendix A for listing of District's wells and capacities.
[2] The estimated peak day demand includes the existing demands within the system and the projected 5 year build out demands (20% increase per year) from existing developments with will serve letters. The Lytle Creek Ranch Development demands are projected with a 10 year build out.
[3] Well W-11 production capacity has been included in the estimated well production number for 2005/06.

EXISTING AND PROJECTED WATER DEMANDS

Existing Demands and Projected Demands - (Excluding the Lytle Creek Ranch Development)
From the District's latest approved Water Master Plan, dated November 2004, the District's average daily water demand for 2004/05 was estimated to be 19.2 million gallons per day (mgd) for potable water, plus 1.2 mgd for non-potable irrigation water, for a total of 20.4 mgd average daily water demand. The estimated peak day demand is twice the average day demand or 38.4 mgd for potable water and 1.9 mgd for non-potable irrigation water, for a total peak day water demand of 40.3 mgd. The District supplies its non-potable irrigation demand with raw SPW and backwash water from its filtration facilities. The District's 2004 Water Master Plan projected a peak day demand for the year 2006/07 to be 42.4 mgd.

The District has prepared Water Supply Assessments for or has issued "Will Serve Letters" for Coyote Canyon Estates for 0.9 mgd peak day demand, Villages of Lytle Creek North for 3.5 mgd for peak day demand, Citrus Heights North for 0.92 mgd peak day demand, Empire Land LLC for 0.7 mgd peak day demand, Summit at Rosena for 0.75 mgd peak day demand, Kline Ranch for 0.3 mgd peak day demand, Cactus Specific Plan for 1.46 mgd peak day demand, Valley Trails for 1.4 mgd peak day demand, Ventana for 0.91 mgd peak day demand, Arboretum for 3.24 mgd peak day demand and Pepper Avenue for 0.93 mgd peak day demand. The District's 2006/07 peak day demand of 42.4 mgd, plus the will serve letter obligations of 15.0 mgd, would be a total of 57.4 mgd for peak day demand. Table-3 below lists these developments and their peak day demands.

TABLE-3
PROJECTED WATER DEMANDS

Development	Peak Day Demand (mgd)
Coyote Canyon Estates	0.9
Villages of Lytle Creek North	3.5
Citrus Heights North	0.92
Empire Land LLC	0.7
Summit at Rosena	0.75
Kline Ranch	0.3
Cactus Specific Plan	1.46
Valley Trails	1.4
Ventana	0.91
Arboretum Specific Plan	3.24
Pepper Specific Plan	0.93
Subtotal	15.0
Water Master Plan 2006/07	42.4
Total Demand	**57.4**

The District's 2004 Water Master Plan's future projections include the areas of Coyote Canyon Estates, Villages of Lytle Creek North, Citrus Heights North, Empire Land LLC, Summit at Rosena, Kline Ranch, Valley Trails, Ventana at Duncan Canyon, Arboretum Specific Plan and Pepper Specific Plan in its water demands. Utilizing the demands projected in the Water Supply Assessments and all of the "Will Serve Letters", plus the projected demand from the District's Water Master Plan, the projected peak day potable demand at build-out of these developments is 57.4 mgd. Table-2 shows a potable water supply for 2006/07 of 70.0 mgd. This water would be supplied from the ground water wells and the water filtration facilities.

Projected Demands (Including the Lytle Creek Ranch Development)

The projected water demand for the development was based on the Lytle Creek Ranch Land Use Plan map dated January 30, 2008 and data provided by the developer (see Appendix B). This map outlines the number and type of dwelling unit along with the acreage allocated for commercial development, school sites, open space and the golf course.

The Lytle Creek Ranch Development is planned for 8,407 dwelling units (Single Family Dwelling and Multi-Family Dwelling), commercial development, schools, parks and open spaces on 2,447.3 acres of land located within the District's service area and it's sphere of influence. The Development is arranged into four neighborhoods, each with a mix of land uses. It is estimated that construction of the Development will be phased by neighborhood over a 10 year period. Table-4 shows the land uses and dwelling units projected for each of the neighborhoods.

TABLE-4
PROPOSED DEVELOPMENT LAND USE SUMMARY BY NEIGHBORHOOD

Land Use	Density Range	Neighborhood I		Neighborhood II		Neighborhood III		Neighborhood IV		Total	
		Acres	DU	Acres	DU	Acres	DU	Acres	DU	Acres	DU
SFR-1 Residential	2-5	131	476	11	40	121.2	427	---	---	**263.2**	**943**
SFR-2 Residential	5-8	---	---	202	1,265	102.5	643	---	---	**304.5**	**1,908**
SFR-3 Residential	8-14	41	466	121	1,262	58	675	---	---	**220.0**	**2,403**
MFD Residential (Multi-Family)	14-28	---	---	---	0	52.3	959	54	869	**106.3**	**1,828**
Mixed Use	Varies	12	336	24.2	364	87.8	625	17	---	**141.0**	**1,325**
Elementary School	---	---	---	---	---	41	---	---	---	**41.0**	**0**
Open Space/ Recreation	---	11	---	226	---	70.8	---	21	---	**328.8**	**0**
Open Space	---	222.2	---	217.6	---	435.2	---	167.5	---	**1,042.5**	**0**
Total	**---**	**417.2**	**1,278**	**801.8**	**2,931**	**968.8**	**3,329**	**259.5**	**869**	**2,447.3**	**8,407**

Acreage and dwelling units for each neighborhood provided by Lytle Creek Ranch Development, 2/11/2008.

The estimated water demand for the Development is calculated in Table-5.

TABLE-5
ESTIMATED WATER DEMAND FOR THE LYTLE CREEK RANCH DEVELOPMENT

Location	Type Land Use	Total Acre	Dwelling Units	Residential Demand (gpd/EDU)	Water Use (gpm/Ac)	Average Day Demand (mgd)	Peak Day Demand (mgd)	Average Day Demand (af/yr)
Neighborhood I	SFR-1 Residential	131	476	1,428		0.68	1.36	761
	SFR-3 Residential	41	466	840		0.39	0.78	438
	Mixed Use	12	336	840		0.28	0.56	316
	Open Space/Recreation	11			2.43	0.04	0.08	43
	Open Space	222.2			0			
	Neighborhood I - Total	**417.2**	**1,278**			**1.39**	**2.78**	**1,559**
Neighborhood II	SFR-1 Residential	11	40	1,428		0.06	0.11	64
	SFR-2 Residential	202	1,265	840		1.06	2.13	1,190
	SFR-3 Residential	121	1,262	840		1.06	2.12	1,188
	Mixed Use	13	364	840		0.31	0.61	343
	Mixed Use	11.2			2.43	0.04	0.08	44
	Open Space/Recreation	216			2.43	0.76	1.51	847
	Open Space/Recreation[1]	10			0			
	Open Space	217.6			0			
	Neighborhood II - Total	**801.8**	**2,931**			**3.28**	**6.56**	**3,675**
Neighborhood III	SFR-1 Residential	121.2	427	1,428		0.61	1.22	683
	SFR-2 Residential[1]	102.5	643	840		0.54	1.08	605
	SFR-3 Residential	58	675	840		0.57	1.13	635
	Multi-Family Residential	52.3	959	840		0.81	1.61	902
	Mixed Use	47.8	625	840		0.53	1.05	588
	Mixed Use	40			2.43	0.14	0.28	157
	Elementary School	41			2.43	0.14	0.29	161
	Open Space/Recreation	65.8			2.43	0.23	0.46	258
	Open Space/Recreation[1]	5			0			
	Open Space	435.2			0			
	Neighborhood III - Total	**968.8**	**3,329**			**3.56**	**7.12**	**3,989**
Neighborhood IV	Multi-Family Residential	54	869	840		0.73	1.46	818
	Mixed Use	17			2.43	0.06	0.12	67
	Open Space/Recreation	17			2.43	0.06	0.12	67
	Open Space/Recreation[1]	4			0			
	Open Space	167.5			0			
	Neighborhood IV - Total	**259.5**	**869**			**0.85**	**1.70**	**951**
		2,447.3	**8,407**			**9.08**	**18.17**	**10,174**

[1] Open Space/Recreation planning areas 19, 24, 29, 81 and 97 are planned for paved trails and will not require irrigation.

The District's 2004 Water Master Plan calculated that the average daily demand per equivalent dwelling unit (edu) is 840 gallons per day (gpd). Commercial and irrigation usage is based on 2.43 gpm/acre. The estimated water demand for the Development is calculated in Table-5 by using the above water demand factors. SFR-1 Residential units are calculated to be on lots greater than 10,000 square feet and therefore would require a 1" meter (1.7 times per equivalent dwelling unit) or 1,428 gpd/edu.

Table-5 calculates that the average day demand for the Lytle Creek Ranch Development will be 9.08 mgd. According to the District's Water Master Plan, peak day demand within the District's service area, for the years 2002 through 2008 is twice the average day demand. Peak day demand for the Lytle Creek Ranch Development is then estimated to be 18.17 mgd. The 18.17 mgd peak day demand added to the existing peak day demand of 42.4 mgd plus the demands projected in the Water Supply Assessments and "Will Serve Letter" obligations of 15.0 mgd totals 75.57 mgd for peak day demand. This is within the District's projected production capacity from Table-2. The actual total for peak day demand will be less as a portion of the demand from the Development was accounted for in the Villages of Lytle Creek North)

Impacts By the Proposed Development on the District's Water Supplies

Water demand projections used in the Urban Water Management Plan were generated from information within the Water Master Plan and from known developments. Demands within the Water Master Plan were based on land within the District's service area and their anticipated land uses.

> ***California Water Code Section 10910***
> *(b) to determine whether the projected water demand associated with a proposed project was included as part of the most recently adopted urban water management plan adopted pursuant to Part 2.6 (commencing with Section 10610).*

The 2,447.3 acres of land within the Development are located in the District's service area boundary and in it's sphere of influence. It was calculated that 961 acres or 39% of the Development was in the District's service area and approximately 1,486 acres or 61% was in the sphere of influence when the Water Master Plan projections were prepared. The future demands projected in the 2006 Urban Water Management Plan include demands for that portion of the Development in the District's service area, but not for those in the sphere of influence.

An analysis of the area revealed that the 961 acres in the service area boundary contained various land uses and was assigned a demand of 2,202 af/yr in the Water Master Plan. Based upon the proposed mix of uses in the Lytle Creek Ranch Specific Plan, the Lytle Creek Ranch Development proposes to develop that same 961 acres with land uses that will require additional supply beyond that projection. The demand associated with the 1,486 acres of land in the District's sphere of influence was not included in the 2006 Urban Water Management Plan and will also require additional supply.

The total demand projected for the Lytle Creek Ranch Development is 10,174 af/yr of water. Table-6 lists the additional water required to supply the development.

TABLE-6
WATER DEMAND NOT ACCOUNTED FOR IN THE UWMP

	Average Day Demand (af/yr)
Lytle Creek Ranch Development Demand	10,174
Demand Accounted for in the UWMP	2,202
Total Demand Required for Development above UWMP Projections	**7,972**

The 7,972 af/yr of additional water demand required, above those projected in the Urban Water Management Plan, could be obtained by a combination of wells constructed in the Bunker Hill Groundwater Basin and Chino Groundwater Basin. The District will be required to pay replenishment charges above their extraction rights in the Chino Basin to the Chino Basin Watermaster. In addition to the groundwater supply, the Development may be able to use reclaimed water when that source of supply becomes available.

California Water Code Section 10910
(5) An analysis of the sufficiency of the groundwater from the basin or basins from which the proposed project will be supplied to meet the projected water demand associated with the proposed project. A water supply assessment shall not be required to include the information required by this paragraph if the public water system determines, as part of the review required by paragraph (1), that the sufficiency of groundwater necessary to meet the initial and projected water demand associated with the project was addressed in the description and analysis required by paragraph (4) of subdivision (b) of Section 10631.

The Chino Groundwater Basin does not appear to be affected by drought cycles due to the extensive capacity of the basin and the pro-active basin management programs and therefore would be a reliable source of supply. The Chino Basin Watermaster has been developing new water supplies for the basin, including the expansion of their recharge basins, which will allow them to capture 50,000 af/yr of storm water. Additional projects will increase the recharge capacity to about 90,000 af/yr. Newly treated water from desalters will add 15,000 af/yr and a large scale reclaimed water project that will ultimately provide 22,000 af/yr of additional supply is also being developed for the Chino Basin. The conjunctive use program for the basin has a long range plan to store over half a million acre-feet of water.

It is estimated that there is as much as 1.6 trillion gallons of water in the Bunker Hill Basin, with sufficient supply for many consecutive drought years without any natural recharge. Historically, ground water pumping within this basin has been partially controlled by a court judgment, which determined that the safe yield for the Bunker Hill Basin was 232,100 acre-feet per year. It is believed that this control on pumping, combined with State Project Water deliveries and annual rainfall is sufficient to replenish the basin storage level for all potential future demands.

The District is preparing to enter into an agreement with multiple agencies to develop 20,000 af/yr of additional supply from the Bunker Hill Groundwater Basin. Regional facilities, including well head treatment constructed within the Basin, will allow the coordinated management of the water supplies in the Bunker Hill Groundwater Basin, which will increase the reliability and quality of this water source. The additional supplies from the Bunker Hill Basin will allow the District adequate supplies to serve the project. If an agreement can not be agreed upon, the District has identified projects to develop this supply in the Bunker Hill Groundwater Basin on its own.

A regional water supply project in the Bunker Hill Basin that will provide 30,000 af/yr is currently underway. CEQA documentation will be handled separately for this project.

FUTURE WATER SUPPLY ASSESSMENT

This Water Supply Assessment analyzes whether the District will have sufficient resources to supply the additional 7,972 acre feet required by this development that was not included in the latest Urban Water Management Plan. The District's planned future supply projects are designed to provide a more than adequate supply, thus giving the District flexibility in system operation and enough supply in the event a water supply source is not able to be utilized. Efforts by the District to obtain additional sources of water above projections in the Urban Water Management Plan will improve supply reliability.

> ***California Water Code Section 10910***
> *(3) If the projected water demand associated with the proposed project was not accounted for in the most recently adopted urban water management plan, or the public water system has no urban water management plan, the water supply assessment for the project shall include a discussion with regard to whether the public water system's total projected water supplies available during normal, single dry, and multiple dry water years during a 20-year projection will meet the projected water demand associated with the proposed project, in addition to the public water system's existing and planned future uses, including agricultural and manufacturing uses.*

The District purchases State Project Water to augment its supplies to the Oliver P. Roemer Water Filtration Facility and for ground water recharge when it is available. The use of State Project Water has been used as a supplemental source for the District due to the State Project Water quality, cost and availability.

The estimates of future SPW deliveries for the District, have been based on the estimates given in the **Draft State Water Project Delivery Reliability Report 2007** (SWPDRR). SPW delivery projections in the report are based on 82 years of historical data (1922-2003) and computer model simulations. The SWPDRR utilizes the average SPW delivery from 1922-2003 for its future average year delivery projection. It uses the multi-year drought of 1929 through 1934 for one of its future multi-year drought delivery projections and the year 1977 for its single dry year delivery projection. Table-7 shows the water delivery projections of SPW based on the draft SWPDRR 2007. Projections are shown as a percentage of maximum annual SPW amounts.

TABLE-7
AVERAGE AND DRY PERIOD STATE WATER PROJECT DELIVERIES FROM THE DELTA UNDER CURRENT AND FUTURE CONDITIONS

	Long Term Average	Single Dry Year 1977	6-year drought 1929-1934
Current (2007)	63%	6%	34%
Future (2027)	66-69%	7%	33-36%

During a drought that reduces the available SPW allotment, all of the water agencies receiving SPW will share in the deficit of the water budget on a percentage basis. In the event of reductions in SPW allotment, water agencies have discussed prioritizing the delivery of water with direct delivery having a higher priority than groundwater replenishment and recharge.

As noted previously, in addition to the potential for drought which could reduce the available SPW allotment, the impact of the recent court decision in *Natural Resources Defense Council v. Kempthorne,* could also result in a reduction of SPW exports from the Delta, although the exact amount of such reduction is not known at this time and depends upon if the year is considered an average water year or a dry water year. Should imported SPW be reduced, the District would turn to and place greater reliance on the groundwater basins as a source for its future supplies of water until SPW allotments are increased.

Projections for SPW for the District are based on the District's ability to utilize the supply at their Water Filtration Facilities (WFF). Phase III of the Oliver P. Roemer WFF expansion, which is projected to be on line in 2010, will add 6 mgd of capacity to the facility for a total of 20.4 mgd (The City of Rialto has 1.5 mgd of capacity in the WFF). The District is projected to use their full allotment of surface water to treat at the WFF which would allow the District to utilize approximately 15,000 af of SPW if available. By 2015, the 6.0 mgd North Village Water Filtration Facility is anticipated to be in operation, which would increase the District's ability to use up to 23,000 af/yr of SPW if available. As shown above, the proposed expansion of the Oliver P. Roemer WFF and the construction of the Lytle Creek North WFF will enable the District to utilize additional SPW when available. The use of SPW will allow the District to reduce ground water pumping, or replenish groundwater basins. The WFF's will provide water to this project and others, and allows the District flexibility in operating their water supply options.

Table-8 represents future production for the years 2010 through 2028 and projected demand within the District during a normal water year. It is estimated that construction of the Lytle Creek Ranch Development will be phased by neighborhood over a 10 year period (2009 through 2019). The demands shown in Table-8 include the Lytle Creek Ranch Development demands at a 10% growth per year in addition to other known developments within the District that will occur during this time frame.

TABLE-8
PROJECTED NORMAL WATER YEAR
SUPPLY AND DEMAND COMPARISON (af/yr)

Source	2010	2015	2020	2028
Lytle Creek Basin	10,000	10,000	10,000	10,000
North Riverside Basin	6,000	8,000	6,000	5,000
Rialto Basin	10,000	10,000	10,000	10,000
Bunker Hill Basin	10,000	15,000	20,000	25,000
Chino Basin	3,000	3,000	3,000	3,000
Lytle Creek Surface Water	5,500	5,500	5,500	5,500
State Project Water	9,450 (1)	15,200 (2)	15,200 (2)	15,200 (2)
SUPPLY	**53,950**	**66,700**	**69,700**	**73,700**
DEMAND	**30,000**	**45,500**	**50,900**	**56,400**
SURPLUS	**23,950**	**21,200**	**18,800**	**17,300**

(1) In 2010 the District's Water Filtration Facilities will have the ability to treat up to 20.4 mgd. When you subtract the City of Rialto's 1.5 mgd capacity and the District's Lytle Creek surface water supply, the District will be able to utilize approximately 15,000 af/yr of SPW. The long term average of 63% of 15,000 af would be 9,450 af.

(2) In 2015 when the 6.0 mgd Villages of Lytle Creek North WFF is anticipated to be in operation, the District will be able to utilize up to 23,000 af/yr. The long term average 66% of 23,000 af would be 15,200 af.

The availability of SPW shown in Tables 8 through 10 is based upon the projected deliveries from Table-7 and the District's ability to utilize this sources at their WFFs. Projections for 2010 are based on the long term average of 63%. In the year 2028, the long term average SPW delivery is projected to be between 66% and 69% (66% of 23,000 af or approximately 15,200 af) of the maximum annual SPW amount. SPW is used by the District as a supplemental water supply to their existing water sources. In addition to the percentage reductions in SPW that have been factored into Table-8, note that even if SPW were eliminated entirely, the District's groundwater supplies would be sufficient to address the projected demand.

The implementation of the Upper Santa Ana River Watershed Integrated Regional Water Management Plan will improve groundwater management and water supply reliability in many of the groundwater basins utilized by the District, especially during times of drought. The Bunker Hill Basin, which the District plans to focus on for its future supplies, is the major basin that will benefit from the projects implemented by the IRWMP. Assuming that the groundwater basins are managed properly, groundwater is thought to be a reliable source of supply during drought years when SPW allotments are cut back.

The District is planning to utilize projected supplies from the Bunker Hill Basin sooner than previously anticipated due to increased demand and rapid growth within the District's service area. The supply and demand comparison tables during normal, single dry and multiple dry water years reflect this and the increased reliability of this source. The District's Urban Water Management Plan, when updated, will reflect these changes.

Development within the District is occurring at a greater rate than the 3% annual growth rate projected in Table 2-8 "Projected Residential Growth" and Table 2-14 "Water Use by Customer - Past, Current and Future (af/yr)" in the Urban Water Management Plan. Current demands plus demands from new development have increased the 2015 water demand beyond projections of the Urban Water Management Plan. Despite the increased demand, the District is estimating a surplus of water.

The District plans the construction of new wells, pump stations and transmission lines to ensure an adequate supply for their existing and future customers. The 73,700 af/yr of supply as projected for a normal water year in the year 2028 is sufficient to accommodate the additional demand that is projected. Due to this increase in demand, the District may wish to construct their water supply projects sooner than planned in anticipation of a multiple dry year event.

The demand at build-out of the District's service area is calculated in the District's Water Master Plan to be 43.28 mgd or 48,483 af/yr. Build-out demands plus the additional demand for this development are approximately 56,400 af/yr in the year 2028.

When there is a drought in Northern California, or if water supplies from Northern California are reduced as a result of restrictions on Delta pumping or other similar measures, SPW deliveries will be reduced or curtailed based on the available supplies. During this time, the District will obtain water supplies from their multiple groundwater sources and surface water diversions. During periods of drought in Southern California when production in the groundwater basins has declined, the District will utilize SPW supplies to augment their supplies. As discussed in greater detail below, in the event of prolonged periods of water shortages, the District may enact its Water Shortage Contingency Plan to reduce consumption and demand through conservation. In addition, the District may also document new sources of supply through increased use of recycled water and improving mechanisms to capture as much water as possible from local surface water sources, such as Lytle Creek.

Table-9A shows the projected supply available during a single dry water year in Southern California. Projections for 2010 are based on the long term average of 63%. SPW delivery during a single dry year in Southern California in the year 2028, is projected to be between 66% and 69% (66% of 23,000 af or approximately 15,200 af) of the maximum annual SPW amount. In addition to the percentage reductions in SPW that have been factored into Table-9A, note that even if SPW were eliminated entirely, the District's groundwater supplies would be sufficient to address the projected demand in every year except 2028.

TABLE-9A
PROJECTED SINGLE DRY YEAR IN SOUTHERN CALIFORNIA ONLY
SUPPLY AND DEMAND COMPARISON (af/yr)

Source	2010	2015	2020	2028
Lytle Creek Basin	9,500	9,500	9,500	9,500
North Riverside Basin	6,000	8,000	6,000	5,000
Rialto Basin	9,500	9,500	9,500	9,500
Bunker Hill Basin	10,000	15,000	20,000	25,000
Chino Basin	3,000	3,000	3,000	3,000
Lytle Creek Surface Water	3,000	3,000	3,000	3,000
State Project Water	9,450 (1)	15,200 (2)	15,200 (2)	15,200 (2)
SUPPLY	**50,450**	**63,200**	**66,200**	**70,200**
DEMAND	**30,000**	**45,500**	**50,900**	**56,400**
SURPLUS	**20,450**	**17,700**	**15,300**	**13,800**

(1) In 2010 the District's Water Filtration Facilities will have the ability to treat up to 20.4 mgd. When you subtract the City of Rialto's 1.5 mgd capacity and the District's Lytle Creek surface water supply, the District will be able to utilize approximately 15,000 af/yr of SPW. The long term average of 63% of 15,000 af would be 9,450 af.

(2) In 2015 when the 6.0 mgd Villages of Lytle Creek North WFF is anticipated to be in operation, the District will be able to utilize up to 23,000 af/yr. The long term average 66% of 23,000 af would be 15,200 af.

Table-9B shows the projected supply available during a single dry water year in Northern California. SPW deliveries were projected to be as seen in 1977 or 7% of the maximum annual SPW amount. In addition to the percentage reductions in SPW that have been factored into Table-9B, note that even if SPW were eliminated entirely, the District's groundwater supplies would be sufficient to address the projected demand.

TABLE-9B
PROJECTED SINGLE DRY YEAR IN NORTHERN CALIFORNIA ONLY
SUPPLY AND DEMAND COMPARISON (af/yr)

Source	2010	2015	2020	2028
Lytle Creek Basin	10,000	10,000	10,000	10,000
North Riverside Basin	6,000	8,000	6,000	5,000
Rialto Basin	10,000	10,000	10,000	10,000
Bunker Hill Basin	10,000	15,000	20,000	25,000
Chino Basin	3,000	3,000	3,000	3,000
Lytle Creek Surface Water	5,500	5,500	5,500	5,500
State Project Water	900 (1)	1,600 (2)	1,600 (2)	1,600 (2)
SUPPLY	**45,400**	**53,100**	**56,100**	**60,100**
DEMAND	**30,000**	**45,500**	**50,900**	**56,400**
SURPLUS	**15,400**	**7,600**	**5,200**	**3,700**

(1) In 2010 the District's Water Filtration Facilities will have the ability to treat up to 20.4 mgd. When you subtract the City of Rialto's 1.5 mgd capacity and the District's Lytle Creek surface water supply, the District will be able to utilize approximately 15,000 af/yr of SPW. The current single dry year projected SPW delivery of 6% of 15,000 af would be 900 af.

(2) In 2015 when the 6.0 mgd Villages of Lytle Creek North WFF is anticipated to be in operation, the District will be able to utilize up to 23,000 af/yr. The future single dry year projected SPW delivery of 7% of 23,000 af would be 1,600 af.

During a single dry year event, the District is not expected to enact any of their water supply shortage stages. The District anticipates that it will utilize additional supply in the Chino Basin as needed. The projected supply during a single dry year is sufficient to meet the projected demands.

Usually, when there is a drought in Northern California, it does not coincide with a drought in Southern California. There have been instances where a state wide drought has occurred. The durations, frequencies and intensities of these occurrences range. The state wide drought of 1929-34 is unequaled in the historical record of the Sacramento River Basin Index dating back to 1872. This data indicates that the drought had a recurrence interval of more than 100 years. The stream flow record reconstructed from tree ring data, indicates that the drought is unequaled for the entire period from 1560 to 1980. This data indicates a possible recurrence interval of more than 400 years. (**U.S. Geological Survey Water-Supply Paper 2375, 591 p.**)

Table-10 shows the projected supply during the fifth year of a five year state wide drought. During a state wide drought, similar to the one that occurred from 1929-1934, the maximum annual SPW amount is projected to be between 33% and 36% (34% of 15,000 af or 5,100 af in 2010 and 33% of 23,000 af or 7,600 af in 2028) refer to Table-7.

TABLE-10
PROJECTED SUPPLY AND DEMAND COMPARISON
FIFTH YEAR OF A FIVE YEAR DROUGHT
IN BOTH SOUTHERN AND NORTHERN CALIFORNIA (af/yr)

Source	2010	2015	2020	2028
Lytle Creek Basin	5,000	7,000	7,000	7,000
North Riverside Basin	4,000	5,000	4,000	3,000
Rialto Basin	3,067	3,067	3,067	3,067
Bunker Hill Basin	10,000	15,000	20,000	25,000
Chino Basin	3,000	8,000	8,000	8,000
Lytle Creek Surface Water	3,000	3,000	3,000	3,000
State Project Water	5,100 (1)	7,600 (2)	7,600 (2)	7,600 (2)
SUPPLY	**33,167**	**48,667**	**52,667**	**56,667**
DEMAND	**30,000**	**45,500**	**50,900**	**56,400**
SURPLUS	**3,167**	**3,167**	**1,767**	**267**

(1) In 2010 the District's Water Filtration Facilities will have the ability to treat up to 20.4 mgd. When you subtract the City of Rialto's 1.5 mgd capacity and the District's Lytle Creek surface water supply, the District will be able to utilize approximately 15,000 af/yr of SPW. The current multi year drought projection of SPW delivery is 34% of 15,000 af or 5,100 af.

(2) In 2015 when the 6.0 mgd Villages of Lytle Creek North WFF is anticipated to be in operation, the District will be able to utilize up to 23,000 af/yr. The future muti year drought projection of SPW delivery is 33-36%. 33% of 23,000 af is 7,600 af.

As shortages become evident, the District may enact the appropriate stage of their Water Shortage Contingency Plan. The District in managing their water supply options and system operation, may choose to purchase additional supplies if available or enact any of their water shortage stages.

WATER SHORTAGE CONTINGENCY

The District has an adopted Water Conservation Plan (Article No. 24, Ordinance No. 68, adopted 7/05/90 by the Board of Directors of the West Valley Water District) which is contained in the District's latest Urban Water Management Plan (2006). The ordinance has four stages of water use. Stage 1 is normal conditions; Stage 2 is both a voluntary and mandatory program with a goal of 10% to 25% reduction in water usage; Stage 3 is voluntary and mandatory program with a goal of 25% to 35% reduction in water usage; and Stage 4 is referred to as a "Water Emergency" with a voluntary and mandatory program with a goal of 35% to 50% reduction in water usage.

COMPLIANCE WITH GOVERNMENT CODES

Government Code Section 65867.5

Government Code Section 65867.5 states that "*A development agreement is a legislative act which shall be approved by ordinance and is subject to referendum. A development agreement* (will serve letter) *shall not be approved unless the legislative body* (board of directors or city council) *finds that the provisions of the agreement are consistent with the general plan and any applicable specific plan*".

The proposed Lytle Creek Ranch Development will be consistent with the District's latest approved Water Master Plan (2004) and UWMP (2006).

Government Code Section 66455.3

Not later than five days after a city or county has determined that a tentative map application for a proposed subdivision, as defined in Section 66473.7, is complete pursuant to Section 65943, the local agency shall send a copy of the application to any water supplier that is, or may become, a public water system, as defined in Section 10912 of the Water Code, that may supply water for the subdivision.

WVWD anticipates the City of Rialto will send a tentative map application for the Lytle Creek Ranch Development to the District, as required by the Government Code.

DETERMINATION

The District's water supply is vulnerable to seasonal and climatic changes based upon precipitation patterns in both Southern and Northern California and may vary substantially from one year to the next. It is impossible to accurately predict the reliability of future SPW deliveries. Deliveries can be affected by several factors including, the amount and location of rain and snowfall in a given year, operational and environmental impacts, levee failures and earthquakes. All of these items affect the delivery and are recognized by the District, but are not within their control.

When there is a drought in Northern California, SPW deliveries will be curtailed based on the available supplies. During this time, the District will obtain water supplies from their multiple groundwater sources and surface water diversions. During periods of drought in Southern California when production in the groundwater basins has declined, the District will utilize SPW supplies to augment their supplies.

The impacts of global climate change on the rain and snowfall is uncertain. To mitigate this impact on their water supplies, the District banks (stores water in underground aquifers) SPW into the Bunker Hill and Chino Groundwater Basins when it is available, and extracts this water during periods of drought. The facilities needed to bank water supplies are currently in place. The District can participate in existing programs that will allow additional water banking by the time the Development will require this supply.

As with all water supplies in Southern California, the Districts sources are also vulnerable to chemical contamination. The District will not see a reduction in supply due to water quality. Their plan is to implement wellhead treatment to remove the volatile organic compounds on existing and future proposed wells as needed. To achieve an acceptable level of reliability of supply within their system, the District plans and constructs facilities and water supply projects to meet the projected demands.

The demand projected in the Urban Water Management Plan along with the demand required for this Development have been identified in this Water Supply Assessment. The District has demonstrated plans to implement the additional supply projects needed for this Development.

The District has verified that it has the water supplies available during normal, single-dry, and multiple-dry years within a 20-year projection that will meet the projected demand associated with the proposed development, in addition to existing and planned future uses, including, but not limited to, agricultural and industrial uses.

The District has shown in this Water Supply Assessment written verification of water rights and contracts, agreements, and its Capital Improvements Program of a sufficient water supply that has been adopted by its governing board of directors.

The District has determined that there will be no foreseeable impacts of the proposed development on the availability of water resources for agricultural and industrial uses within the District's public water system service area that are not currently receiving water from the District's water system, but are utilizing the same sources of water.

RESERVATION OF AUTHORITY

Nothing in this Water Supply Assessment shall be construed to create a right or entitlement to water service, or any specific level of service nor does it affect existing law concerning West Valley Water District's obligation to provide water service to its existing customers or to any potential future customers. **(See Government Code § 66473.7(m) and (n).)**

In addition, West Valley Water District specifically reserves its authority to impose reasonable terms and conditions or to refuse water service to any existing customers or to any potential future customers, in order to conserve water in the face of an existing or threatened water shortage. **(See Water Code § 350, et. seq.)**

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Appendices

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APPENDIX A

EXISTING WELL CAPACITY (NOV. 2006)

ZONE	DESIGNATION	BASIN	LOCATION	PUMPING CAPACITY (GPM)	PRODUCTION CAPACITY (MGD)[1]
2	W-16	R	296 S. Eucalyptus Avenue, Rialto	1,500	1.4
2	W-17 [2]	R	404 S. Acacia Avenue, Rialto	1,000	1.0
2	W-18A	NR	1783 S. Sycamore Avenue, Colton	2,700	2.6
2	W-29	NR	180 W. Slover Avenue, Fontana	0	0
2	W-40 [3]	NR	157 Resource Drive, Rialto (Not equipped)	0	0
2	W-41	NR	3353 Industrial, Rialto	2,200	2.1
2,3,3A	W-15	BH	1950 W. 9th St., San Bernardino	2,300	2.2
2,3,3A	W-30	BH	2015 W. 9th St., San Bernardino	2,700	2.6
3	W-37 [4]	C	17186 ½ Slover Avenue, Fontana	1,500	1.4
3	W-39 [5]	C	10301 Linden Avenue TPP, Bloomington	0	0
3	W-42	NR	295 E. San Bernardino Avenue, Rialto	2,200	2.1
3A	W-11[4]	R	238 W. Victoria St., Rialto	1,500	1.4
3A	W-33	R	855 W. Baseline Road, Rialto	2,100	2.0
4	W-1A	LC	19523 Country Club Drive, Rialto	2,000	1.9
4	W-2	LC	19973 Country Club Drive, Rialto	1,800	1.7
4	W-4A	LC	5914 N. Sycamore Avenue, Rialto	1,500	1.4
4	W-5A	LC	5914 N. Sycamore Avenue, Rialto	1,500	1.4
3,4	W-7	LC	6871 Martin PMP, San Bernardino	1,900	1.8
3,4	W-8A	LC	6871 Martin Road, San Bernardino	2,000	1.9
4	W-34	LC	19653 Country Club Drive, Rialto	1,400	1.3
4	W-35A	LC	5800 N. Sycamore Avenue, Rialto	500	0.0
3,4	W-36	LC	3401 Plant	2,000	1.9
4	W-22A	R	5700 N. Riverside Avenue, Rialto	1,000	1.0
6	W-23A [6]	R	4334 Riverside Avenue, Rialto	200	0
6	W-24	R	4334 Riverside Avenue, Rialto	350	0.3
6	W-54	R	Duncan Canyon Road	1,000	1.0
			TOTAL	**36,850**	**34.4**

[1] 16-hours/day Pumping Time.
[2] Under evaluation for water quality.
[3] To be on-line 2010/11.
[4] Standby Summer Peaking.
[5] To be on-line 2007/08.
[6] Standby for well W-24 only.

APPENDIX B

N1

Type Land Use	Total Acre	Dwelling Units
SFR-1 Residential	131	476
SFR-3 Residential	41	466
Mixed Use	12	336
Open Space/Recreation	11	
Open Space	222.2	
N1 total	417.2	1278

N2

Type Land Use	Total Acre	Dwelling Units
SFR-1 Residential	11	40
SFR-2 Residential	202	1265
SFR-3 Residential	121	1262
Multi-Family Residential	0	0
Mixed Use	13	364
Mixed Use	11.2	
Open Space/Recreation	226	
Open Space	217.6	
N2 total	801.8	2931

N3

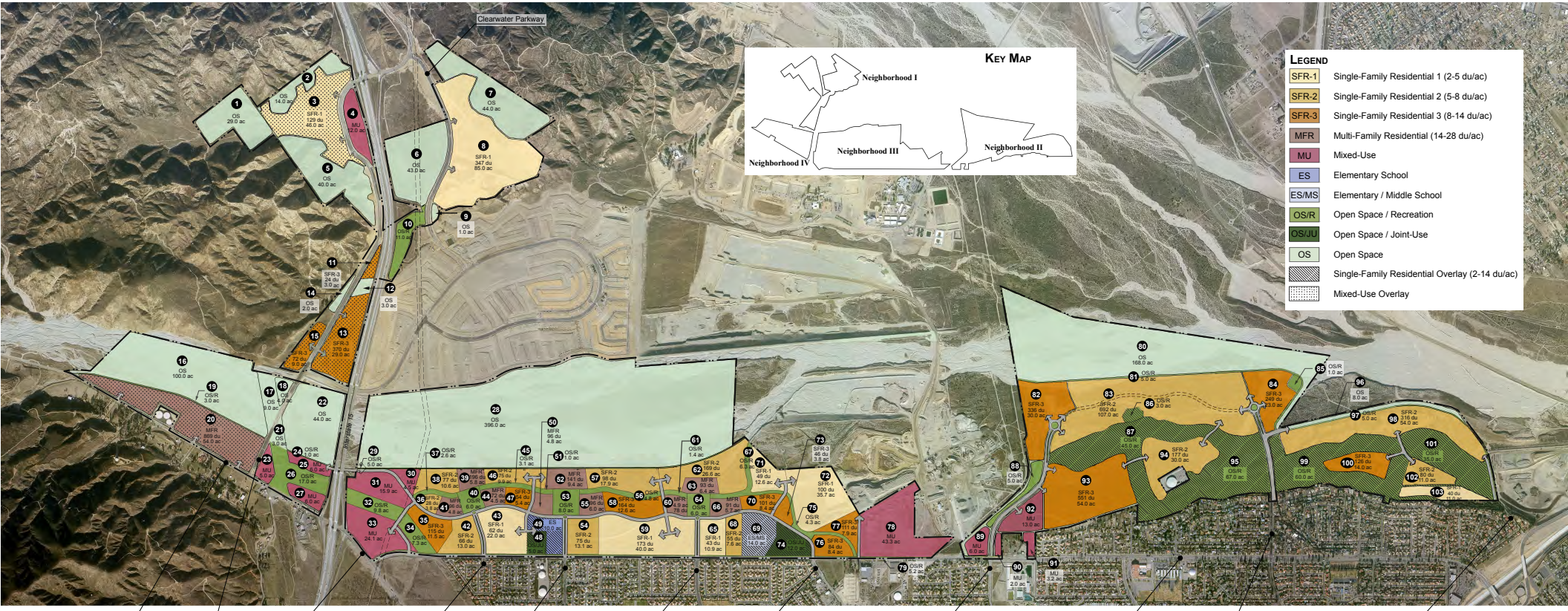
Type Land Use	Total Acre	Dwelling Units
SFR-1 Residential	121.2	427
SFR-2 Residential	102.5	643
SFR-3 Residential	58	675
Multi-Family Residential	52.3	959
Mixed Use	47.8	625
Mixed Use	40	
Elementary School	41	
Open Space/Recreation	70.8	
Open Space	435.2	
N3 total	968.8	3329

N4

Type Land Use	Total Acre	Dwelling Units
Multi-Family Residential	54	869
Mixed Use	17	
Open Space/Recreation	21	
Open Space	167.5	
N4 total	259.5	869

Total	2447.3	8407

*Information provide by Lytle Creek Ranch Development 2/11/2008



Lytle Development Joint Venture III

Lytle Creek Ranch Land Use Plan

Rialto, California

Note: Planning Areas 82-84, 93-94, 98, 100, and 102-103 will be constructed as Active Adult Housing.

0' 400' 800' 1,600'

KTGY GROUP, INC.

January 30, 2008

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Appendix III-K

WASTEWATER COLLECTION AND TREATMENT

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Appendix III-K-A

Otte-Berkeley Groupe, Inc. Description of Proposed Sewer Infrastructure Lytle Creek Ranch Project October 13, 2009

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OTTE–BERKELEY GROUPE, Inc.
CIVIL ENGINEERS
Professional Engineering Services in a Collaborative Context

WASTEWATER FACILITIES PLAN SUMMARY

Through numerous joint meetings between the development design team and the City of Rialto's Public Works Department, Maintenance and Operations Section several collection options were provided to the development team.

The City of Rialto Maintenance and Operations Section identified several collection system restrictions within the existing Wastewater Collection System Master Plan as summarized in both the P•A•C•E prepared City of Rialto Sewer System Evaluation, July, 2005 and the TRC prepared Wastewater Collection System Analysis, October, 2005.

The City of Rialto has determined that they can accept the expected flows from the proposed development by directing these flows to multiple existing Lift Stations along the southerly side of the 210 Freeway at Ayala Avenue, Cactus Avenue, Lilac Avenue and Sycamore Avenue. The City has provided the following necessary collection system upgrades and modifications to mitigate the project's additional flows.

LIFT STATIONS

(a) Upgrade the following four (4) Lift Stations; Ayala Avenue Lift Station, Cactus Avenue Lift Station, Lilac Avenue Lift Station, and the Sycamore Avenue Lift Station. Necessary improvements will require a 100% increase in pumping capacity at these locations.

(b) The majority of the expected flows shall be tributary to the Ayala Avenue Lift Station. The expected connection point for this tributary reach would be the existing manhole within Locust Avenue just southerly of Riverside Avenue.

(c) Remaining flows may be directed to the Cactus Avenue Lift Station with a connection point located at Cactus Avenue and Riverside Avenue, the Lilac Avenue Lift Station with a connection point located at Cactus Avenue and Casmalia Avenue, and at the Sycamore Avenue Lift Station with a connection point located at Oakdale Avenue.

TRANSMISSION LINES

Within the Wastewater Collection System Analysis Report prepared by TRC in 2005, numerous transmission main lines have been identified as having deficiencies that would require upgrading to serve the proposed project development. Approximately 9,135 linear feet of existing 12" to 30" transmission main line need to be upgraded downstream from the four (4) identified Lift Stations located along the southerly side of the 210 Freeway to facilitate expected flows.

Existing transmission mains extending from the four (4) identified Lift Stations to the proposed project connection points also need to be upgraded as follows.

(a) The existing 12" transmission main extending northerly up Locust Avenue to the proposed connection point 250 feet southerly of Riverside Avenue needs to either be replaced with a 21" main or an additional 18" main needs to be installed parallel to the

existing main. This upgrade would accommodate an additional 2.23 MGD of flow through the line and deliver them to the Ayala Lift Station.

(b) The existing 10" transmission line extending northerly up Cactus Avenue from the Cactus Avenue Lift Station to the intersection with Riverside Avenue needs to be replaced with a 15" main. This upgrade would accommodate an additional 0.86 MGD of flow through the line.

(c) The existing 8" transmission line extending northerly from the Lilac Lift Station to Casmalia Avenue needs to be replaced with a 15" main and a parallel 12" main installed westerly along Casmalia to Cactus Avenue to intercept a portion of the existing tributary flows and redirect these flows through a diverter structure to the Lilac Avenue Lift Station. This upgrade would accommodate an additional 0.66 MGD of flow through the line.

(d) The existing combination 8" and 10" transmission line extending from the Sycamore Avenue Lift Station northerly to the proposed connection point north of Arbeth Avenue needs to be replaced with a 15" main. This upgrade would accommodate an additional 0.86 MGD of flow through the line.

WASTEWATER TREATMENT PLANT

The City of Rialto Wastewater Treatment Plant has an existing treatment capacity of 11 MGD. While the City of Rialto's facility has some existing reserve capacity, full build-out of the proposed Lytle Creek Ranch Development Project would require an expansion of the facility.

The City of Rialto's Public Works Department is currently under contract for a revised sewer facility Master Plan to address possible facility upgrades and expansions.

SCALPING PLANT

In an effort to reduce the amount of capital improvements required to service the proposed project, including additional treatment capacity, increased lift station pumping capacity, and the upgrading of the collection system transmission mains, the project developer and the City have had several discussions on the use of a scalping plant.

Typically, scalping plants are utilized in areas that have two necessary conditions, a high volume of flow and a user needing to maintain large areas of landscape or an industrial end user.

The Lytle Creek Ranch Project does include a golf course. The project also abuts two existing mining operations that do have an existing industrial use for water and immediately south of the project is the newly constructed 210 Freeway which is currently irrigating with domestic water.

Possible locations for a scalping plant, or plants, would be within the proposed Neighborhood III on the north side of Riverside Avenue at Locust Avenue, at the termination of Oakdale Avenue

at the south end of the proposed golf community within Neighborhood II and the Ayala Lift Station at the 210 Freeway.

Scalping Plants, typically, can remove up to 75% of the volume of water tributary to the plant assuming that there is a dedicated use for the removed volume. If the maximum reduction could be used for this project the expected flow rate from the project could be reduced from 1.56 MGD to 0.39 MGD. This reduction would be directly proportional at the City's Wastewater Treatment Plant and would result in a substantial capital improvement reduction at the identified Lift Stations as well as the within the sewer collection system.

Much additional investigation needs to be done to address the economic benefit of utilizing a scalping plant weighted against the level of treatment the Regional Water Board and the local water purveyors my require to allow the water to be used for irrigation in the localized area.

OTTE–BERKELEY GROUPE, Inc.
CIVIL ENGINEERS
Professional Engineering Services in a Collaborative Context

The Lytle Creek Ranch Wastewater Collection System

NEIGHBORHOOD IV

The backbone system for this area is located adjacent to and west of the proposed Lytle Creek levee and consists of 8" diameter sewer pipe. An estimated 1,171 dwelling units and/or equivalents is expected to develop an average daily flow of 0.212 million gallons per day (MGD). Applying a peaking factor of 3.0, the peaked flow rate expected is 0.636 MGD or 0.98 *cfs*.

NEIGHBORHOOD III

The sewer main within Neighborhood III is an extension of the backbone system discussed in Neighborhood IV. The intent is to locate the main line within a multi-use Paseo generally running through the middle of this project consisting of varying density residential developments as well as both recreational open space and institutional school sites. The Paseo will also house the primary storm water facilities and be the focal point of pedestrian traffic between residential, recreational, and school venues.

The main line sewer will consist of 10", 12", & 15"-diameter pipe sizes with 8"-diameter sewer lines conveying the flows from various tributary planning areas. A planned 3,635 dwelling unit equivalents are anticipated to generate an average daily flow of 0.659 MGD while peaking at 1.78 MGD or 2.75 *cfs* using a peaking factor of 2.7. The combined tributary flows from both Neighborhoods III & IV upon completion of ultimate build-out are expected to generate 0.871 MGD average daily flow with a cumulative peak flow of 2.35 MGD or 3.64 *cfs*. These expected flows will be directed to the City's identified collection point 250' south of the Locust Avenue intersection with Riverside Avenue.

A design alternative to construct a scalping plant within the open space parcel at the northwest corner of Riverside and Locust Avenues is being considered. An evaluation of potential industrial uses and/or golf course irrigation along with impacts to the groundwater aquifer needs to be performed. If deemed both economical and environmentally feasible, the plant may significantly reduce the burden on the City's existing collection system in terms of transmission line, lift station, and treatment facility upgrades.

A small remainder of the Neighborhood III tributary area lying downstream of the point of connection in Locust Avenue will convey its flows into Neighborhood II. This area is universally considered to be the last project area to be improved. An average daily flow of 0.126 MGD representing 694 dwelling unit equivalents is anticipated to achieve a peak flow rate of 0.403 MGD or 0.62 *cfs* applying a peaking factor or 3.2.

NEIGHBORHOOD II

The predominant land use feature in Neighborhood II is a newly designed municipal golf course surrounded by clusters of active senior housing. Two discrete sewer systems, located within the proposed street network and comprised of 8" to 15"-diameter pipe, will outlet their respective waste products into existing City of Rialto facilities in Cactus Avenue and Oakdale Avenue.

The 2,568 dwelling equivalents tributary to the Cactus Avenue sewer within Neighborhood II combined with the 694 units from Neighborhood III shall feed a lift station centrally located within the golf course. Pressurized flows will need to be lifted to the crest within County Club

575 E. Carreon Drive • Colton, California 92324-3000
(909) 370-0911 • Fax (909) 370-1211

Drive then continue via gravity to the connection point in Cactus Avenue. An opportunity may be available to provide sewering capability to existing residences along and upstream of Country Club Drive. This may include constructing a gravity line parallel to the force main and pumping these additional tributary flows as well. Further analysis may be necessary in order to determine the adequacy of the indicated pipe sizes due to the demands of any potential additional residences. Also, a lift station within planning area 84 may be necessary to sewer discrete residential sites due to their elevation below the adjacent sewer main. An average daily flow of 0.591 MGD is expected from the project alone with a peak flow rate of 1.60 MGD or 2.47 *cfs*.

Tributary to the City's Oakdale sewer are 562 possible dwelling units generating an average daily flow of 0.102 GPM while peaking at a flow rate of 0.50 *cfs*. A scalping plant located at the southerly terminus of the project site is being considered pursuant to a potential need for irrigation water due to the recent completion of the 210 freeway.

NEIGHBORHOOD I

Service areas within Neighborhood I are all tributary to an existing sewer facility within and adjacent to Clearwater Parkway. These facilities were constructed as part of the infrastructure improvements associated with Tract 15900 within the County of San Bernardino and maintained by the County's Special Districts Department. Flows in this system are conveyed now to the County of San Bernardino's wastewater treatment facility located east of the Lytle Creek Wash, opposite the Sherriff's Detention Facility. Wastewater treatment capacity for Neighborhood I has been reserved at this facility.

The area west of Interstate 15 comprised of 342 dwelling units or equivalents will gravity flow under the I-15 Bridge through an 8"-diameter sewer line to a point of connection into the existing sewer line located near the Clearwater Parkway/Glen Helen Parkway intersection. An average daily flow of 0.062 MGD is expected to produce a peak flow of 0.211 MGD or 0.33 *cfs* applying a 3.4 peaking factor.

A 347 dwelling unit residential development east of the interstate shall connect to the sewer main located beneath the travelled lanes of Clearwater Parkway. The 8"-diameter sewer lines constructed herein are anticipated to generate 0.063 MGD of average daily flow with a 0.214 MGD or 0.33 *cfs* peaked rate of flow.

A 10"-diameter dry sewer line constructed just north of the Rosena Ranch development and connecting to the main sewer line in Clearwater Parkway has been specifically installed to convey the flows for 466 dwelling units (Planning Areas 11,13, & 15) adjacent to Glen Helen Parkway and west of Interstate 15. Average daily flows of 0.084 MGD are anticipated to produce 0.287 MGD or 0.44 *cfs* when a peaking factor of 3.4 is applied.

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Appendix III-K-B

Roberson Water Consulting
Lytle Creek Ranch
Preliminary Onsite
Treatment Options Review
Wastewater Treatment Plant &
Water Recycling Plant Option
July 2009

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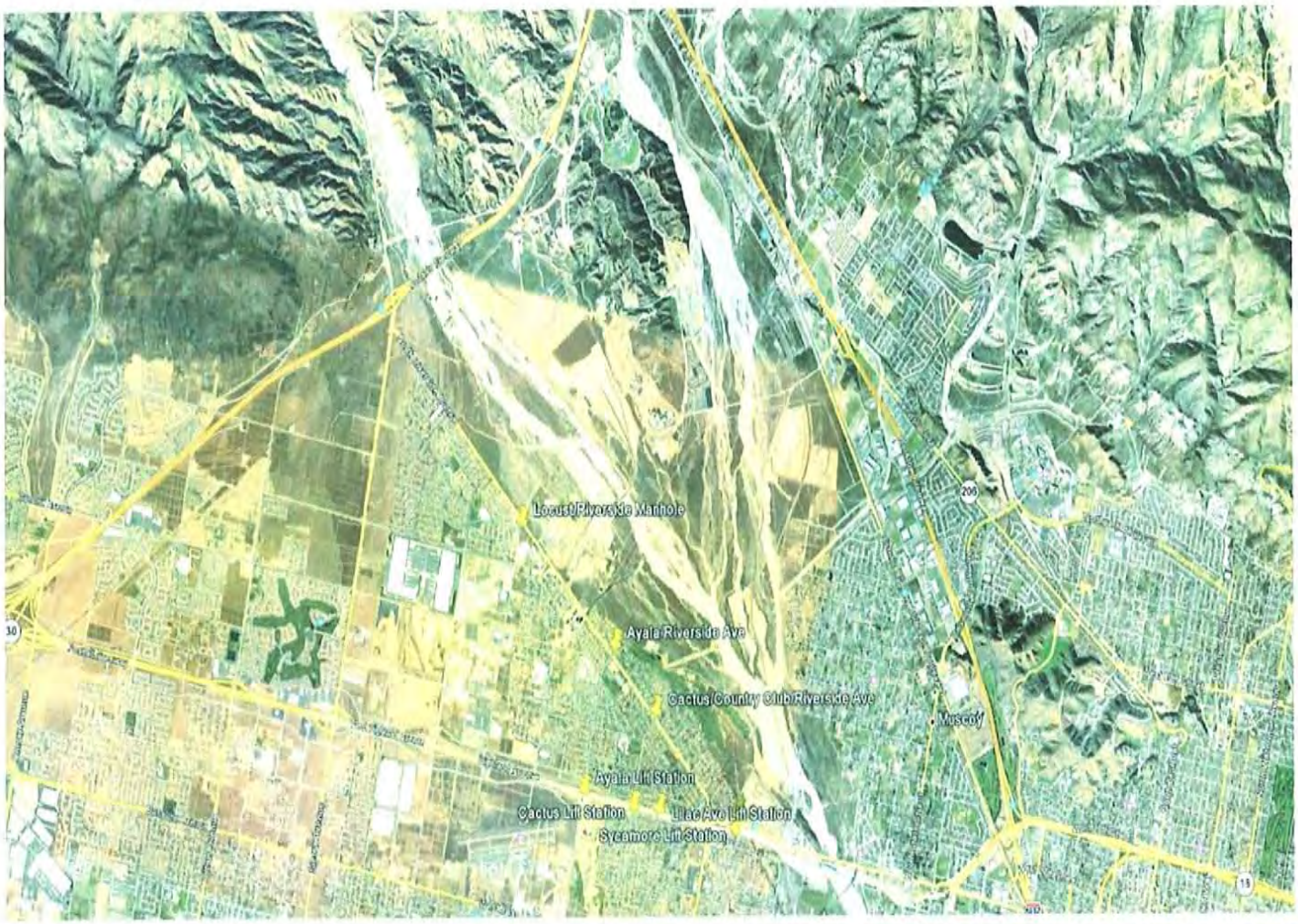

LYTLE CREEK RANCH

PRELIMINARY ONSITE TREATMENT OPTIONS REVIEW

WASTEWATER TREATMENT PLANT & WATER RECYCLING PLANT OPTION

PREPARED BY ROBERSON WATER CONSULTING
For
LYTLE DEVELOPMENT COMPANY

JULY 2009

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LYTLE CREEK RANCH

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AND

WATER RECYCLING PLANT

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AUGUST 2009

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3	Area Aerial Photo
4	Design Build Industry Similars
5	EPA SBR Fact Sheet
6	Engineering Evaluation Samples Hollister, CA, Gig Harbor, WA, and Somerton, AZ
7	SBR Standard Specification
8	Siemens MBR Proposal
9	Siemens RO Proposal
10	Siemens Cannibal Proposal
11	Severn Trent De-Nitrification Filter Data
12	Glossary of Wastewater Terms

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LYTLE CREEK RANCH

Wastewater Treatment & Advanced Waste Treatment Facility Alternative

July 31, 2009

Background

The Lytle Creek Ranch planning area has been reviewed by the development design team and the City of Rialto's Public Works Department, Maintenance and Operations Section several collection options were considered including certain collection system restrictions within the existing Wastewater Collection System Master Plan documentation. The City of Rialto has determined that they can accept the expected flows from the proposed development by directing these flows to multiple existing Lift Stations along the southerly side of the 210 Freeway at Ayala Avenue, Cactus Avenue, Lilac Avenue and Sycamore Avenue. The City has provided the following necessary collection system upgrades and modifications to mitigate the project's additional flows.

(a) Upgrade the following four (4) Lift Stations; Ayala Avenue Lift Station, Cactus Avenue Lift Station, Lilac Avenue Lift Station, and the Sycamore Avenue Lift Station. Necessary improvements will require a 100% increase in pumping capacity at these locations.

(b) The majority of the expected flows shall be tributary to the Ayala Avenue Lift Station. The expected connection point for this tributary reach would be the existing manhole within Locust Avenue just southerly of Riverside Avenue.

(c) Remaining flows may be directed to the Cactus Avenue Lift Station with a connection point located at Cactus Avenue and Riverside Avenue, the Lilac Avenue Lift Station with a connection point located at Cactus Avenue and Casmalia Avenue, and at the Sycamore Avenue Lift Station with a connection point located at Oakdale Avenue.

The Wastewater Collection System Analyses has also identified transmission lines with deficiencies that would require upgrading to serve the proposed project development. Approximately 9,135 linear feet of existing 12" to 30" transmission main line need to be upgraded downstream from the four (4) identified Lift Stations located along the southerly side of the 210 Freeway to facilitate expected flows.

Existing transmission mains extending from the four (4) identified Lift Stations to the proposed project connection points also need to be upgraded as follows.

(a) The existing 12" transmission main extending northerly up Locust Avenue to the proposed connection point 250 feet southerly of Riverside Avenue needs to either be replaced with a 21" main or an additional 18" main needs to be installed parallel to the existing main. This upgrade would accommodate 2.23 MGD of the expected flows, the majority, from the proposed project and deliver them to the Ayala Lift Station.

(b) The existing 10" transmission line extending northerly up Cactus Avenue from the Cactus Avenue Lift Station to the intersection with Riverside Avenue needs to be replaced with a 15" main. This upgrade would accommodate 0.86 MGD of the expected project flows.

(c) The existing 8" transmission line extending northerly from the Lilac Lift Station to Casmalia Avenue needs to be replaced with a 15" main and a parallel 12" main installed westerly along

Casmalia to Cactus Avenue to intercept a portion of the existing tributary flows and redirect these flows through a diverter structure to the Lilac Avenue Lift Station. This upgrade would accommodate 0.66 MGD of the expected project flows.

(d) The existing combination 8" and 10" transmission line extending from the Sycamore Avenue Lift Station northerly to the proposed connection point north of Arbeth Avenue needs to be replaced with a 15" main. This upgrade would accommodate 0.86 MGD of the expected project flows.

Wastewater Treatment

The City of Rialto Wastewater Treatment Plant has an existing treatment capacity of 11 MGD. While the City of Rialto's facility has some existing reserve capacity, full build-out of the proposed Lytle Creek Ranch Development Project would require an expansion of the facility.

The City of Rialto's Public Works Department is currently designing an expansion to the existing facility that would increase the capacity of the Wastewater Treatment Plant to 16 MGD. This expansion to the facility, while currently under design, has not yet been presented to the City Council for approval and funding.

Local Service Area Wastewater Treatment Plant

In an effort to reduce the amount of capital improvements required to service the proposed project, including additional treatment capacity, increased lift station pumping capacity, and the upgrading of the collection system transmission mains, the project developer and the City had discussions on the use of a wastewater treatment and water reclamation plant located in the area being served now and the future development to be served.

The Lytle Creek Ranch Project includes an 18 Hole championship golf course which is well suited for storage and turf irrigation with recycled water. The project is also adjacent to several reuse sites including an roofing tile manufacturer, an existing sand and rock mining operation that also has a recycled water TDS Offsets program in final planning stages in cooperation with the operator (CEMEX) who has an existing industrial use for water near the project.

Possible locations for a scalping plant, or plants, would be within the proposed Neighborhood III on the north side of Riverside Avenue at Locust Avenue, at the termination of Oakdale Avenue at the south end of the proposed golf community within Neighborhood II and the Ayala Lift Station at the 210 Freeway.

Plants such as these are typically able to remove up to 75% of the volume of water tributary to the plant assuming that there is a dedicated use for the removed volume. If the maximum reduction could be used for this project the expected flow rate from the project could be reduced from 4.2 MGD to 1.05 MGD. This reduction would be directly proportional at the City's Wastewater Treatment Plant

and would result in a substantial capital improvement reduction at the identified Lift Stations, the sewer collection system, and future expansion of the City's existing wastewater treatment plant.

This evaluation is of a feasibility level but will require an engineering study to be done to fully address all economic benefits of utilizing local service area plant versus the high level of treatment required in the Lytle Creek Basin by the Regional Water Quality Control Board, State Department of Public Health, San Bernardino County Health, and local water purveyor members of the Lytle Creek Water Conservation Association will all have some specific water quality issues to address before allowing the limited recycled water uses in the localized service area.

Feasibility Review

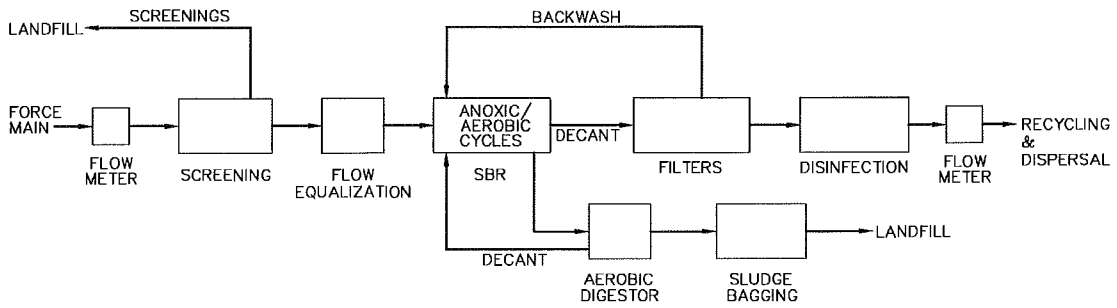
The following options were considered to allow for the local service area sewage flows to be treated and reused in the current and future water service areas. Sources of information are: Process equipment manufacturers and representatives, recent plant comparison projects, and General Engineering Contractors.

Wastewater Treatment Plant

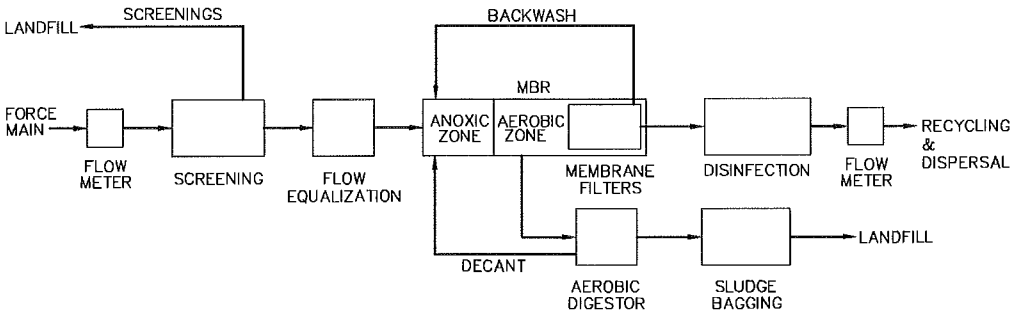
- ✓ 2.2 mgd MBR Membrane Plant Option
- ✓ 2.2 mgd SBR Activated Sludge Plant Option
- ✓ Treatment plant necessary appurtenant systems
- ✓ 2.2 mgd Cannibal Solids Reduction
- ✓ 2.0 mgd Denitrification Filters (RWQCB Requirement)
- ✓ 2.2 mgd Reverse Osmosis (RO) Recycled Water Plant
- ✓ Effluent Wetwell storage and pump station to RW storage and reuse system
- ✓ Brine storage tank handling and discharge to SARI line
- ✓ Onsite Effluent Disinfection by CL_2 Generation
- ✓ Wetwell and 3,000 gpm influent pump station
- ✓ Sewer collection pipe and manholes
- ✓ Site work, concrete, grading, paving, and fencing
- ✓ Electrical, storage, maintenance, and lab & control buildings

LYTLE CREEK RANCH

Wastewater Treatment & Advanced Waste Treatment Facility Alternative



SBR OPTION



MBR OPTION

LYTLE CREEK RANCH

Wastewater Treatment & Advanced Waste Treatment Facility Alternative

Wastewater and Recycled Water Budget Cost Estimate

The budget estimate is for two basic wastewater treatment plant processes which are typical of the wastewater treatment industry today and involve the use of Sequencing Batch Reactor (SBR) an aerated multi tank sequencing method of optimizing wastewater nutrient removal and solids reduction by filling, aerating, resting, and feeding cycles. The other process selected is a submerged membrane system (MBR) that uses aeration anoxic, and submerged hollow membranes to concentrate solids before wasting highly concentrated solids to further solids reduction and eventually dewatering.

Solids reduction in the form of a Siemens Cannibal like the one used at the Lytle Creek WRF Plant is shown as an option if the Rialto sewers are not allowed to receive all biological waste solids.

Denitrification filters are required by the State RWQCB due to the strict Nitrate level restriction of <2.0 mg/L in the Lytle Creek Basin and again like the Lytle Creek North WRF similar technology is being indicated to meet those water quality requirements. Severn Trent units are quoted on as the approved designated method by the State Department of Public Health and the Santa Ana River Basin RWQCB.

Solids dewatering is planned to be done under an annual contract by use of a portable solids dewatering firm once per year unless the City of Rialto accepts all biological waste solids for reduction, treatment, and gas production for co-generation .

The Lytle Creek Basin ambient water quality of total dissolved solids TDS is 260 mg/L and the wastewater plant effluent will likely be above 500 mg/L requiring that the plant effluent for local reuse be either further treated to reduce the TDS to at or below 260 mg/L or the plant would have to be allowed to be a party to a future TDS Offsets program being prepared by the local water purveyors and the County of San Bernardino under State Department of Public Health and RWQCB water quality requirements necessary to protect the Lytle Creek Basin public water supply.

The following table summarizes detailed costs and site size requirements are based on the two major process options (MBR and SBR) as the fixed minimum and variable requirements if the City of Rialto does not accept; wasted biological solids into their sewage collection system; if the plant does not become a party to a local TDS Offsets program approved by the State RWQCB; and if a high percentage of recycled water is not beneficially reused.

Capital plant variable costs are significant and amount to $4.0 to $5.0 million depending wholly on the level of onsite treatment processes that could be required to be permitted under various scenarios and conditions that depend on the ability to utilize existing local sewage collection systems, use of the local golf course for storage, and basin TDS offset mitigation programs.

LYTLE CREEK RANCH

Wastewater Treatment & Advanced Waste Treatment Facility Alternative

Process Option	Estimated Cost $ Million	Site Size Ft2	
Fixed Costs			
MBR Wastewater Treatment Plant	15.5 to 20.0	10,000	Higher technology modern treatment process which has a higher price but significantly smaller footprint.
SBR Wastewater Treatment Plant	14.5 to 19.0	20,000	Current technology used regularly as a secondary treatment process and is lower cost but requires more appurtenant processes and higher land use.
Denitrification Nitrate reduction	.945	5,000	Costs included in each option
Influent Sewage Influent Wetwell 3,000 gpm PS	.563	2,500	Costs included in each option
Control and Electric Buildings 4 @ 900 ft2	1.375	8,000	Costs included in each option
Denite feed storage & 2,000 gpm PS	.250	20,000	Costs included in each option
Plant wide improvements and access ways	1.93	25,000	Costs included in each option
Buffer area		32,000	
Total		102,500 to 112,500	Site requirement 2 to 3 acres
Variable Costs			
Cannibal solids reduction	1.55	20,000	
Reverse Osmosis TDS reduction	1.30	3,000	
Brine storage		1,000	
Recycled water PS and storage 1.5 mg	.840	40,000	
Percolation	.321	25,000	
Total	$4.0 Million adder	89,000 ft2	Additional site required 2 acres

Based on comparisons of recent similar sized treatment plants does indicate that this plant, depending on levels of treatment and ability to utilize local facilities and programs will range between $14.5 and $20.0 million. Healdsburg and Fillmore unique situations and needs for MBR only plus additional other feature not required for the LCR WRP.

Lytle Creek North 2.0 mgd WRP 2007 $15 Million
Bull Head City 2.0 mgd WWTP 2007 $17 Million
Healdsburg 2.0 mgd WRP 2008 $20-30 Million
Fillmore WRP 2.5-6.0 mgd 2008 $30.0 Million

LYTLE CREEK RANCH WWTP WRP ONSITE OPTION REVIEW

	A	B	C	D	E	F	G	H	I
1	**Name: RWC Don Roberson**						**Updated:**	28-Jul-09	
2			**Sequencing Batch Reactor Process Option 1**						
3									
4	**Description**	**Equipment**	**Site Grading**	**Installation**	**Ohead & Supv**	**Profit**	**Total**		
5									
6	Headworks	150,000	20,000	200,000	30,000	30,000	430,000		
7	Influent PS	140,000	95,000	250,000	39,000	39,000	563,000		
8	Grit Removal	75,000		25,000	9,000	5,000	114,000		
9	SBR Process	1,700,000	200,000	2,500,000	200,000	250,000	4,850,000		
10	SBR Effluent Flow EQ Storage & Pumping	200,000	38,000	350,000	28,000	35,000	651,000		
11	Contact Chamber	100,000	50,000	370,000	30,000	40,000	590,000		
12	Cannibal Solids Reduction	1,170,000	37,000	175,000	100,000	70,000	1,552,000		
13	AWT Pump Station	4,884		8,500	1,770	2,125	17,279		
14	Tetra Tertiary Filtration	500,000	70,000	250,000	65,000	60,000	945,000		
15	Reverse Osmosis <tds>	1,000,000		250,000	15,000	25,000	1,290,000		
16	Onsite CL_2 Generation	150,000		75,000	20,000	10,000	255,000		
17	Solids Dewatering	50,000		50,000	1,500	2,000	103,500		
18	Recycled Pump Station & Wetwell	250,000	6,000	300,000	24,000	35,000	615,000		
19	Odor Control	100,000	2,000	40,000	8,000	7,000	157,000		
20	Electrical & Controls (Subs)	400,000	75,000	900,000			1,375,000		
21	Control Bldg. (4 each)	101,556	25,000	150,000	18,000	18,000	312,556		
22	Plant Wide Improvements	850,000	280,000	700,000	35,000	65,000	1,930,000		
23	Percolation Pond	40,000	45,000	200,000	16,000	25,000	326,000		
24	Recycled Storage 1.5 mg	200,000	50,000	500,000	40,000	55,000	845,000		
25	Tax	630,000		320,000			950,000		
26	Job Yard Ohead				200,000		200,000		
27	**Est. Totals**	$7,811,440	$993,000	$7,613,500	$880,270	$773,125	$18,071,335		
28							500,000	Bond	
29							$18,571,335	Total	

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Locust/Riverside Manhole
Ayala/Riverside Ave
Cactus/Country Club/Riverside Ave
Ayala Lift Station
Cactus Lift Station
Lilac Ave Lift Station
Sycamore Lift Station
Muscoy
San Bernardino
Ontario Freeway
North Riverside Avenue
Kendall Drive
Barton Freeway
206
Kimball Avenue
Northpark Blvd
Kimball Avenue
West Highland Avenue
Highland Avenue
Olive Avenue
Citrus Avenue
Sterling Avenue
North State Street
West 30th Street
West 27th Street
West Base Line Road
215
Foothill Boulevard
Image © 2008 DigitalGlobe
© 2008 Tele Atlas
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2006

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Design/Build

City of Lathrop
Waste Water Treatment Plant

Location:	Lathrop, CA
Bid Date:	July 7, 2003
Work Description:	Construction of an entire new Membrane Bio-Reactor (MBR) Treatment Facility, complete with headworks and influent pump station, MBR structure with Anoxic and Aerobic tanks and Chlorine Contact Basin, MBR Equipment and Electrical Building, MBR Aeration Blower Building, Flow Equalization Tank, WAS Storage Tank, Sodium Hypochlorite Storage Facility with Truck Unloading Pad, 11 Million Gallon Effluent Storage Pond, 75' x 175' Sludge Storage Pad, and a Reclaimed Water Pump Station for the treated effluent. Also included is the site piping, site grading and paving, electrical and instrumentation.
Est. Final Contract Amt.	$4,930,000.00
Completion Date:	Current
Owner:	Veolia Formerly (U. S. Filter Operating Services, Inc.) 250 Airside Drive Airside Business Park Moon Township, PA 15108-2793
Owner Contact:	Craig Watkins - Veolia Formerly (U.S. Filter Engineering and Construction) 562-755-2218
Engineer:	U. S. Filter Operating Services, Inc.
KCC Job Number:	0130
KCC Project Manager:	Pat Van Treeck

Design/Build

MORONGO WASTEWATER TREATMENT PLANT

Location:	51950 Seminole Dr. Cabazon, CA
Bid Date:	April 22, 2002
Work Description:	W.M. Lyles Co. is a subcontractor to US Filter to furnish and install a complete and functioning wastewater treatment plant that includes the following: headworks, sequencing batch reactor basins, aerobic digester, control building, standby generator, below grade yard piping and manholes, (5) blowers with support piping, percolation ponds, paving and grading, fencing, complete electrical controls and instrumentation. US Filter furnishes $1.5 million of equipment.
Contract Amount:	$4,146,072
Completion Date:	May-04
Owner:	US Filter 250 Airside Drive Moon Township, PA 15108-2793
Owner Contact:	Craig Watkins - Veolia (562) 755-2218
Design Engineer:	The Holt Group 1561 South 4th Street El Centro, CA 92243
Engineer Contact:	Jack Holt (760) 337-3883
WM Lyles Co. PM:	Dave O'Dear

Design/Build

LYTLE CREEK WASTEWATER TREATMENT PLANT

Location:	18000 Institution Road San Bernardino, CA 92407
Bid Date:	February 27, 2004
Work Description:	Design and construct a new WWTP capable of treating 2 MGD of influent. New facilities to include the following: Influent Pump Station, Headworks and Grit Removal Chamber, Administration Building, Electrical Building, Odor Control Facilities, Sludge Dewatering Facilities, Sedimentation Basins/Oxidation Ditches, Equalization Pond, De-Nitrification Filters, UV Disinfection and Plant Water Pump Station, Recycled Water Storage Ponds, Percolation Ponds, sitework improvements such as: Paving, Fencing and Decorative Rock Landscaping. Upon completion the new facilities are to be fully automated and computer controlled.
Contract Amount:	$14,650,000
Completion Date:	April 28, 2006
Owner:	San Bernardino Co. Special Districts 12402 Industrial Blvd., Bldg. D, Suite 6 Victorville, CA 92395
Owner Contact:	Lytle Development - Don Roberson 949-279-1797
Design Engineer:	PBS & J 18022 Cowan Street, Suite 100A Irvine, CA 92614-6805
Engineer Contact:	Mark Ralph, P.E., DEE 714-750-7275
WM Lyles Co. PM:	Dave O'Dear

United States Environmental Protection Agency
Office of Water Washington, D.C.
EPA 832-F-99-073 September 1999

Wastewater Technology Fact Sheet
Sequencing Batch Reactors

DESCRIPTION

The sequencing batch reactor (SBR) is a fill-and-draw activated sludge system for wastewater treatment. In this system, wastewater is added to a single "batch" reactor, treated to remove undesirable components, and then discharged. Equalization, aeration, and clarification can all be achieved using a single batch reactor. To optimize the performance of the system, two or more batch reactors are used in a predetermined sequence of operations. SBR systems have been successfully used to treat both municipal and industrial wastewater. They are uniquely suited for wastewater treatment applications characterized by low or intermittent flow conditions.

Fill-and-draw batch processes similar to the SBR are not a recent development as commonly thought. Between 1914 and 1920, several full-scale fill-and-draw systems were in operation. Interest in SBRs was revived in the late 1950s and early 1960s, with the development of new equipment and technology. Improvements in aeration devices and controls have allowed SBRs to successfully compete with conventional activated sludge systems.

The unit processes of the SBR and conventional activated sludge systems are the same. A 1983 U.S. EPA report, summarized this by stating that "the SBR is no more than an activated sludge system which operates in time rather than in space." The difference between the two technologies is that the SBR performs equalization, biological treatment, and secondary clarification in a single tank using a timed control sequence. This type of reactor does, in some cases, also perform primary clarification. In a conventional activated sludge system, these unit processes would be accomplished by using separate tanks.

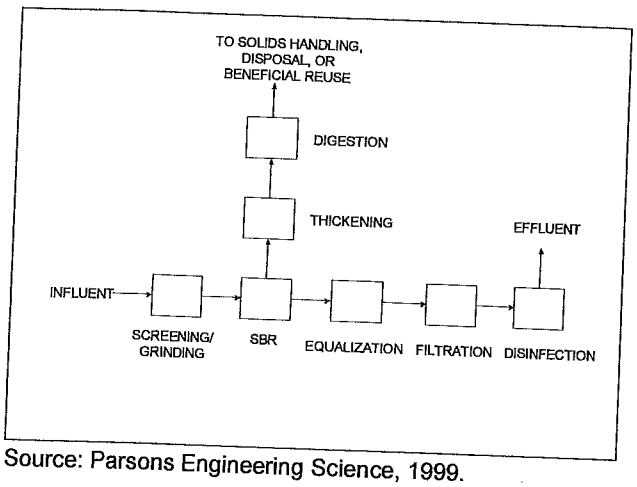
A modified version of the SBR is the Intermittent Cycle Extended Aeration System (ICEAS). In the ICEAS system, influent wastewater flows into the reactor on a continuous basis. As such, this is not a true batch reactor, as is the conventional SBR. A baffle wall may be used in the ICEAS to buffer this continuous inflow. The design configurations of the ICEAS and the SBR are otherwise very similar.

Description of a Wastewater Treatment Plant Using an SBR

A typical process flow schematic for a municipal wastewater treatment plant using an SBR is shown in Figure 1. Influent wastewater generally passes through screens and grit removal prior to the SBR. The wastewater then enters a partially filled reactor, containing biomass, which is acclimated to the wastewater constituents during preceding cycles. Once the reactor is full, it behaves like a conventional activated sludge system, but without a continuous influent or effluent flow. The aeration and mixing is discontinued after the biological reactions are complete, the biomass settles, and the treated supernatant is removed. Excess biomass is wasted at any time during the cycle. Frequent wasting results in holding the mass ratio of influent substrate to biomass nearly constant from cycle to cycle. Continuous flow systems hold the mass ratio of influent substrate to biomass constant by adjusting return activated sludge flowrates continually as influent flowrates, characteristics, and settling tank underflow concentrations vary. After the SBR, the "batch" of wastewater may flow to an equalization basin where the wastewater flowrate to

additional unit processed can be is controlled at a determined rate. In some cases the wastewater is filtered to remove additional solids and then disinfected.

As illustrated in Figure 1, the solids handling system may consist of a thickener and an aerobic digester. With SBRs there is no need for return activated sludge (RAS) pumps and primary sludge (PS) pumps like those associated with conventional activated sludge systems. With the SBR, there is typically only one sludge to handle. The need for gravity thickeners prior to digestion is determined



Source: Parsons Engineering Science, 1999.

FIGURE 1 PROCESS FLOW DIAGRAM FOR A TYPICAL SBR

on a case by case basis depending on the characteristics of the sludge.

An SBR serves as an equalization basin when the vessel is filling with wastewater, enabling the system to tolerate peak flows or peak loads in the influent and to equalize them in the batch reactor. In many conventional activated sludge systems, separate equalization is needed to protects the biological system from peak flows, which may wash out the biomass, or peak loads, which may upset the treatment process.

It should also be noted that primary clarifiers are typically not required for municipal wastewater applications prior to an SBR. In most conventional activated sludge wastewater treatment plants, primary clarifiers are used prior to the biological system. However, primary clarifiers may be recommended by the SBR manufacturer if the total suspended solids (TSS) or biochemical oxygen demand (BOD) are greater than 400 to 500 mg/L. Historic data should be evaluated and the SBR manufacturer consulted to determine whether primary clarifiers or equalization are recommended prior to an SBR for municipal and industrial applications.

Equalization may be required after the SBR, depending on the downstream process. If equalization is *not* used prior to filtration, the filters need to be sized in order to receive the batch of wastewater from the SBR, resulting in a large surface area required for filtration. Sizing filters to accept these "batch" flows is usually not feasible, which is why equalization is used between an SBR and downstream filtration. Separate equalization following the biological system is generally not required for most conventional activated sludge systems, because the flow is on a continuous and more constant basis.

APPLICABILITY

SBRs are typically used at flowrates of 5 MGD or less. The more sophisticated operation required at larger SBR plants tends to discourage the use of these plants for large flowrates.

As these systems have a relatively small footprint, they are useful for areas where the available land is limited. In addition, cycles within the system can be easily modified for nutrient removal in the future, if it becomes necessary. This makes SBRs extremely flexible to adapt to regulatory changes for effluent parameters such as nutrient removal. SBRs are also very cost effective if treatment beyond biological treatment is required, such as filtration.

ADVANTAGES AND DISADVANTAGES

Some advantages and disadvantages of SBRs are listed below:

Advantages

- Equalization, primary clarification (in most cases), biological treatment, and secondary clarification can be achieved in a single reactor vessel.
- Operating flexibility and control.
- Minimal footprint.
- Potential capital cost savings by eliminating clarifiers and other equipment.

Disadvantages

- A higher level of sophistication is required (compared to conventional systems), especially for larger systems, of timing units and controls.
- Higher level of maintenance (compared to conventional systems) associated with more sophisticated controls, automated switches, and automated valves.
- Potential of discharging floating or settled sludge during the DRAW or decant phase with some SBR configurations.
- Potential plugging of aeration devices during selected operating cycles, depending on the aeration system used by the manufacturer.
- Potential requirement for equalization after the SBR, depending on the downstream processes.

DESIGN CRITERIA

For any wastewater treatment plant design, the first step is to determine the anticipated influent characteristics of the wastewater and the effluent requirements for the proposed system. These influent parameters typically include design flow, maximum daily flow BOD_5, TSS, pH, alkalinity, wastewater temperature, total Kjeldahl nitrogen (TKN), ammonia-nitrogen (NH_3-N), and total phosphorus (TP). For industrial and domestic wastewater, other site specific parameters may also be required.

The state regulatory agency should be contacted to determine the effluent requirements of the proposed plant. These effluent discharge parameters will be dictated by the state in the National Pollutant Discharge Elimination System (NPDES) permit. The parameters typically permitted for municipal systems are flowrate, BOD_5, TSS, and Fecal Coliform. In addition, many states are moving toward requiring nutrient removal. Therefore, total nitrogen (TN), TKN, NH_3-N, or TP may also be required. It is imperative to establish effluent requirements because they will impact the operating sequence of the SBR. For example, if there is a nutrient requirement and NH_3-N or TKN is required, then nitrification will be necessary. If there is a TN limit, then nitrification and denitrification will be necessary.

Once the influent and effluent characteristics of the system are determined, the engineer will typically consult SBR manufacturers for a recommended design. Based on these parameters, and other site specific parameters such as temperature, key design parameters are selected for the system. An example of these parameters for a wastewater system loading is listed in Table 1.

TABLE 1 KEY DESIGN PARAMETERS FOR A CONVENTIONAL LOAD

	Municipal	Industrial
Food to Mass (F:M)	0.15 - 0.4/day	0.15 - 0.6/day
Treatment Cycle Duration	4.0 hours	4.0 - 24 hours
Typically Low Water Level Mixed Liquor Suspended Solids	2,000-2,500 mg/L	2,000 - 4,000 mg/L
Hydraulic Retention Time	6 - 14 hours	varies

Source: AquaSBR Design Manual, 1995.

Once the key design parameters are determined, the number of cycles per day, number of basins, decant volume, reactor size, and detention times can be calculated. Additionally, the aeration equipment, decanter, and associated piping can then be sized.

Other site specific information is needed to size the aeration equipment, such as site elevation above mean sea level, wastewater temperature, and total dissolved solids concentration.

The operation of an SBR is based on the fill-and-draw principle, which consists of the following five basic steps: Idle, Fill, React, Settle, and Draw. More than one operating strategy is possible during most of these steps. For industrial wastewater applications, treatability studies are typically required to determine the optimum operating sequence. For most municipal wastewater treatment plants, treatability studies are not required to determine the operating sequence because municipal wastewater flowrates and characteristic variations are usually predictable and most municipal designers will follow conservative design approaches.

The Idle step occurs between the Draw and the Fill steps, during which treated effluent is removed and influent wastewater is added. The length of the Idle step varies depending on the influent flowrate and the operating strategy. Equalization is achieved during this step if variable idle times are used. Mixing to condition the biomass and sludge wasting can also be performed during the Idle step, depending on the operating strategy.

Influent wastewater is added to the reactor during the Fill step. The following three variations are used for the Fill step and any or all of them may be used depending on the operating strategy: static fill, mixed fill, and aerated fill. During static fill, influent wastewater is added to the biomass already present in the SBR. Static fill is characterized by no mixing or aeration, meaning that there will be a high substrate (food) concentration when mixing begins. A high food to microorganisms (F:M) ratio creates an environment favorable to floc forming organisms versus filamentous organisms, which provides good settling characteristics for the sludge. Additionally, static fill conditions favor organisms that produce internal storage products during high substrate conditions, a requirement for biological phosphorus removal. Static fill may be compared to using "selector" compartments in a conventional activated sludge system to control the F:M ratio.

Mixed fill is classified by mixing influent organics with the biomass, which initiates biological reactions. During mixed fill, bacteria biologically degrade the organics and use residual oxygen or alternative electron acceptors, such as nitrate-nitrogen. In this environment, denitrification may occur under these anoxic conditions. Denitrification is the biological conversion of nitrate-nitrogen to nitrogen gas. An anoxic condition is defined as an environment in which oxygen is not present and nitrate-nitrogen is used by the microorganisms as the electron acceptor. In a conventional biological nutrient removal (BNR) activated sludge system, mixed fill is comparable to the anoxic zone which is used for denitrification. Anaerobic conditions can also be achieved during the mixed fill phase. After the microorganisms use the nitrate-nitrogen, sulfate becomes the electron acceptor. Anaerobic conditions are characterized by the lack of oxygen and sulfate as the electron acceptor.

Aerated Fill is classified by aerating the contents of the reactor to begin the aerobic reactions completed in the React step. Aerated Fill can reduce the aeration time required in the React step.

The biological reactions are completed in the React step, in which mixed react and aerated react modes are available. During aerated react, the aerobic reactions initialized during aerated fill are completed and nitrification can be achieved. Nitrification is the conversion of ammonia-nitrogen to nitrite-nitrogen and ultimately to nitrate-nitrogen. If the mixed react mode is selected, anoxic conditions can be attained to achieve denitrification. Anaerobic conditions can also be achieved in the mixed react mode for phosphorus removal.

Settle is typically provided under quiescent conditions in the SBR. In some cases, gentle mixing during the initial stages of settling may result in a clearer effluent and a more concentrated settled sludge. In an SBR, there are no influent or effluent currents to interfere with the settling process as in a conventional activated sludge system.

The Draw step uses a decanter to remove the treated effluent, which is the primary distinguishing factor between different SBR manufacturers. In general, there are floating decanters and fixed

decanters. Floating decanters offer several advantages over fixed decanters as described in the Tank and Equipment Description Section.

Construction

Construction of SBR systems can typically require a smaller footprint than conventional activated sludge systems because the SBR often eliminates the need for primary clarifiers. The SBR never requires secondary clarifiers. The size of the SBR tanks themselves will be site specific, however the SBR system is advantageous if space is limited at the proposed site. A few case studies are presented in Table 2 to provide general sizing estimates at different flowrates. Sizing of these systems is site specific and these case studies do not reflect every system at that size.

TABLE 2 CASE STUDIES FOR SEVERAL SBR INSTALLATIONS

Flow	Reactors			Blowers	
(MGD)	No.	Size (feet)	Volume (MG)	No.	Size (HP)
0.012	1	18 x 12	0.021	1	15
0.10	2	24 x 24	0.069	3	7.5
1.2	2	80 x 80	0.908	3	125
1.0	2	58 x 58	0.479	3	40
1.4	2	69 x 69	0.678	3	60
1.46	2	78 x 78	0.910	4	40
2.0	2	82 x 82	0.958	3	75
4.25	4	104 x 80	1.556	5	200
5.2	4	87 x 87	1.359	5	125

Note: These case studies and sizing estimates were provided by Aqua-Aerobic Systems, Inc. and are site specific to individual treatment systems.

The actual construction of the SBR tank and equipment may be comparable or simpler than a conventional activated sludge system. For Biological Nutrient Removal (BNR) plants, an SBR eliminates the need for return activated sludge (RAS) pumps and pipes. It may also eliminate the need for internal Mixed Liquor Suspended Solid (MLSS) recirculation, if this is being used in a conventional BNR system to return nitrate-nitrogen.

The control system of an SBR operation is more complex than a conventional activated sludge system and includes automatic switches, automatic valves, and instrumentation. These controls are very sophisticated in larger systems. The SBR manufacturers indicate that most SBR installations in the United States are used for smaller wastewater systems of less than two million gallons per day (MGD) and some references recommend SBRs only for small communities where land is limited. This is not always the case, however, as the largest SBR in the world is currently a 10 MGD system in the United Arab Emirates.

Tank and Equipment Description

The SBR system consists of a tank, aeration and mixing equipment, a decanter, and a control system. The central features of the SBR system include the control unit and the automatic switches and valves that sequence and time the different operations. SBR manufacturers should be consulted for recommendations on tanks and equipment. It is typical to use a complete SBR system recommended and supplied by a single SBR manufacturer. It is possible, however, for an engineer to design an SBR system, as all required tanks, equipment, and controls are available through different manufacturers. This is not typical of SBR installation because of the level of sophistication of the instrumentation and controls associated with these systems.

The SBR tank is typically constructed with steel or concrete. For industrial applications, steel tanks coated for corrosion control are most common while concrete tanks are the most common for municipal treatment of domestic wastewater. For mixing and aeration, jet aeration systems are typical as they allow mixing either with or without aeration, but other aeration and mixing systems are also used. Positive displacement blowers are typically used for SBR design to handle wastewater level variations in the reactor.

As previously mentioned, the decanter is the primary piece of equipment that distinguishes different SBR manufacturers. Types of decanters include floating and fixed. Floating decanters offer the advantage of maintaining the inlet orifice slightly

below the water surface to minimize the removal of solids in the effluent removed during the DRAW step. Floating decanters also offer the operating flexibility to vary fill-and-draw volumes. Fixed decanters are built into the side of the basin and can be used if the Settle step is extended. Extending the Settle step minimizes the chance that solids in the wastewater will float over the fixed decanter. In some cases, fixed decanters are less expensive and can be designed to allow the operator to lower or raise the level of the decanter. Fixed decanters do not offer the operating flexibility of the floating decanters.

Health and Safety

Safety should be the primary concern in every design and system operation. A properly designed and operated system will minimize potential health and safety concerns. Manuals such as the Manual of Practice (MOP) No. 8, Design of Municipal Wastewater Treatment Plants, and MOP No. 11, Operation of Municipal Wastewater Treatment Plants should be consulted to minimize these risks. Other appropriate industrial wastewater treatment manuals, federal regulations, and state regulations should also be consulted for the design and operation of wastewater treatment systems.

PERFORMANCE

The performance of SBRs is typically comparable to conventional activated sludge systems and depends on system design and site specific criteria. Depending on their mode of operation, SBRs can achieve good BOD and nutrient removal. For SBRs, the BOD removal efficiency is generally 85 to 95 percent.

SBR manufacturers will typically provide a process guarantee to produce an effluent of less than:

- 10 mg/L BOD
- 10 mg/L TSS
- 5 - 8 mg/L TN
- 1 - 2 mg/L TP

OPERATION AND MAINTENANCE

The SBR typically eliminates the need for separate primary and secondary clarifiers in most municipal systems, which reduces operations and maintenance requirements. In addition, RAS pumps are not required. In conventional biological nutrient removal systems, anoxic basins, anoxic zone mixers, toxic basins, toxic basin aeration equipment, and internal MLSS nitrate-nitrogen recirculation pumps may be necessary. With the SBR, this can be accomplished in one reactor using aeration/mixing equipment, which will minimize operation and maintenance requirements otherwise be needed for clarifiers and pumps.

Since the heart of the SBR system is the controls, automatic valves, and automatic switches, these systems may require more maintenance than a conventional activated sludge system. An increased level of sophistication usually equates to more items that can fail or require maintenance. The level of sophistication may be very advanced in larger SBR wastewater treatment plants requiring a higher level of maintenance on the automatic valves and switches.

Significant operating flexibility is associated with SBR systems. An SBR can be set up to simulate any conventional activated sludge process, including BNR systems. For example, holding times in the Aerated React mode of an SBR can be varied to achieve simulation of a contact stabilization system with a typical hydraulic retention time (HRT) of 3.5 to 7 hours or, on the other end of the spectrum, an extended aeration treatment system with a typical HRT of 18 to 36 hours. For a BNR plant, the aerated react mode (oxic conditions) and the mixed react modes (anoxic conditions) can be alternated to achieve nitrification and denitrification. The mixed fill mode and mixed react mode can be used to achieve denitrification using anoxic conditions. In addition, these modes can ultimately be used to achieve an anaerobic condition where phosphorus removal can occur. Conventional activated sludge systems typically require additional tank volume to achieve such flexibility. SBRs operate in time rather than in space and the number of cycles per day can be varied to control desired effluent limits, offering additional flexibility with an SBR.

COSTS

This section includes some general guidelines as well as some general cost estimates for planning purposes. It should be remembered that capital and construction cost estimates are site-specific.

Budget level cost estimates presented in Table 3 are based on projects that occurred from 1995 to 1998. Budget level costs include such as the blowers, diffusers, electrically operated valves, mixers, sludge pumps, decanters, and the control panel. All costs have been updated to March 1998 costs, using an ENR construction cost index of 5875 from the March 1998 Engineering News Record, rounded off to the nearest thousand dollars.

TABLE 3 SBR EQUIPMENT COSTS BASED ON DIFFERENT PROJECTS

Design Flowrate (MGD)	Budget Level Equipment Costs ($)
0.012	94,000
0.015	137,000
1.0	339,000
1.4	405,000
1.46	405,000
2.0	564,000
4.25	1,170,000

Source: Aqua Aerobics Manufacturer Information, 1998.

In Table 4, provided a range of equipment costs for different design flowrates is provided.

TABLE 4 BUDGET LEVEL EQUIPMENT COSTS BASED ON DIFFERENT FLOW RATES

Design Flowrate (MGD)	Budget Level Equipment Costs ($)
1	150,000 - 350,000
5	459,000 - 730,000
10	1,089,000 - 1,370,000
15	2,200,000
20	2,100,000 - 3,000,000

Note: Budget level cost estimates provided by Babcock King - Wilkinson, L.P., August 1998.

Again the equipment cost items provided do not include the cost for the tanks, sitework, excavation/backfill, installation, contractor's overhead and profit, or legal, administrative, contingency, and engineering services. These items must be included to calculate the overall construction costs of an SBR system. Costs for other treatment processes, such as screening, equalization, filtration, disinfection, or aerobic digestion, may be included if required.

The ranges of construction costs for a complete, installed SBR wastewater treatment system are presented in Table 5. The variances in the estimates are due to the type of sludge handling facilities and the differences in newly constructed plants versus systems that use existing plant facilities. As such, in some cases these estimates include other processes required in an SBR wastewater treatment plant.

TABLE 5 INSTALLED COST PER GALLON OF WASTEWATER TREATED

Design Flowrate (MGD)	Budget Level Equipment Cost ($/gallon)
0.5 - 1.0	1.96 - 5.00
1.1 - 1.5	1.83 - 2.69
1.5 - 2.0	1.65 - 3.29

Note: Installed cost estimates obtained from Aqua-Aerobics Systems, Inc., August 1998.

There is typically an economy of scale associated with construction costs for wastewater treatment,

meaning that larger treatment plants can usually be constructed at a lower cost per gallon than smaller systems. The use of common wall construction for larger treatment systems, which can be used for square or rectangular SBR reactors, results in this economy of scale.

Operations and Maintenance (O&M) costs associated with an SBR system may be similar to a conventional activated sludge system. Typical cost items associated with wastewater treatment systems include labor, overhead, supplies, maintenance, operating administration, utilities, chemicals, safety and training, laboratory testing, and solids handling. Labor and maintenance requirements may be reduced in SBRs because clarifiers, clarification equipment, and RAS pumps may not be necessary. On the other hand, the maintenance requirements for the automatic valves and switches that control the sequencing may be more intensive than for a conventional activated sludge system. O&M costs are site specific and may range from $800 to $2,000 dollars per million gallons treated.

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12. U.S. EPA. EPA Design Manual, Summary Report *Sequencing Batch Reactors*. EPA/625/8-86/011, August 1986.

13. Manual of Practice (MOP) No. 8, Design of Municipal Wastewater Treatment Plants,

14. Manual of Practice (MOP) No. 11, Operation of Municipal Wastewater Treatment Plants.

ADDITIONAL INFORMATION

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Blountstown, FL 32424

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OWM MTB
Excellence in compliance through optimal technical solutions
MUNICIPAL TECHNOLOGY BRANCH

PROCESS DESCRIPTION

The membrane operating system (MOS) for the Healdsburg wastewater treatment plant consists of a five parallel membrane tanks with a common overflow weir. The following gives a brief background into the design and configuration of the Healdsburg membrane bioreactors (MBR) system. The MOS design has been based on the following conditions:

Average Daily Flow: 1.6 mgd
Maximum Capacity: 4.0 mgd (this peak can be up to two weeks in duration with the winter storm season)

The system uses membrane modules with a surface area of 404 sq.ft. Each module contains thousands of hollow fibers made of chlorine resistant polyvinylidene fluoride (PVDF) material with a nominal pore size of 0.04 micron.

The MOS includes five membrane tanks for the 4.0 mgd capacity, each equipped with:

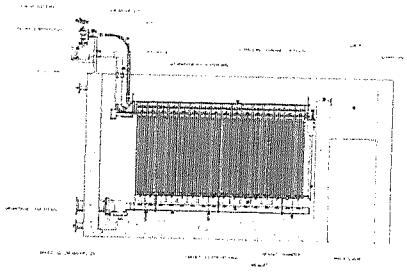
- 144 modules in 9 racks of 16 modules
- Each cell can accommodate up to 160 modules in 10 racks to provide room for 11% excess membrane area
- Total effective area per membrane tank is 58,176 sq.ft.

The system will operate based the levels in the biological tank, the filtrate pump variable frequency drive will adjust proportionally to the operating band in the biological tanks. As such, flux rate of each membrane tank will vary because of the variation in influent flow. However, for the design flows, the system will have operating instantaneous flux rates as follows:

Average Daily Flow
- 3 units in service, 2 in standby: 11.2 gfd (19.1 lmh) @ 20°C
- 4 units in service, 1 in standby: 8.4 gfd (14.3 lmh) @ 20°C

Peak Daily Flow
- 4 units in service, 1 in standby: 21.6 gfd (36.7 lmh) @ 20°C
- 5 units in service, 0 in standby: 17.3 gfd (29.4 lmh) @ 20°C

System Description
The mixed liquor (ML) is drawn from the biological system and pumped into one of the membrane tanks, approximately five times the average flow. Once the ML enters the membrane tank. it is directed into a ML feed manifold and lateral system. As the ML exits the jet manifold, air is introduced into the base of the module where it mixes with the ML.



This two-phase stream flow up around the modules scouring the membrane fibers as it passes. The concentrated return ML overflow the tank weir into a common trough before returning to the biological system, typically with dissolved oxygen concentration of between 5 and 7mg/L.

A single filtrate pump is provided for each membrane tank which applies a vacuum or suction pressure for filtration, typically between 0.5 psi and 8 psi. The filtrate produced from each membrane tank is combined after each filtrate pump and is directed downstream for further treatment.

To promote enhanced membrane life and minimal operational costs, the MemJet® system is designed to carefully manage the environment around the membrane. The environment is optimized in the following ways:

- Combined ML and air jet injection into the membrane module base, to reduce membrane dehydration and solids accumulation.
- Two-phase ML and air injection eliminates mal-distribution effects and solids polarization, commonly seen in overflow and continuous bleed systems.

During a membrane filtration process, membranes will gradually accumulate a filter cake and inorganic and organic foulants on the membrane surface increasing the amount of suction pressure required to produce a certain flow rate. To keep this change of pressure to a minimum, three major cleaning techniques are used at the facility: relaxation, maintenance clean, and clean in place.

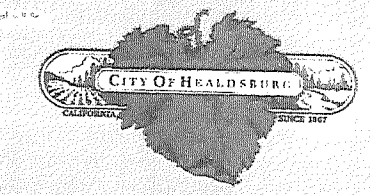
The Healdsburg Wastewater Treatment Plant Story

As a result of a U.S. Court decision, the City of Healdsburg was ordered to construct an advanced wastewater treatment facility. The plant will have a design average dry weather flow of 1.4 mgd with a sustained peak of 4 mgd. The City and HDR (consultant) investigated two options: conventional BNR plant and MBR with Cannibal® solids processing. The MBR/Cannibal® process was selected as having the lowest present worth cost. MBR treatment uses Siemens membranes and disinfection is provided by low pressure, high intensity UV lamps. The Healdsburg facility is one of the most advanced and innovative treatment facilities in California. Ultimately, virtually all plant effluent will be reclaimed for full, unrestricted reuse. The Cannibal® process is guaranteed to produce 0.15 pounds of biological solids (excluding inerts) per pound of BOD removed, compared to a normal biosolids yield of 0.4 to 0.55. Bids were received in June 2006, and Overaa & Co. of Richmond, California, was awarded the contract for $29.35 million.

Project Information Contacts

City of Healdsburg	HDR	SIEMENS
Jim Flugum, PE	Craig Olson, PE	Victoria Kippax, PE
(707) 431-3369	(916) 817-4700	(262) 521-8487

CITY OF HEALDSBURG MEMBRANE WASTEWATER TREATMENT FACILITY



Facility Cost: $30 million

SIEMENS HDR

PROCESS EQUIPMENT DESIGN CRITERIA

INFLUENT WASTEWATER FLOWS

Average Day	1.6 mgd
Peak Hour	4.0 mgd

HEADWORKS

Coarse Screens

Number	2
Type	WedgeSection
Capacity	7.5 mgd (each)
Opening Size	0.25 Inches

Grit Basin

Number	1
Type	Forced Vortex
Capacity	10 mgd

Fine Screens

Number	2
Type	Ultra-Fine
Capacity	4.0 mgd (each)
Opening Size	1 mm

BIOLOGICAL AND AERATION FACILITY

Aeration Basin Structure

Number of Trains	2
Number of Basins	2
Capacity	350,000 Gallons
Total Capacity	700,000 Gallons

Denitrification

Number of Trains	2
Number of Basins	4
Total Capacity	520,000 Gallons

Mixers

Number	8

Membrane Feed (Mixed Liquor) Pumps

Number	6
Type	Submersible Non-Clog
Capacity	3,000 gpm @ 25 Ft

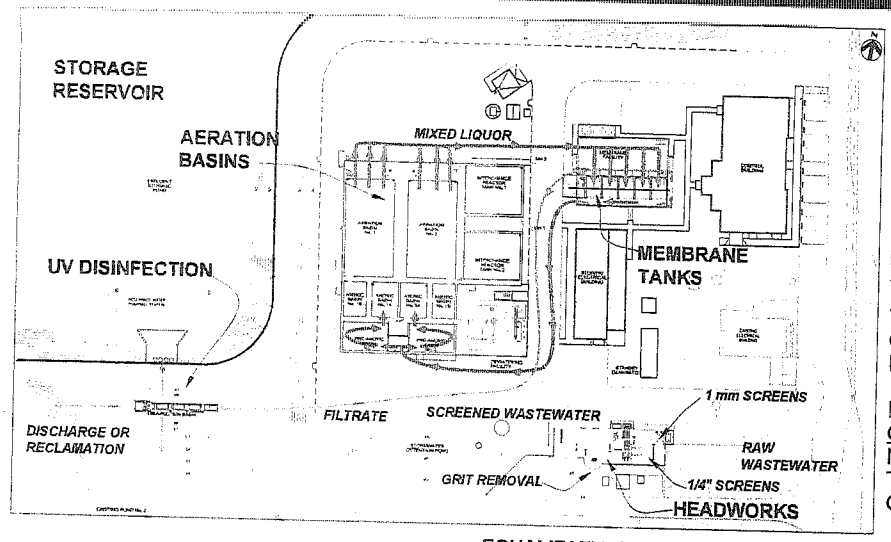
MEMBRANE FACILITY

Membrane Tanks

Number	5

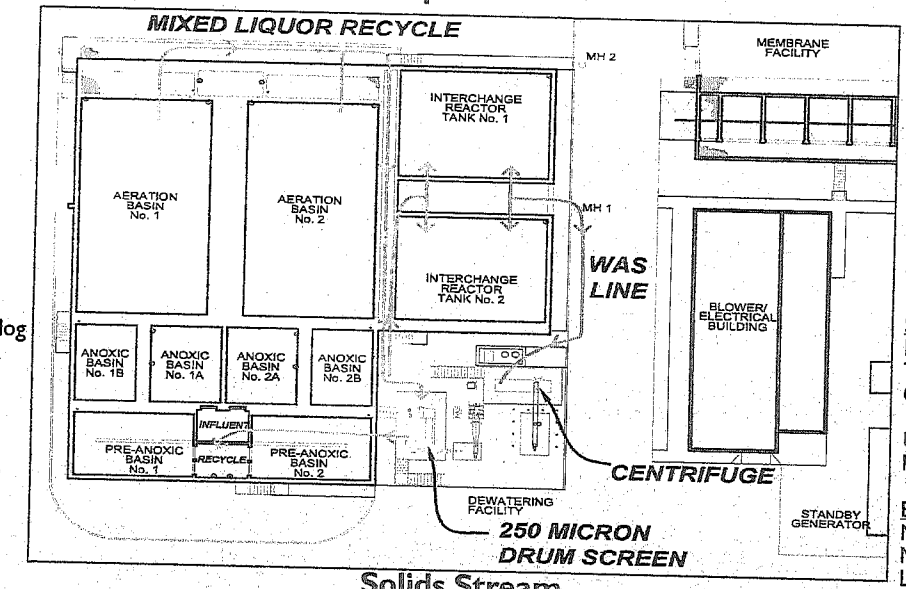
Membrane CIP Chemical Pumps

Number	2
Type	Gear
Capacity	500 gph, 1,000 gph



EQUALIZATION STORAGE

Liquid Stream



Solids Stream

MEMBRANE FACILITY

Filtrate Pump

Number	5
Type	Rotary Lobe
Horsepower	20
Capacity	3,000 gpm @ 20 Ft
Drive	Variable

BLOWER BUILDING

Aeration Basins and Interchange Reactor Tanks Air Supply Blowers

Number	4
Type	Multi-Stage Centrifugal
Capacity	2,100 scfm @ 100° F
Horsepower	150

DEWATERING FACILITY

Centrifuge

Number	1
Type	High Solids Dewatering
Capacity Average	75 gpm
Maximum	100 gpm

Rotary Drum Screen (for Cannibal® System)

Number	1
Length (approx)	164 Inches
Width (approx)	95 Inches
Opening Size	250 Micron

INTERCHANGE REACTOR TANKS (CANNIBAL®)

Tanks

Number of Tanks	2
Total Capacity	216,800 Gallons

Mixers

Number of Tanks	2
Type	Propeller

Sludge Feed Pump

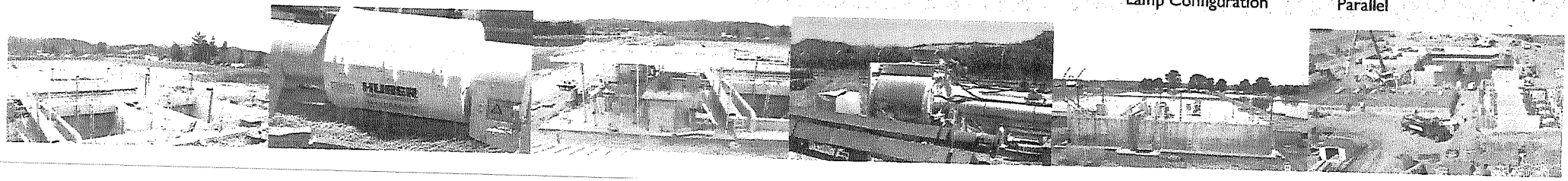
Number	1
Type	Progressive Cavity
Capacity	150 gpm @ 20 psi

ULTRAVIOLET (UV) DISINFECTION

Number	1

Banks

Number	3
Modules per Bank	8
Lamp Type	Low Pressure, High Intensity
Lamp Configuration	Parallel



6. Evaluation of Wastewater Treatment Alternatives

The wastewater treatment selection is closely related to the effluent management strategy. After initial screening of wastewater treatment plant processes, two factors arose that limited the treatment plant alternatives. First, the Hollister City Council along with other stakeholders decided that the City has a long-term goal of maximizing the use of recycled water from the treatment plant. Because of this filtration and disinfection to meet Title 22 recycled water requirements are necessary of all of the treatment plant alternatives. Second, through correspondence with the Regional Water Quality Control Board (**Appendix F**) it became clear that any effluent strategy that continued to rely on percolation would result in strict effluent limitations on nitrates. With this in mind, only processes including nitrification and denitrification were considered for further investigation. The following treatment alternatives were assessed:

- Extended Aeration System
- Oxidation Ditch
- Immersed Membrane Bioreactor (MBR)
- Sequencing Batch Reactor

Various treatment designs are possible and process selection involves consideration of many factors, including:

- wastewater effluent management
- wastewater strength
- process reliability
- operational requirements
- treatment flexibility
- available space
- solid waste disposal
- nuisance odor
- visual aesthetics
- capital and operating costs
- discharge standards
- ease or difficulty of permitting

Of the factors identified above, the method of wastewater effluent management and the restrictions imposed therein will have the greatest effect on the type of treatment required. Wastewater treatment plants in the State must be permitted by the State. WDRs and operating criteria are imposed on these plants through their permits. Depending on each plant's individual permit, design of a WWTP will be

directed at meeting its specific discharge requirements and different unit processes will be assembled to achieve that goal.

This Section discusses alternative wastewater treatment conceptual design for upgrading the DWTP and summarizes the factors influencing their design and implementation. It is organized into the following subsections:

- Design Considerations
- Design Criteria
- Wastewater Treatment Alternatives
- Estimated Cost

6.1. Long-Term Wastewater Treatment Design Considerations

Design of the WWTP must balance the technical requirements of providing adequate and reliable treatment performance with more intangible factors that can affect which alternative design is selected. At a minimum, such factors include consideration of site limitations and good neighbor features that affect how the facility is perceived by the surrounding community.

6.1.1. Site Constraints

Evaluation of alternative treatment modifications and upgrades to increase the DWTP capacity must take into account inherent site constraints. Potential limitations arising from physical size, site geology, topography, and institutional issues are considered in the analysis. Based on a preliminary review of the existing site, the following potential site constraints were identified:

- limited hydraulic head due to the generally flat terrain at the DWTP,
- increased design requirements and construction efforts on new structures to offset the effects of the high groundwater level,
- limited expansion opportunities beyond the existing 50-acre treatment pond area, and
- construction limitations on work in close proximity to Highway 156.

6.1.2. Good Neighbor Factors

The DWTP is located on the outskirts of the City, but is locally situated among commercial, agricultural, and residential development. It is also adjacent to Highway 156, which experiences heavy vehicular traffic. Due to the close proximity to generally populated areas, any alternative evaluation will consider factors that could influence how the DWTP is perceived by the public during both operation and construction. In turn, this evaluation will also consider potential impacts on the health and well-being of operations staff. At a minimum, good neighbor factors will include potential issues over visual aesthetics, noise, and air quality.

Aesthetic Issues. Aesthetic issues pertaining to possible new on-site and off-site facilities will be incorporated in the alternative evaluation. In addition to the architectural appearance of structures, the aesthetic influence of exposed pipes, pumps, maintenance vehicles, and other equipment visible to passersby will also be considered. Consideration will be given to the impacts of any possible nighttime activities that could produce additional illumination to the surrounding area. Control on operational hours and/or the use of focused, directional lighting could be considered to minimize nighttime lighting disturbance.

Noise Level Concerns. Excessive noise possibly resulting from construction, routine operation, and traffic will be considered in any alternative evaluation. Identified nuisance noise will either be eliminated or mitigated to minimize public disturbance from wastewater operations and/or construction. Noise impact on operations personnel will also be considered and minimized through proper specification of equipment and sound-adsorbing enclosures or isolation. Maximum noise levels for working areas will meet California Occupational Safety and Health Administration (Cal-OSHA) requirements.

Air Quality Concerns. Wastewater treatment plants can be sources of odor, chemical emissions, particulates, and aerosols, all of which must be controlled. Air quality concerns that pose a risk to human health are addressed by the Federal Clean Air Act and locally controlled by the Regional Air Quality Control Board. Proposed alternatives will meet state and federal air quality requirements through containment and/or treatment of potentially harmful emissions releases. Aerosols and particulates from plant operations and construction will be further minimized.

Strong nuisance odors from wastewater treatment and discharge will be considered and mitigated with any alternative evaluation. The City has received odor complaints in the past, particularly when the treatment ponds turn. Consequently, alternative processes will include provisions to minimize odor concerns through the use of an odor control process, which, at a minimum, could include the following:

- Selection of low-odor solids-handling processes;
- installation of biofilters or scrubbers for foul air streams;
- dilution with odor-free gases;
- containment through the use of enclosures;
- use of masking agents; and
- chemical oxidation and precipitation of odor-causing compounds in the wastewater.

6.2. Design Criteria

Specific process goals for preliminary design of each WWTP alternative are discussed in this Section. The following is a summary of the criteria, which were based on the regulatory and environmental requirements and input from the City:

- Processes should minimize potential for odors.
- Processes should minimize noise levels during construction and during normal operation.
- Sludge dewatering/handling facilities should be utilized.
- Processes should have long solids retention time (SRT) to produce stabilized sludge suitable for on-site sludge stabilization basins (SSBs).
- Nitrogen removal is required to meet more stringent TN and/or nitrate limits.
- Algae removal may be required to reduce solids loading to the percolation beds.
- Where appropriate and practical, WWTP designs should take advantage of existing site topography and facilities.
- Plant footprints should fit within the boundaries of the existing DWTP, particularly on the space currently occupied by the primary and stabilization ponds.

6.3. Wastewater Treatment Alternatives

Four alternative wastewater treatment processes were considered for evaluation: (1) the extended aeration system, (2) an oxidation ditch, (3) immersed membrane bioreactors (MBR) and (4) sequencing batch reactors (4). These processes are representative of treatment processes capable of meeting the effluent limitations anticipated for the upgraded DWTP. Process and operational design parameters for each treatment alternative are summarized in **Table 6-1**. This Section describes the wastewater treatment processes evaluated in the LTWMP and presents preliminary design information on each alternative. Each treatment alternative was selected and developed to achieve specific goals consistent with and appropriate to the specific discharge point and scenario condition.

Table 6-1: Process and Operational Design Parameters for Treatment Alternatives

Process	Mean Cell Residence Time (MCRT) (day)	F:M (lb BOD/ lb MLVSS/day)	MLSS (mg/L)	HDT (hour)
1. Extended Aeration	20–40	0.04–0.10	2,000–5,000	20–30
2. Oxidation Ditch	15–30	0.04–0.10	3,000–5,000	15–30
3. MBR	10-30	0.05–0.40	8,000–20,000	8-20
4. SBR	10–30	0.04–0.10	2,000–5,000	15-40

6.3.1. Process Alternative 1—Extended Aeration System

Extended aeration systems are biological treatment processes that provide BOD removal and nitrification through lined aeration basins. Surface aerators or more efficient oxygen delivery systems, such as diffusers arrayed along the basin floor, can be utilize to enhance oxygen transfer efficiency (OTE).

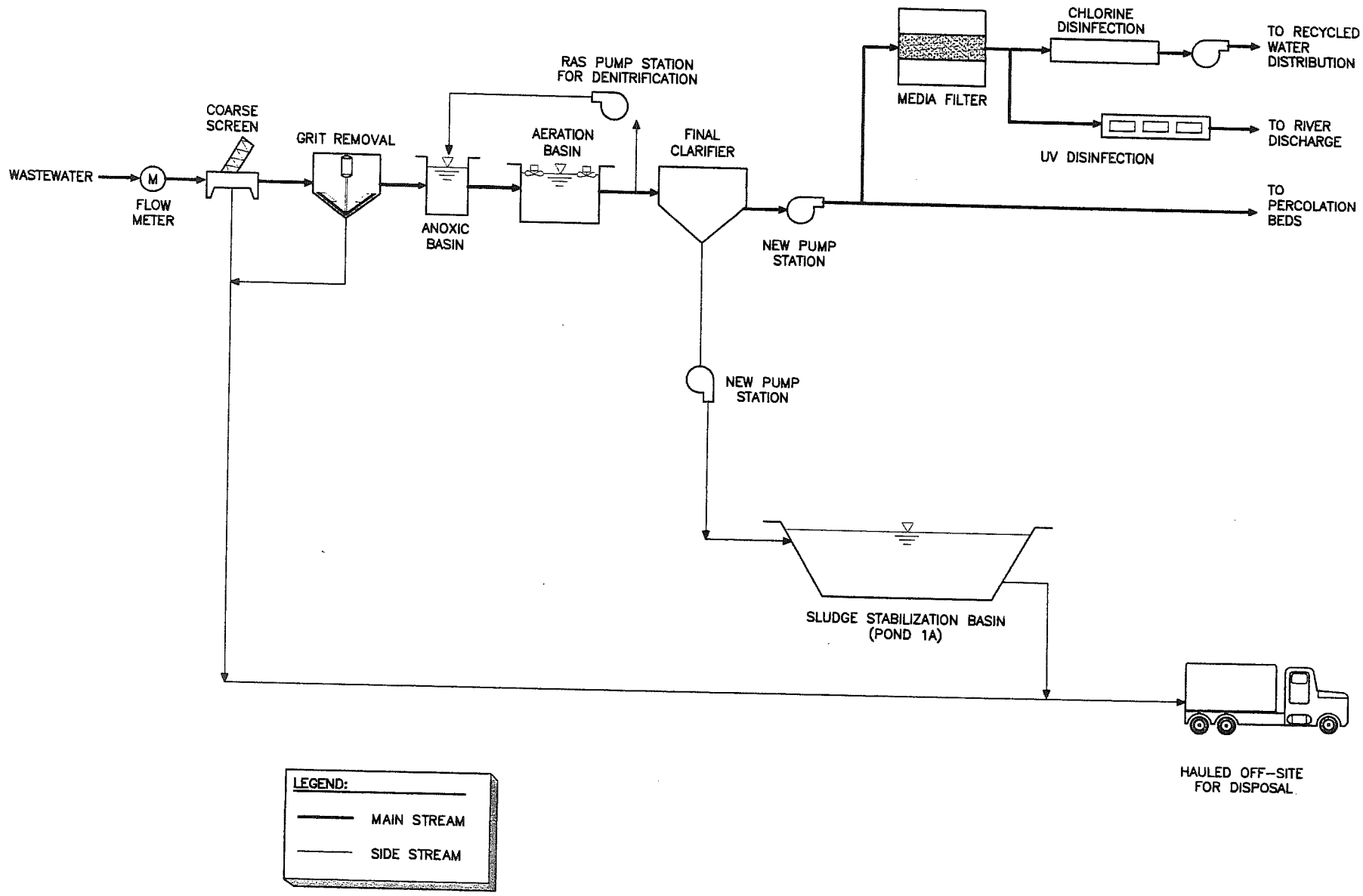
Aeration provides an aerobic environment necessary for BOD removal and nitrification while maintaining the solids in suspension. Process design and operational parameters for the extended aeration process are shown in **Table 6-1**. Extended MCRTs allow efficient BOD removal and nitrification processes to occur.

Denitrification can be accomplished through an add-on process or by design using the aeration basin and aeration equipment, respectively. One add-on process is the construction of a separate basin upstream of the aeration basin that can support an anoxic environment where denitrifying microorganisms can synthesize soluble nitrate into nitrogen gas. Alternatively, the aeration basin can be designed to use flexible headers connected to diffusers that span the basins, perpendicular to the direction of flow. Denitrification can then be achieved simultaneously in the same basin by alternating the flow of air to the headers to provide traveling aerated and anoxic zones within the single aeration basin.

Following solids separation by the final clarifier, additional treatment may be added depending on the discharge alternative. For discharge to a recycled water system, tertiary filtration would be required as an added process prior to disinfection by sodium hypochlorite. In the case of recycled water, chlorination is preferred over UV since maintaining a chlorine residual in recycled water distribution systems is desirable.

Solids produced from WWTP operations, such as the waste activated sludge (WAS), would be routed to the SSB where the solids are concentrated, compacted, and stabilized. SSBs are designed with sufficient capacity to provide long-term stabilization of the sludge, with some facilities operating up to 10 years without requiring removal of accumulated sludge. Alternatively, the solids could be dewatered and hauled to a sludge disposal site.

The extended aeration system preliminary design incorporates several effluent management alternatives. A process train required for discharge to percolation beds, surface discharge and recycled water is shown in **Figure 6-1**.



HydroScience Engineers, Inc.

Figure 6-1
City of Hollister Long-Term Wastewater Mangement Program
Extended Aeration System Process Flow Diagram

6.3.1.1. Facility Design

The following extended aeration facility design is based on a preliminary estimate of flows presented in **Section 4**. Facility design of the extended aeration alternative was completed on a preliminary level. A conceptual site layout is included in **Figure 6-2** showing major facility sizes and locations for treating 5.0 MGD ADF. Future additional facilities are also shown to illustrate expandability to the proposed new buildout flow of 7.5 MGD ADF. Unit process summaries for major processes are included in **Table 6-2.**

Table 6-2: Unit Process Summary for the Extended Aeration System

Unit Process [a]	Design Criteria [b]	Size (ft) [c]	Total units at ADF	
			5.0 MGD	7.5 MGD
Flow Meter	Range 0-28 mgd, 0.25 fps min., 33 fps max.	16 inch ∅	1	1
Screen	Inclined rotary in-channel type 0.25-inch slot width	6 ∅	1	2
Grit Chamber	Vortex type	12 ∅	1	2
Aeration Basin	20d MCRT 3,000 mg/L MLVSS	208L x 248W x 10D	2	3
Final Clarifier	< 400 gpd/ft^2/d, ADF < 800 gpd/ft^2/d, PHF < 1 lb/ft^2/hour, ADF < 1.4 lb/ft^2/hour, PHF	90∅ x 14D	2	3
UV Disinfection	Total coliform MPN 2.2 per 100 mL sample (surface discharge)	TBD	1 channel	1 channel
Tertiary Filtration	Average turbidity < 2 NTU 2.5 gpm/ft^2 at ADF with 1 cell out of service, 5.0 gpm/ft^2 at PHF	16.7L x 16.7W	6	8
Chlorination	Contact time = 120 minutes @ 5.5 mgd	435L x 8W x 9D	2	3
Sludge Stabilization Basin	15 lb MLVSS/ 1000 sq-ft/ d	38 MG	1	1

[a] Design is based on ADF.
[b] Minimum design freeboard is 2 ft.
[c] Length, width, depth, height, and diameter are denoted as L, W, D, H, and ∅ respectively. Units in ft unless noted otherwise.

Modifying the DWTP into an extended aeration system would involve extensive retrofits to most of the existing facility. This alternative would accommodate new primary, secondary, and tertiary treatment. The necessary modifications of key components are described below.

Headworks

Due to concerns related to flow measurement and odors, the Regional Board issued a Cease and Desist Order (**Appendix B**) that required a new headworks be constructed at the existing plant prior to construction of the long-term wastewater treatment facilities. The headworks upgrade was completed during the summer of 2003 as the initial construction in the phased approach and is currently in operation. To control odors and improve flow measurement, a new influent lift station was constructed. It was equipped with a mechanical grinder, an odor control biofilter, and a magnetic flow meter. Flow measurement is accomplished by a magnetic flow meter installed in a section of pipe that is always submerged. The headworks improvements can be integrated into any new design alternative.

Influent Pump Station

In order to minimize excavation required at the location selected for the extended aeration basins, the influent pump station (incorporated in the new headworks) would be required to lift the wastewater to the

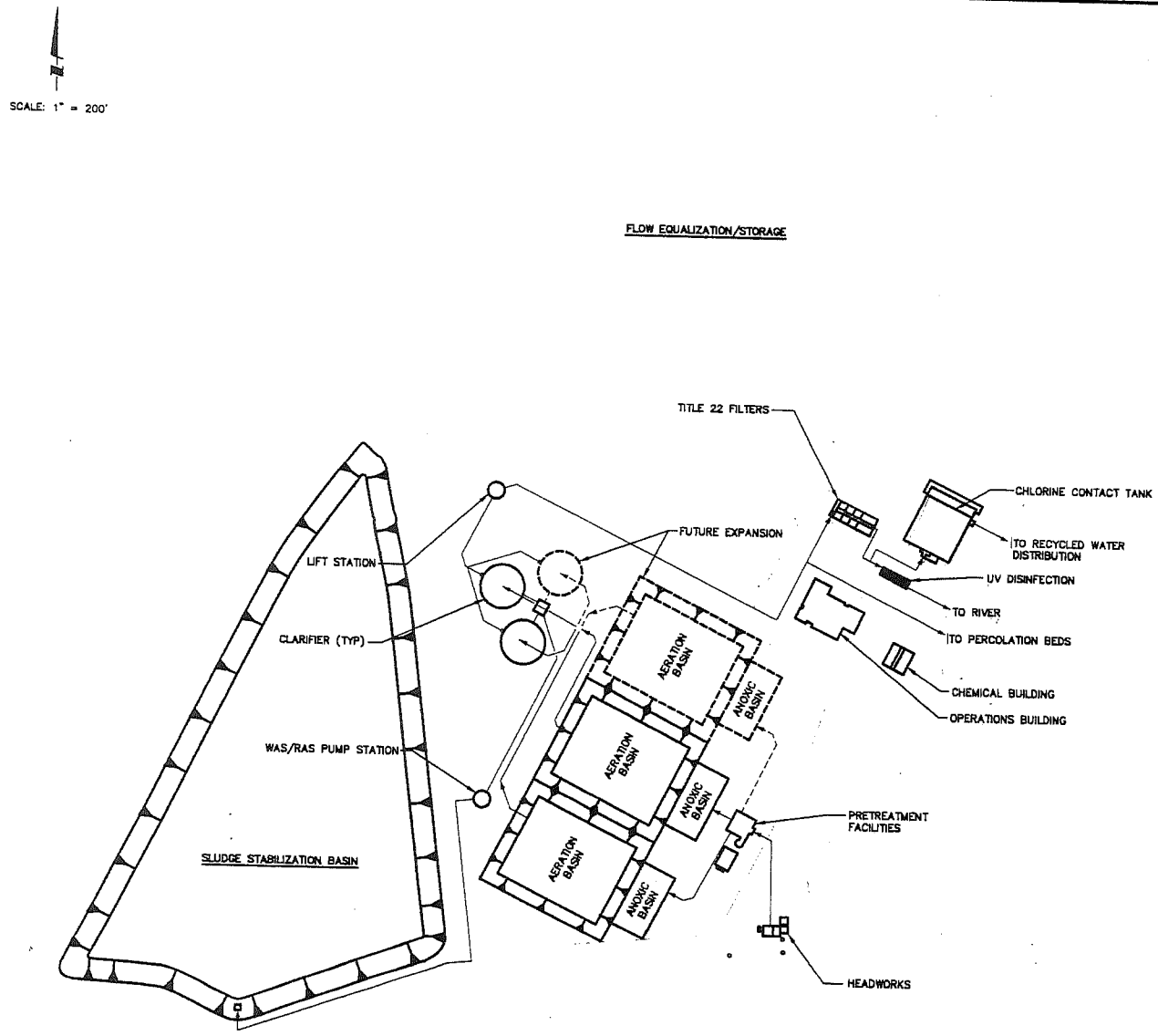


Figure 6-2
City of Hollister Long-Term Wastewater Management Program
Extended Aeration System Conceptual Site Layout

high water level in the pretreatment facilities. Once pumped to this elevation, the remainder of the flow through the biological processes would be by gravity. The influent pump station has a high level overflow that diverts wastewater to an equalization basin (Pond 1B) in the event the pump station fails or cannot match the influent flow. The pump station is designed to handle the design peak hour flow. Space has been provided for addition of future pumps for expansion to the future buildout peak hour flow.

Pretreatment

The pretreatment facilities consist of screening, grit removal and flow distribution. All wastewater flows into a common rectangular channel at the beginning of the pretreatment facility. A flow-splitting structure allows the flow to be split to two identical channels. One channel houses a self-cleaning fine screen. The second channel is a bypass channel and contains a manual bar screen. Under normal operation, all wastewater flows through the self-cleaning coarse screen. However, a weir allows wastewater to either overflow or be diverted to the bypass channel, in the event the self-cleaning screen fails or is down for maintenance.

The self-cleaning screen is an inclined in-channel rotary screen. This type of screen utilizes a slotted or perforated cylinder as the screen. The cylinder is mounted in the rectangular channel at a 45-degree angle and a helical screw/scraper conveys solids up the cylinder into a dewatering section and then into a holding bin. The advantage of using this type of screen is that the screening, washing and compacting of the screened material is accomplished in one unit. Another advantage is that the top portion of the screen (above the channel) can be enclosed for odor control, as well as the solids discharge shaft to the screenings bin.

Following screening, the channel allows future addition of grit removal. Grit removal would not necessarily be required for the extended aeration alternative. If selected, a vortex type grit chamber would be designed to separate the grit from the screened wastewater. The grit would be pumped to a grit classifier to remove organics from the inert grit and to dewater the grit. The grit classifier and grit bin would be housed in a building to contain odors and minimize vector attraction.

All pretreatment channels, screening and grit facilities are enclosed to contain foul odors. A blower and a biofilter scrub foul air for odor removal. The blower continuously pulls air from the headspace in the enclosed facility. This maintains a negative pressure in the structure so that air cannot escape from the facility. The blower discharges into an odor control biofilter. The biofilter can be a compost design or a packaged synthetic media design.

Extended Aeration System

The extended aeration system would consist of a square concrete basin with a series of aeration headers and diffuser assemblies. The extended aeration basins could be designed with vertical or sloped sidewalls. Two separate extended aeration process trains would be provided for flexibility for O&M of the system over a wide range of flows. The existing primary Pond 1B would be converted to accommodate the basins. Each basin would be approximately 208 ft wide by 248 ft long by 10 ft side water depth and have a volume of approximately 3.0 MG each. Space would be designated for addition of a third extended aeration system in the future to meet future buildout flows.

The system would contain an anoxic zone upstream of an aerated zone. Raw wastewater would be blended with a recycled stream of oxidized/nitrified effluent from the aeration zone and then introduced to the anoxic zone, where anoxic bacteria will accomplish denitrification. The raw wastewater blend is required to provide a source of carbon for the biological denitrification process. From the anoxic zone, the effluent would flow by gravity to the aeration zone. The aeration zone would contain an aeration system sized to accomplish both BOD removal and nitrification. It may be possible to use the existing surface

aerators, though more efficient aeration systems may provide improved performance and lower operating costs.

Alternatively, denitrification could be achieved in the same basin by alternating aerated and anoxic zones, if certain proprietary aeration systems are utilized. In such a system, only one basin would be required, though the total basin volume required would be similar to the two-basin system described above.

A portion of the activated sludge that settles in the clarifiers would be returned to the extended aeration system to maintain the required mixed liquor concentration. Excess sludge would be wasted to the sludge stabilization basin. Typical SRTs in the extended aeration system are 20 days or greater. This results in a partially digested and stabilized biomass.

From the basins, the two process streams would be combined and advance to a flow-splitting structure upstream of the clarifiers. The wastewater would flow by gravity through the extended aeration system to the secondary clarifiers.

Clarifiers

Two circular clarifiers would be provided for secondary sedimentation. A flow-splitting structure upstream of the clarifiers would ensure even distribution of flow to the two clarifiers. Each clarifier would have a working diameter of approximately 90 ft and a working depth of 14 ft. A surface skimmer would remove floating material, while scrapers at the bottom would collect sludge for return to the extended aeration system or the SSB. From the clarifiers, water would flow to a wet well to pump water to Title 22 filters for river discharge or recycled water production. Space would be designated for addition of a third clarifier in the future to meet future buildout flows. Clarified effluent may be sent directly to percolation beds or first through the filters prior to percolation.

Sludge Stabilization Basin

Existing Primary Pond 1A would be converted into a sludge stabilization basin (SSB). WAS would be collected from the secondary clarifiers for further stabilization in the SSB. The SSBs would have enough capacity to provide long-term storage. Based on the size of the existing Pond 1A, it is expected that the sludge storage capacity would exceed 10 years.

Solids Dewatering

As an option waste sludge from the clarifiers could be mechanically dewatered. The dewatered sludge would be taken to a landfill for disposal. Note that this sludge would not meet Class B requirements and could not be eligible for beneficial reuse without further treatment. At a minimum a facility including a sludge storage tank, sludge feed pump, polymer feed system and a two-meter belt filter press would be required for the initial construction. Provisions for adding a second belt press would be made. The belt press and ancillary equipment would be housed in building to protect the equipment from weather and to contain any odors. Dewatered sludge from the belt filter press would be conveyed via a screw conveyor to a waste container or truck trailer.

Flow Equalization and Storage

Ponds 2, 3A, and 3B would be converted to storage for flow equalization and/or storage of treated effluent. Accumulated sludge in these ponds will be removed. New inlet and outlet structures would be constructed to allow movement of screened influent or recycled water in to and out of these ponds.

UV Disinfection

For effluent to be discharged to a surface water, UV disinfection is proposed to eliminate the need for dechlorination and to eliminate the potential for chlorine residual discharge violations. It is expected that a maximum total coliform MPN of 2.2 per 100 mL will be required. Space would be provided in the

channel for addition of future banks for expansion to future buildout flows. Validation testing for Title 22 certification would not be required. It is anticipated that no disinfection limits would be required on effluent discharged to the percolation beds. Therefore, this effluent stream could bypass the UV channel or chlorination system and be applied to the percolation beds as undisinfected secondary or undisinfected tertiary effluent.

Title 22 Media Filter

Media filtration would follow the clarifiers for additional effluent polishing and for the production of recycled water. Media filtration would be required to meet the Title 22 *Water Recycling Criteria*. The *Water Recycling Criteria* includes minimum design requirements, certifications, and turbidity requirements. It is expected that recycled water would only be required during the dry season. Thus, the Title 22 filtration facilities would be sized based on the design ADF. Space would be designated for addition of future filtration facilities to meet the future buildout ADF.

Two types of single media sand filters have proven most effective for Title 22 applications. One type utilizes a sand filter with a continuous backwash mechanism. Continuous backwash rates are set by adjusting weir levels within the filter. Another system utilizes a conventional downflow sand filter with intermittent backwash cycles. In this system, backwash cycles are controlled by an increase in water depth above the filter or an increase in headloss through the filter.

A third filter alternative is the use of a cloth media filter. This filter utilizes a cloth media mounted on a disk as the filtration barrier to remove solids. Flows directions can either be outside-in or inside-out on these types of filters. The cloth media filters are equipped with a backwash system to clean the filter media when it becomes clogged with solids.

Any filtration systems require the addition of flocculants, such as alum and/or polymers. Each type of filtration system would be adequate for this process train.

Chlorine Disinfection

Chlorine disinfection is preferred for water recycling applications in order to provide a residual in the recycled water distribution system. Thus, a chlorine disinfection system would be provided for the Title 22 recycled water sidestream. Effluent from the Title 22 filters would flow to the chlorine disinfection system. The proposed disinfection system would use sodium hypochlorite as the disinfectant. Disinfection would be accomplished in a chlorine contact basin sized to meet Title 22 *Water Recycling Criteria*. The criteria require that the basin provide a minimum modal contact time of 90 minutes and a minimum CT of 450 mg-minutes/L. Thus, for a modal contact time of 90 minutes, the minimum chlorine residual in the chlorine contact basin would be 5 mg/L. The chlorine contact tank would be designed for an HRT of 120 minutes at MDF (5.5 mgd) to ensure a modal contact time of 90. The basin would consist of a multi-pass structure with a minimum length to width ration of 40:1 to promote plug flow. Inlet/outlet structures and knockout walls would be provided to allow additional passes to be constructed to meet future buildout flows.

Recycled Water Pump Station

A recycled water pump station would be required for recycled water distribution. The size and type of pumps required would be determined based on the hydraulic flow and storage characteristics and requirements of the recycled water distribution system.

Chemical Storage and Handling Facilities

The chlorine disinfection system would require sodium hypochlorite, which would be stored in a 8,000-gallon polyethylene tank. Duty and standby metering pumps would be provided for supply of sodium hypochlorite to the chlorine contact tank. It is expected that the metering pumps would be located indoors

within an area for designed for spill containment. The chemical storage would be located outdoors in another spill containment structure. A canopy would be provided to shade the storage tank.

6.3.1.2. Non-economic Advantages/Disadvantages

The non-economic advantages and disadvantages of the extended aeration system are summarized in **Table 6-3**.

Table 6-3: Non-economic Advantages and Disadvantages of the Extended Aeration System

Advantages	Disadvantages
Easier to operate than some conventional sludge systems.	Larger footprint compared to conventional activated sludge systems.
Lower waste sludge production than conventional activated sludge plants.	Vulnerable to future regulatory change.
Achieves nitrogen removal.	Add-on process for nitrogen removal may be required to ensure reliable treatment performance.
Minimal chemical storage/handling.	Most extended aeration systems produce lower quality effluent than conventional treatment systems.
	Vulnerable to bulking sludge.

6.3.2. Process Alternative 2—Oxidation Ditch

The oxidation ditch is based on a conventional activated sludge process modified for nitrogen removal and augmented with a tertiary treatment process. An oxidation ditch is a variation of the activated sludge process that reliably produces a high quality effluent. The design is well established, relatively easy to operate, and produces effluent with low SS, TN, and BOD.

Compared to the extended aeration system, the oxidation ditch is more mechanically intensive, requiring additional pumps and controls to moderate process dynamics for the use of return activated sludge (RAS) and WAS, respectively. Discharge alternatives for consideration include the percolation bed, water recycling, and river discharge.

Oxidation ditches are biological treatment processes that achieve BOD removal and combined nitrification and denitrification through a plug-flow reactor design, as opposed to the previous complete-mix-type basins. This difference in the process reactor takes advantage of a different aeration method, which in turn changes the biochemical kinetics but still achieves the same treatment objectives. In an oxidation ditch, the wastewater is aerated with brush, disk, or surface aerators that introduce the oxygen required for microorganisms to metabolize the BOD. At the same time, these aerators impart a velocity to the water that causes it to recirculate around the oxidation ditch, which is designed around a racetrack configuration. As the wastewater is brushed along a racetrack, oxygen is transferred producing an aerobic zone where BOD removal and nitrification occur. As the wastewater continues down the racetrack, oxygen becomes depleted leaving an anoxic zone where denitrification occurs.

As microorganisms in the oxidation ditch metabolize BOD, biomass is produced and later settled. Downstream of the oxidation ditch, the final clarifier separates the biomass through gravitational settling. Since the settled solids are rich in biomass, a portion of the settled sludge is either returned to the oxidation ditch (RAS) to maintain an adequate population of microorganisms or removed from the process entirely for disposal (WAS).

Clarified effluent continues down the process train undergoing additional treatment depending on the discharge capacity and/or discharge point. If the discharge point is surface-discharge to the river, then the clarified effluent must first be filtered to meet possible turbidity limits on the river and then disinfected with UV light. UV disinfection is preferred for river discharge since it avoids chemical addition, such as with chlorination, which increases the risk of DBP formation. Disinfection by UV would allow the

facility to consistently and reliably meet the stringent coliform limits for a surface discharge. For discharge to a recycled water system, tertiary filtration would be required as an added process prior to disinfection by sodium hypochlorite.

Waste sludge and solids residuals would be disposed of in one of the existing facultative treatment ponds, which would be converted to an SSB. At the SSB, the solids residuals are concentrated, compacted, and further stabilized. SSBs are designed with sufficient capacity to provide long-term stabilization of the sludge, with some facilities operating up to 10 years without requiring removal of accumulated sludge. Alternatively, the solids could be dewatered and hauled to a sludge disposal site.

The extended aeration system preliminary design incorporates several effluent management alternatives. A process train required for discharge to percolation beds, surface discharge and recycled water only is shown in **Figure 6-3**.

6.3.2.1. Facility Design

The following oxidation ditch facility design is based on a preliminary estimate of flows presented in **Section 4**. Facility design of the oxidation ditch alternative was completed on a preliminary level. A conceptual site layout is included in **Figure 6-4** showing major facility sizes and location for treating 5.0 MGD ADF. Both alternatives (with and without water recycling) are summarized in this figure. Future additional facilities are also shown to illustrate expandability to the proposed new buildout flow of 7.5 MGD ADF. Unit process summaries for major processes are included in **Table 6-4**.

Table 6-4: Unit Process Summary for the Oxidation Ditch

Unit Process [a]	Design Criteria [b]	Size (ft) [c]	Total units at ADF 5.0 MGD	Total units at ADF 7.5 MGD
Flow Meter	Range 0-28 mgd, 0.25 fps min., 33 fps max.	16 inch ∅	1	1
Screen	Inclined rotary in-channel type 0.25-inch slot width	6 ∅	1	2
Grit Chamber	Vortex type	12 ∅	1	2
Oxidation Ditch	20d MCRT 3,000 mg/L MLVSS	200L x 80W x 14D	2	3
Final Clarifier	< 400 gpd/ft^2/d, ADF < 800 gpd/ft^2/d, PHF < 1 lb/ft^2/hour, ADF < 1.4 lb/ft^2/hour, PHF	90 ∅ x 14D	2	3
UV Disinfection	MPN 2.2 per sample (surface discharge)	TBD	1 channel	1 channel
Tertiary Filtration	Average turbidity < 2 NTU 2.5 gpm/ft^2 at ADF with 1 cell out of service, 5.0 gpm/ft^2 at PHF	16.7L x 16.7W	6	8
Chlorination	Contact time = 120 minutes @ 5.5 mgd	435L x 8W x 9D	2	3
Sludge Stabilization Basin	15 lb MLVSS/ 1000 sq-ft/ d	38 MG	1	1

[a] Design is based on ADF.
[b] Minimum design freeboard is 2 ft.
[c] Length, width, depth, height, and diameter are denoted as L, W, D, H, and ∅ respectively.

Modifying the DWTP into an oxidation ditch system involves extensive retrofits. The oxidation ditch system would include a new process for primary, secondary, and tertiary treatment. The necessary modifications of key components are described below.

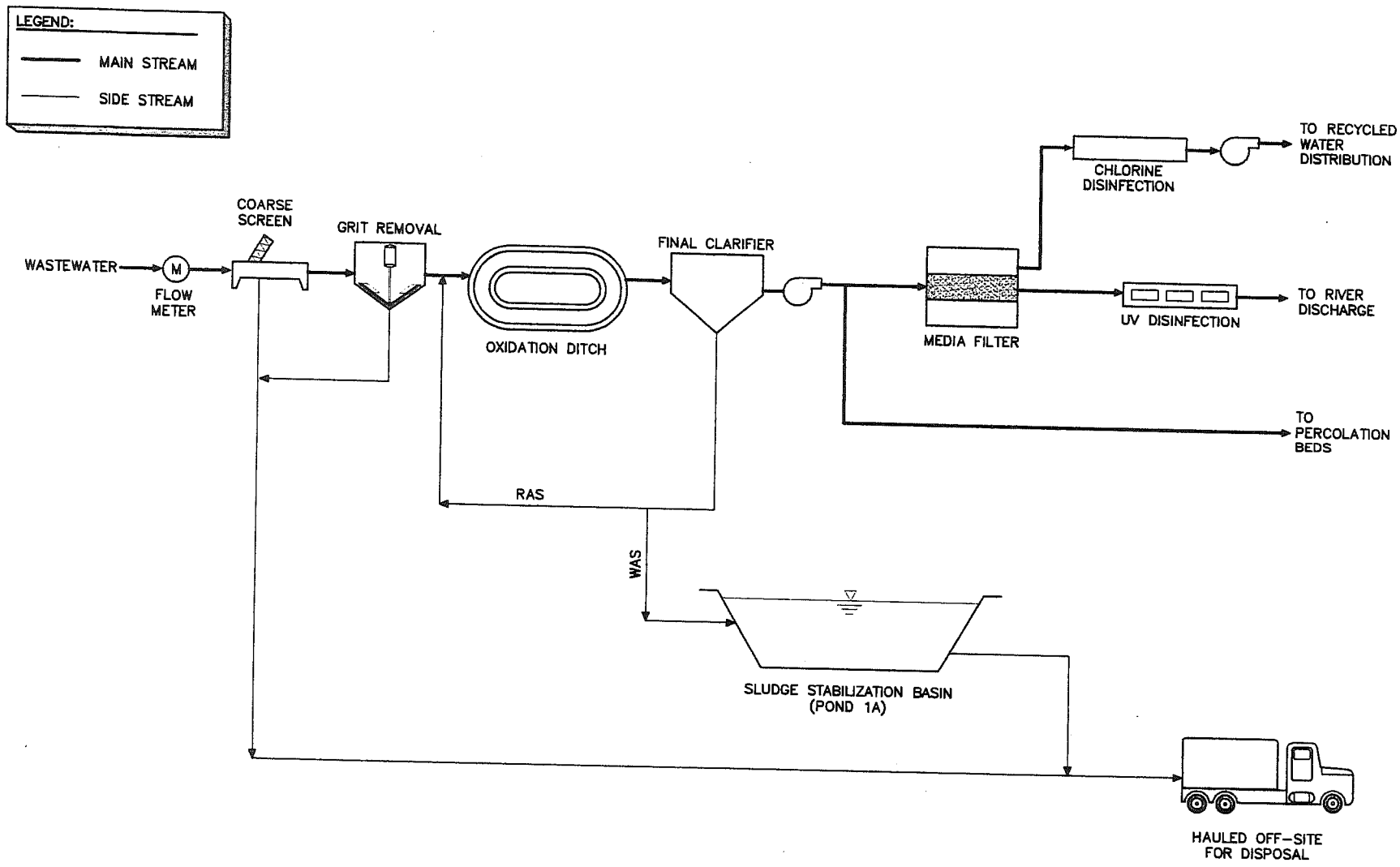


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Figure 6-3
City of Hollister Long-Term Wastewater Management Program
Oxidation Ditch Process Flow Diagram with Reclamation

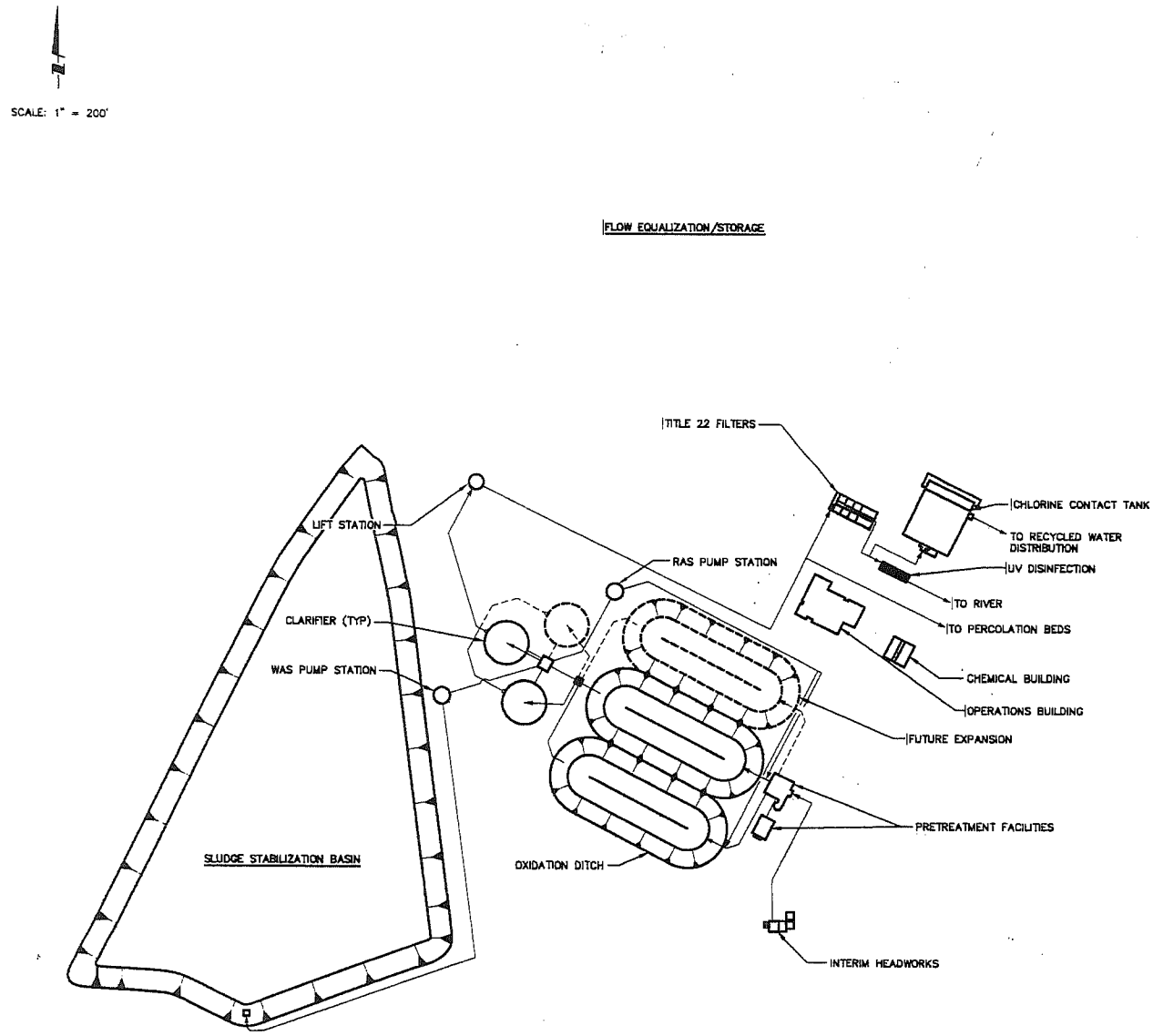

Figure 6-4
City of Hollister Long-Term Wastewater Management Program
Oxidation Ditch Conceptual Site Layout

Headworks

The existing headworks would be incorporated into the oxidation ditch design as detailed previously in **Section 6.3.1.1**.

Influent Pump Station

In order to minimize excavation required at the location selected for the oxidation ditch basins, the influent pump station (incorporated in the existing headworks) would be required to lift the wastewater to the high water level in the pretreatment facilities. Once pumped to this elevation, the remainder of the flow through the biological processes would be by gravity. The influent pump station has a high level overflow that diverts wastewater to an equalization basin (Pond 1B) in the event the pump station fails or cannot match the influent flow. The pump station is designed to handle the design peak hour flow. Space has been provided for addition of future pumps for expansion to the future buildout peak hour flow.

Pretreatment

The pretreatment facilities consist of screening, grit removal and flow distribution. All wastewater flows into a common rectangular channel at the beginning of the pretreatment facility. A flow-splitting structure allows the flow to be split to two identical channels. One channel houses a self-cleaning fine screen. The second channel is a bypass channel and contains a manual bar screen. Under normal operation, all wastewater flows through the self-cleaning coarse screen. However, a weir allows wastewater to either overflow or be diverted to the bypass channel, in the event the self-cleaning screen fails or is down for maintenance.

The self-cleaning screen is an inclined in-channel rotary screen. This type of screen utilizes a slotted or perforated cylinder as the screen. The cylinder is mounted in the rectangular channel at a 45-degree angle and a helical screw/scraper conveys solids up the cylinder into a dewatering section and then into a holding bin. The advantage of using this type of screen is that the screening, washing and compacting of the screened material is accomplished in one unit. Another advantage is that the top portion of the screen (above the channel) can be enclosed for odor control, as well as the solids discharge shaft to the screenings bin.

Following screening, the channel allows future addition of grit removal. Grit removal would not necessarily be required for the oxidation ditch alternative. If selected, a vortex type grit chamber would be designed to separate the grit from the screened wastewater. The grit would be pumped to a grit classifier to remove organics from the inert grit and to dewater the grit. The grit classifier and grit bin would be housed in a building to contain odors and minimize vector attraction.

All pretreatment channels, screening and grit facilities are enclosed to contain foul odors. A blower and a biofilter scrub foul air for odor removal. The blower continuously pulls air from the headspace in the enclosed facility. This maintains a negative pressure in the structure so that air cannot escape from the facility. The blower discharges into an odor control biofilter. The biofilter can be a compost design or a packaged synthetic media design.

Oxidation Ditch

The secondary treatment equipment would be installed on the site of the primary treatment pond 1B. That area is at a lower elevation than the headworks, therefore the wastewater would flow by gravity to the oxidation ditch.

The oxidation ditch system would provide a racetrack configuration containing aeration and anoxic zones. The oxidation ditch would be approximately 200 ft long by 80 ft wide by 14 ft deep and have a volume of approximately 3.2 MG. Two separate oxidation ditch process trains would be provided for flexibility for operation and maintenance (O&M) of the system over a wide range of flows. The existing primary pond

1B would be converted to accommodate this system. A portion of the activated sludge that settles in the clarifiers would be continuously returned to the oxidation ditch to maintain the required mixed liquor concentration. Excess sludge would be wasted to the SSB.

From the oxidation ditches, the two process streams would be combined and advance to a flow-splitting structure upstream of the clarifiers. The wastewater would flow by gravity through the oxidation ditch and to the secondary clarifiers.

Clarifiers

Two circular clarifiers would be provided for secondary sedimentation. A flow-splitting structure upstream of the clarifiers would ensure even distribution of flow to the two clarifiers. Each clarifier would have a working diameter of approximately 90 ft and a working depth of 14 ft. A surface skimmer would remove floating material, while scrapers at the bottom would collect sludge for return to the extended aeration system or the SSB. From the clarifiers, water would flow to a wet well to pump water to Title 22 filters for river discharge or recycled water production. Space would be designated for addition of a third clarifier in the future to meet future buildout flows. Clarified effluent may be sent directly to percolation beds or first through the filters prior to percolation.

Sludge Stabilization Basin

Existing Primary Pond 1A would be converted into an SSB. WAS would be collected from the secondary clarifiers for further stabilization. The storage basins would have enough capacity to provide long-term storage. Based on the size of the existing Pond 1A, it is expected that the sludge storage capacity would exceed 10 years.

Solids Dewatering

As an option waste sludge from the clarifiers could be mechanically dewatered. The dewatered sludge would be taken to a landfill for disposal. Note that this sludge would not meet Class B requirements and could not be eligible for beneficial reuse without further treatment. At a minimum a facility including a sludge storage tank, sludge feed pump, polymer feed system and a two-meter belt filter press would be required for the initial construction. Provisions for adding a second belt press would be made. The belt press and ancillary equipment would be housed in building to protect the equipment from weather and to contain any odors. Dewatered sludge from the belt filter press would be conveyed via a screw conveyor to a waste container or truck trailer.

Flow Equalization and Storage

Ponds 2, 3A, and 3B would be converted to storage for flow equalization and/or storage of treated effluent.

Title 22 Media Filtration

The design of the media filters would utilize the same approach detailed previously in **Section 6.3.1.1**. However, it is expected that media filtration would be sized for both surface water discharge and recycled water production.

UV Disinfection

For surface water discharge, it is assumed that the disinfection standard will be a total coliform MPN of 2.2 per 100 mL. The type and design of the UV disinfection system would be as described previously in **Section 6.3.1.1**. Effluent from the Title 22 sand filters earmarked for surface water discharge would flow to the UV system dedicated to surface water discharge.

Chlorine Disinfection

As described previously, chlorine disinfection is preferred for water recycling applications. A chlorine disinfection system would be provided for the Title 22 recycled water sidestream. Effluent from the Title 22 sand filters would flow to the chlorine disinfection system. The design of the chlorine disinfection system would be as described in **Section 6.3.1.1** for Alternative 1.

Recycled Water Pump Station

A recycled water pump station would be required for recycled water distribution. The size and type of pumps required would be determined based on the hydraulic flow and storage characteristics and requirements of the recycled water distribution system.

Chemical Storage and Handling Facilities

The chlorine disinfection system would require sodium hypochlorite, which would be stored in an 8,000-gallon polyethylene tank. Duty and standby metering pumps would be provided for supply of sodium hypochlorite to the chlorine contact tank. It is expected that the metering pumps would be located indoors within an area for designed for spill containment. The chemical storage would be located outdoors in another spill containment structure. A canopy would be provided to shade the storage tank.

6.3.2.2. Non-economic Advantages/Disadvantages

The non-economic advantages and disadvantages of the oxidation ditch system are summarized in **Table 6-5.**

Table 6-5: Non-economic Advantages and Disadvantages of the Oxidation Ditch

Advantages	Disadvantages
Smaller footprint.	Clarification stability susceptible to activated sludge process upsets.
High effluent quality.	Dedicated sludge handling facilities required.
Achieves nitrogen removal.	
Nonproprietary design allows competitive bidding.	

6.3.3. Process Alternative 3—Immersed Membrane Bioreactor

MBRs are state-of-the-art treatment processes designed to treat wastewater using the same principles as conventional activated sludge processes. That common driving principle is the conversion of soluble waste into biomass. The difference is the rate at which these reactions are occurring and also the method by which the separation of solids occurs. Compared to conventional activated sludge, which relies on a clarifier for gravitational separation of solids, MBRs utilize membrane technology to physically separate the solids. The result is a more uniform effluent quality and enhanced biological treatment performance because of the higher microorganism concentrations not previously possible with activated sludge.

Using membrane technology, high-quality effluent is produced that can be readily applied to a variety of discharge reuse alternatives. Discharge alternatives for consideration using this process include the percolation bed, recycled water, and river discharge.

MBRs consolidate many of the unit processes required in a conventional activated sludge design. Fine screening is required to protect the immersed membranes. In addition, if grit is found to be present in the wastewater, grit removal may be necessary. However, the process combines oxidation, clarification, and filtration into one step. A bioreactor with separate anoxic and aerobic cells provides the environment necessary for BOD removal, nitrification, and denitrification processes to occur. As a result of the high concentrations of microorganisms that synthesize the waste, uptake rates are significantly increased.

Membrane modules immersed in the aerobic portion of the process tank combine the functions of the clarifier and tertiary filtration processes in a single step. The membranes are typically classified as microfiltration or ultrafiltration and have nominal pores with a diameter of 0.1 to 0.4 μm. Filtration by this method produces an effluent with very low solids concentration. After filtration, the membrane effluent, called permeate, is ready for disinfection.

Depending on the discharge point, the permeate is disinfected with either UV or sodium hypochlorite. For discharge to the river, UV is well-suited since a very low solids concentration minimizes shielding of bacteria. As a result, UV disinfection provides efficient and consistent microbial inactivation without increased risk of chemical DBP formation. In the case of discharge for recycled water, chlorination is preferred over UV since maintaining a chlorine residual in recycled water distribution systems is desirable.

Waste sludge and solids residuals would be disposed of in one of the existing facultative treatment ponds, which would be converted to an SSB. At the SSB, the solids residuals are concentrated, compacted, and further stabilized. SSBs are designed with sufficient capacity to provide long-term stabilization of the sludge, with some facilities operating in excess of 10 years without requiring removal of accumulated sludge. Alternatively, the solids could be dewatered and hauled to a sludge disposal site.

The MBR system preliminary design incorporates several effluent management alternatives. A process train required for discharge to percolation beds, surface discharge and recycled water is shown in **Figure 6-5.**

6.3.3.1. Facility Design

The following MBR facility design is based on a preliminary estimate of flows presented in **Section 4.** Facility design of the MBR alternative was completed on a preliminary level. A conceptual site layout is included in **Figure 6-6** showing major facility sizes and locations for treating 5.0 MGD ADF. Future additional facilities are also shown to illustrate expandability to the proposed new buildout flow of 7.5 MGD ADF. Unit process summaries for major processes are included in **Table 6-6.**

Table 6-6: Unit Process Summary for the Immersed Membrane Bioreactor

Unit Process [a]	Design Criteria [b]	Size (ft) [c]	Total units at ADF	
			5.0 MGD	7.5 MGD
Flow meter	Range 0-28 mgd, 0.25 fps min., 33 fps max.	16 inch ∅	1	1
Fine screen	Rotary drum screen 1-3 mm perforations	20L x 2.5W	1	2
Grit removal	Vortex type	12 ∅	1	2
Anoxic basin	4 hour HDT	43L x 30W x 22D	4	6
Aeration basin	10 hour HDT	110L x 30W x 21D	4	6
Immersed membrane bioreactor	10.4 gfd @ ADF; 18.1 gfd @ PHF 3.6 hour HDT 6:1 recycle ratio	63L x 10W x 9D	4	5
UV disinfection	Total coliform MPN 2.2 per 100 mL sample (surface discharge)	TBD	1 channel	1 channel
Chlorination	Contact time = 120 minutes @ 5.5 mgd	660L x 10W x 10D	2	3
Sludge stabilization basin	15 lb MLVSS/ 1000 sq-ft/ d	38 MG	1	1

[a] Design is based on ADF.
[b] Minimum design freeboard is 2 ft.
[c] Length, width, depth, height, and diameter are denoted as L, W, D, H, and ∅ respectively.

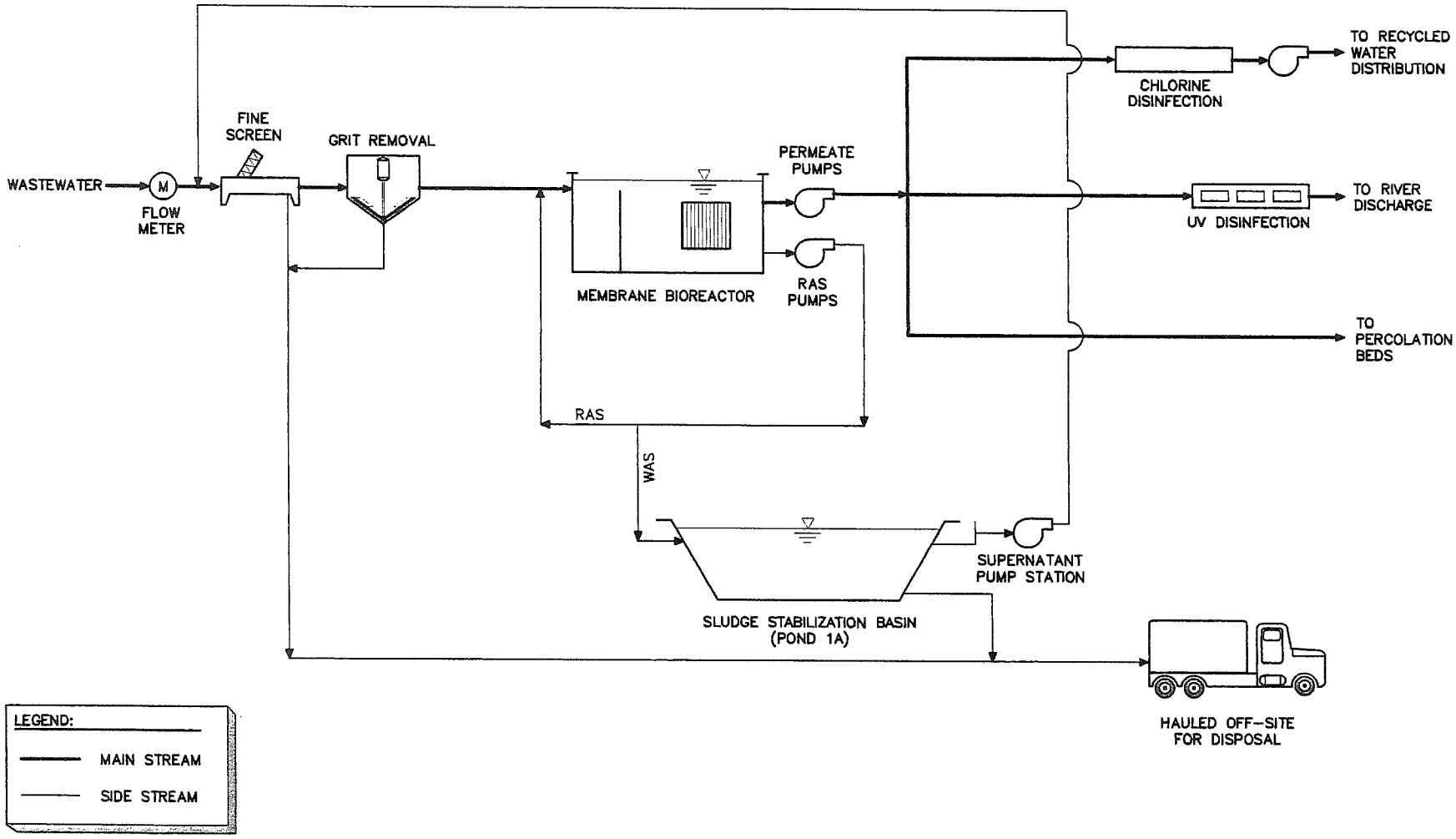

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Figure 6-5
City of Hollister Long-Term Wastewater Management Program
Immersed Membrane Bioreactor Process Flow Diagram with Reclamation

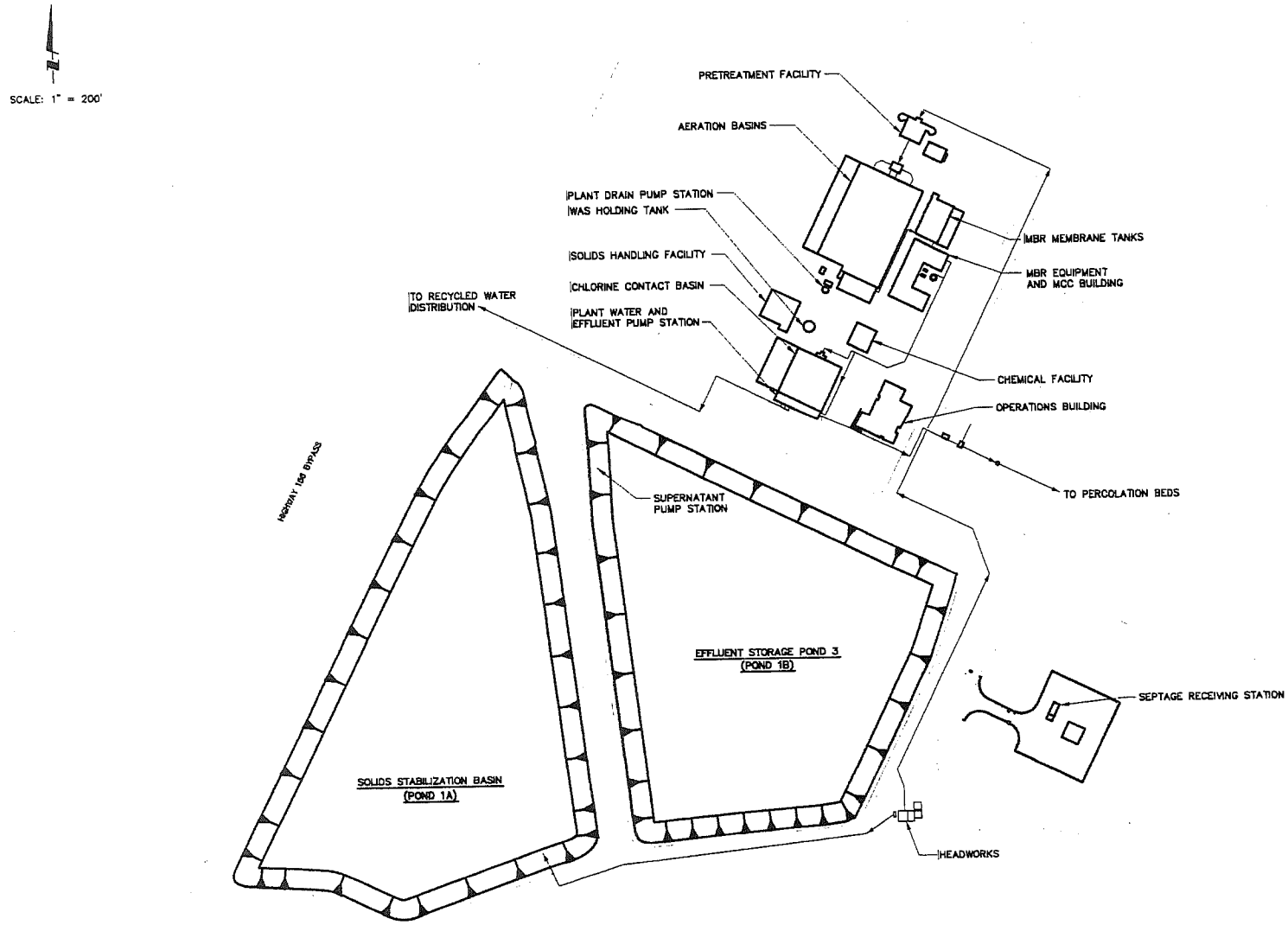

Figure 6-6
City of Hollister Long-Term Wastewater Management Program
Immersed Membrane Bioreactor Conceptual Site Layout

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Headworks

The existing headworks would be incorporated into the MBR design as detailed previously in **Section 6.3.1.1**.

Influent Pump Station

In order to minimize excavation required at the location selected for the MBR basins, the influent pump station (incorporated in the existing headworks) would be required to lift the wastewater to the high water level in the pretreatment facilities. Once pumped to this elevation, the remainder of the flow through the biological processes would be by gravity. The influent pump station has a high level overflow that diverts wastewater to an equalization basin (Pond 1B) in the event the pump station fails or cannot match the influent flow. The pump station is designed to handle the design peak hour flow. Space has been provided for addition of future pumps for expansion to the future buildout peak hour flow.

Pretreatment

The pretreatment facilities consist of screening, grit removal and flow distribution. All wastewater flows into a common rectangular channel at the beginning of the pretreatment facility. A flow-splitting structure allows the flow to be split. Flow is split between two rotary drum screens. Provisions are made for the addition of a third screen in the future.

The rotary drum screen is a horizontal fine screen. This type of screen utilizes a perforated cylinder as the screen. MBR manufacturers recommend using perforations between 1 to 3 mm in diameter. The cylinder is mounted horizontally and is equipped with an inlet distribution weir. Screenings are captured inside the screen and are directed out the end of the cylinder. The advantage of using this type of screen is that the screening capture rate is very high. This is important for MBR systems since screenings can accumulate within the membrane fibers and cause physical damage to the membranes. Another advantage is that the screen is enclosed for odor control.

The grit removal facilities are located after the screens. Grit removal is necessary for MBR systems to prevent excess wear on the membranes for grit. A vortex type grit chamber would be designed to separate the grit from the screened wastewater. The grit would be pumped to a grit classifier to remove organics from the inert grit and to dewater the grit. The grit classifier and grit bin would be housed in a building to contain odors and minimize vector attraction.

All pretreatment channels, screening and grit facilities are enclosed to contain foul odors. A blower and a biofilter scrub foul air for odor removal. The blower continuously pulls air from the headspace in the enclosed facility. This maintains a negative pressure in the structure so that air cannot escape from the facility. The blower discharges into an odor control biofilter. The biofilter can be a compost design or a packaged synthetic media design.

Immersed Membrane Bioreactor (MBR)

The MBR system combines a suspended growth biological reactor with membrane filtration (microfiltration or ultrafiltration). Each MBR process train will consist of an anoxic zone for denitrification, an aeration zone for soluble BOD reduction and nitrification, and a membrane filtration zone for solids removal. Four MBR trains would be provided, each sized for an ADF of 1.25 MGD. The MBR will typically produce an effluent with BOD and TSS levels of less than 1 mg/L, and a turbidity of less than 0.1 NTU. The components of the MBR are described below.

Anoxic Zone: The first stage of an MBR is the anoxic zone. Main basin domestic wastewater flows from the pretreatment facility to a covered distribution channel running along the four anoxic zones. Wastewater is distributed into the four anoxic tanks through weir gates in the channel. The anoxic zone in each process train would be approximately 43 ft by 30 ft with a liquid depth of approximately 22 ft. The

HRT would be approximately four hours at ADF. The anoxic zones are equipped with mechanical mixers. From the anoxic zones, the wastewater flows to the aeration tanks.

Aeration Zone: Each aeration tank would be approximately 110 ft by 30 ft with a liquid depth of approximately 21 ft. The HRT would be approximately 10 hours at ADF. The aeration tanks are equipped with fine bubble diffusers for mixing and oxygen transfer.

Membranes: The membranes are located in a separate membrane basin. Four membrane tanks are proposed for the 5.0 mgd plant. Membrane cassettes are immersed in each basin; each cassette contains numerous membrane elements. A membrane element consists of a bundle of hollow microfiltration or ultrafiltration fibers or sheets, with a typical nominal pore size of approximately 0.1 to 0.4 microns.

A vacuum is applied to the module headers to draw the wastewater from the process tank through the membrane. Wastewater flows through the hollow fibers to a permeate pump. The permeate pump transfers the wastewater to the disinfection facilities or to the seasonal storage reservoir.

Mixed liquor from the membrane zone is continuously recycled back to the anoxic zone by a recycle pump in each membrane tank. This oxidized and nitrified recycle stream is blended with raw sewage (carbon source) to allow denitrification to occur in the anoxic zone. Periodically, a waste sludge pump located in each membrane zone pumps mixed liquor to the SSBs.

Air is typically fed to the underside of the membranes to prevent solids from binding on the surface of the membranes. One backwash storage tank would be provided for periodic backwash of the membranes, with a storage capacity of approximately 6,000 gallons. The backwash tank is filled with permeate from the MBRs. Sodium hypochlorite is periodically added to the backwash for control of bio-growth on the membrane strands. It is expected that the chlorine demand in the mixed liquor will consume any chlorine introduced by the backwash cycle.

UV Disinfection

A UV channel would be provided for wastewater effluent management through surface water discharge. The UV disinfection process would be as described in **Section 6.3.1.1** for Alternative 1.

Chlorine Disinfection

A chlorine contact basin would be provided to disinfect tertiary-treated wastewater for Title 22 recycled water discharge. The chlorine contact tank would be designed to meet Title 22 disinfected tertiary recycled water requirements. The disinfection system design would be as described in **Section 6.3.1.1** for Alternative 1.

Recycled Water Pump Station

A recycled water pump station would be required for recycled water distribution. The size and type of pumps required would be determined based on the hydraulic flow and storage characteristics and requirements of the recycled water distribution system.

Chemical Storage and Handling Facilities

The chlorine disinfection system would require sodium hypochlorite, which would be stored in an 8,000-gallon polyethylene tank. Duty and standby metering pumps would be provided for supply of sodium hypochlorite to the chlorine contact tank. It is expected that the metering pumps would be located indoors within an area for designed for spill containment. The chemical storage would be located outdoors in another spill containment structure. A canopy would be provided to shade the storage tank.

Sludge Stabilization Basin

Existing Primary Pond 1A would be converted into an SSB. WAS would be collected from the MBRs for further stabilization. The storage basins would have enough capacity to provide long-term storage. Based on the size of existing Pond 1A, it is expected that sludge storage capacity would exceed 10 years.

Solids Dewatering

As an option waste sludge from the clarifiers could be mechanically dewatered. The dewatered sludge would be taken to a landfill for disposal. Note that this sludge would not meet Class B requirements and could not be eligible for beneficial reuse without further treatment. At a minimum a facility including a sludge storage tank, sludge feed pump, polymer feed system and a two-meter belt filter press would be required for the initial construction. Provisions for adding a second belt press would be made. The belt press and ancillary equipment would be housed in building to protect the equipment from weather and to contain any odors. Dewatered sludge from the belt filter press would be conveyed via a screw conveyor to a waste container or truck trailer.

Flow Equalization and Storage

Ponds 1B, 3A, and 3B would be converted for storage of treated effluent. Accumulated solids in the ponds would be removed and inlet/outlet structures would be added.

6.3.3.2. Non-economic Advantages/Disadvantages

The non-economic advantages and disadvantages of the MBR system are summarized in **Table 6-7**.

Table 6-7: Non-economic Advantages and Disadvantages of the MBR

Advantages	Disadvantages
Small footprint.	Requires fine screening.
Extremely high quality effluent; state-of-the-art treatment.	Limited equipment manufacturers.
Achieves nitrogen removal.	Relatively "new" process.
Combines clarification and filtration with oxidation process.	Requires dedicated sludge handling facilities.
High MLSS provides resistance to loading shocks.	
Certified for CCR Title 22 use by CA DHS.	
Significantly reduces disinfection requirements.	
Provides pretreatment for TDS removal by reverse osmosis.	

6.3.4. Process Alternative 4 - Sequencing Batch Reactor

Sequencing Batch Reactors (SBRs) are a variation of the activated sludge process capable of producing high quality effluent. The principal difference between SBRs and oxidation ditches are that stabilization and solids separation are sequentially accomplished in a single reactor operating in batch mode as opposed to an individual aeration basin and clarifier, which are designed for continuous flow.

After the wastewater flows through the headworks and is screened, it is routed to the SBR tank. The SBR tank is a single concrete reactor where five different steps are carried out. The first step is the fill mode, where wastewater is introduced at 25%-100% of the design volume. When the set-point volume is reached, flow to the tank is stopped and diverted to a parallel SBR tank to allow the WWTP to continuously receive and treat the wastewater. Alternate phases aeration and mixing (without aeration) follows as the second step. The aeration phase promote soluble BOD removal and nitrification. The mixing or anoxic phase promotes denitrification. Once completed, the process switches to settling mode, the third step, which provides solids separation. When the solids have settled, the clarified portion is decanted (step four) and disinfected prior to discharge, while the solids are wasted (step five).

The clarified effluent continues down the process train undergoing additional treatment depending on the discharge capacity and/or discharge point. For direct discharge to the percolation beds, no disinfection is required of the clarified effluent prior to discharge. If the discharge point is surface-discharge to the river, then the clarified effluent must first be filtered to meet possible turbidity controls on the river and then disinfected with UV light. UV disinfection is preferred for river discharge since it avoids chemical addition, such as with chlorination, which increases the risk for DBP formation. For discharge of recycled water, tertiary filtration would be required as an added process prior to disinfection by sodium hypochlorite.

WAS and solids residuals would be disposed of in one of the existing facultative treatment ponds, which would be converted to an SSB. At the SSB, the solids residuals would be concentrated, compacted, and further stabilized. SSBs are designed with sufficient capacity to provide long-term stabilization of the sludge, with some facilities operating up to 10 years without requiring removal of accumulated sludge. Alternatively, the solids could be dewatered and hauled to a sludge disposal site.

6.3.4.1. Facility Design

Facility design of this WWTP alternative was completed on a preliminary level. A process flow diagram illustrating the proposed treatment train is shown in **Figure 6-7**. Unit process summaries for major processes are included in a conceptual site layout is included in **Figure 6-8** showing major facility sizes and locations for treating 5.0 MGD ADF. Future additional facilities are also shown to illustrate expandability to the proposed new buildout flow of 7.5 MGD ADF. Unit process summaries for major processes are included in **Table 6-8**.

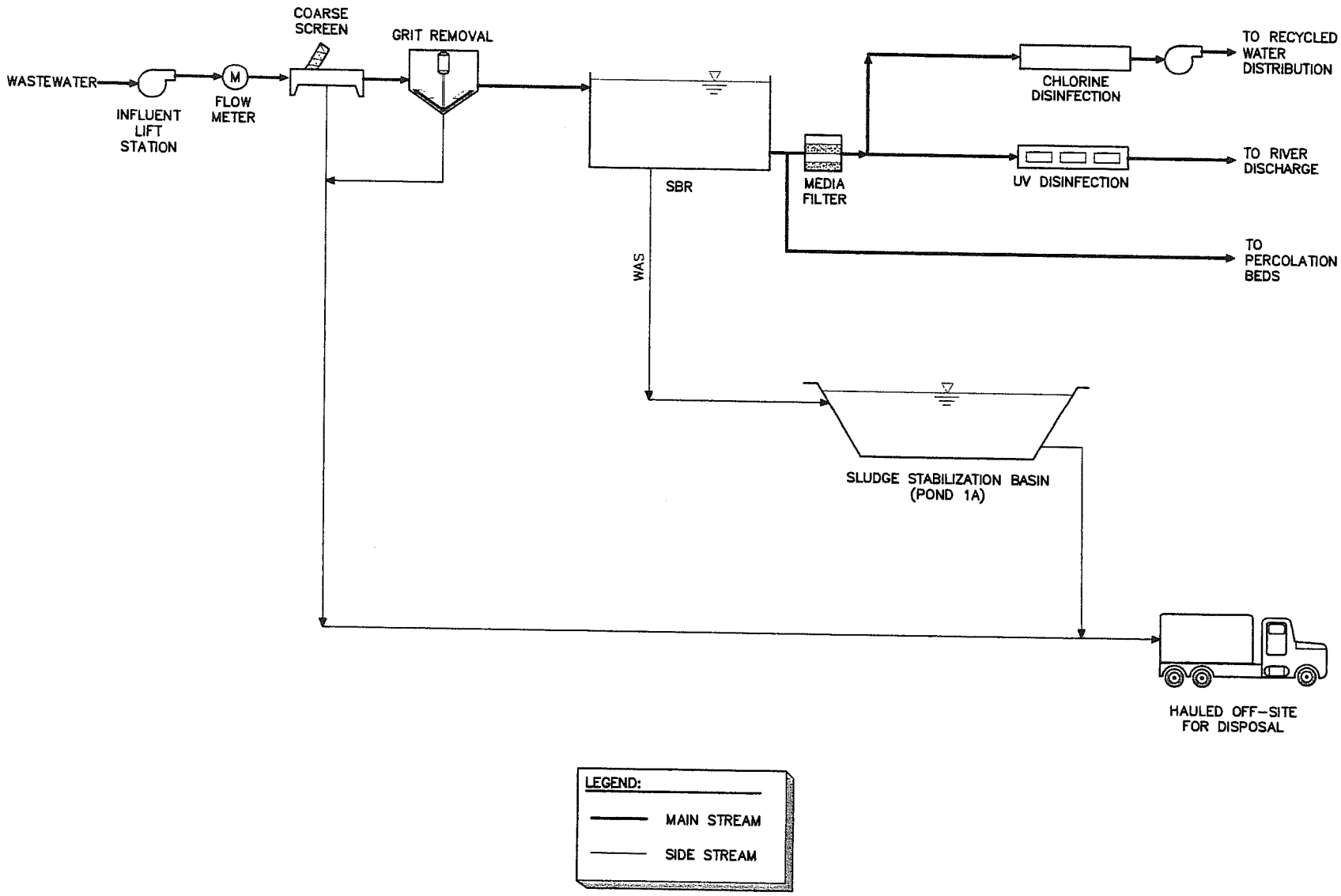
Table 6-8: Unit Process Summary for the Sequencing Batch Reactor

Unit Process [a]	Design Criteria [b]	Size (ft) [c]	ADF	
			5.0 MGD	7.5 MGD
Flow meter	Range 0-28 mgd, 0.25 fps min., 33 fps max.	16 inch ∅	1	1
Fine screen	Inclined rotary in-channel type 0.25-inch slot width	6 ∅	1	2
Grit removal	Vortex type	12 ∅	1	1
SBR Basins	6 cycles/day 1.45 days HDT 16.3 days SRT	100L x 100W x 19.5D	5	7
Tertiary Filtration	Average turbidity < 2 NTU 2.5 gpm/ft^2 at ADF with 1 cell out of service, 5.0 gpm/ft^2 at PHF	16.7L x 16.7W	6	8
UV disinfection	Total coliform MPN 2.2 per 100 mL sample (surface discharge)	TBD	1 channel	2 channels
Chlorination	Contact time = 120 minutes @ 5.5 mgd	470L x 12W x 8D	1	2
Sludge stabilization basin	15 lb VSS/10^3 ft^2/d	38 MG	1	1

[a] Design is based on ADF.
[b] Minimum design freeboard is 2 ft.
[c] Length, width, depth, height, and diameter are denoted as L, W, D, H, and ∅ respectively.

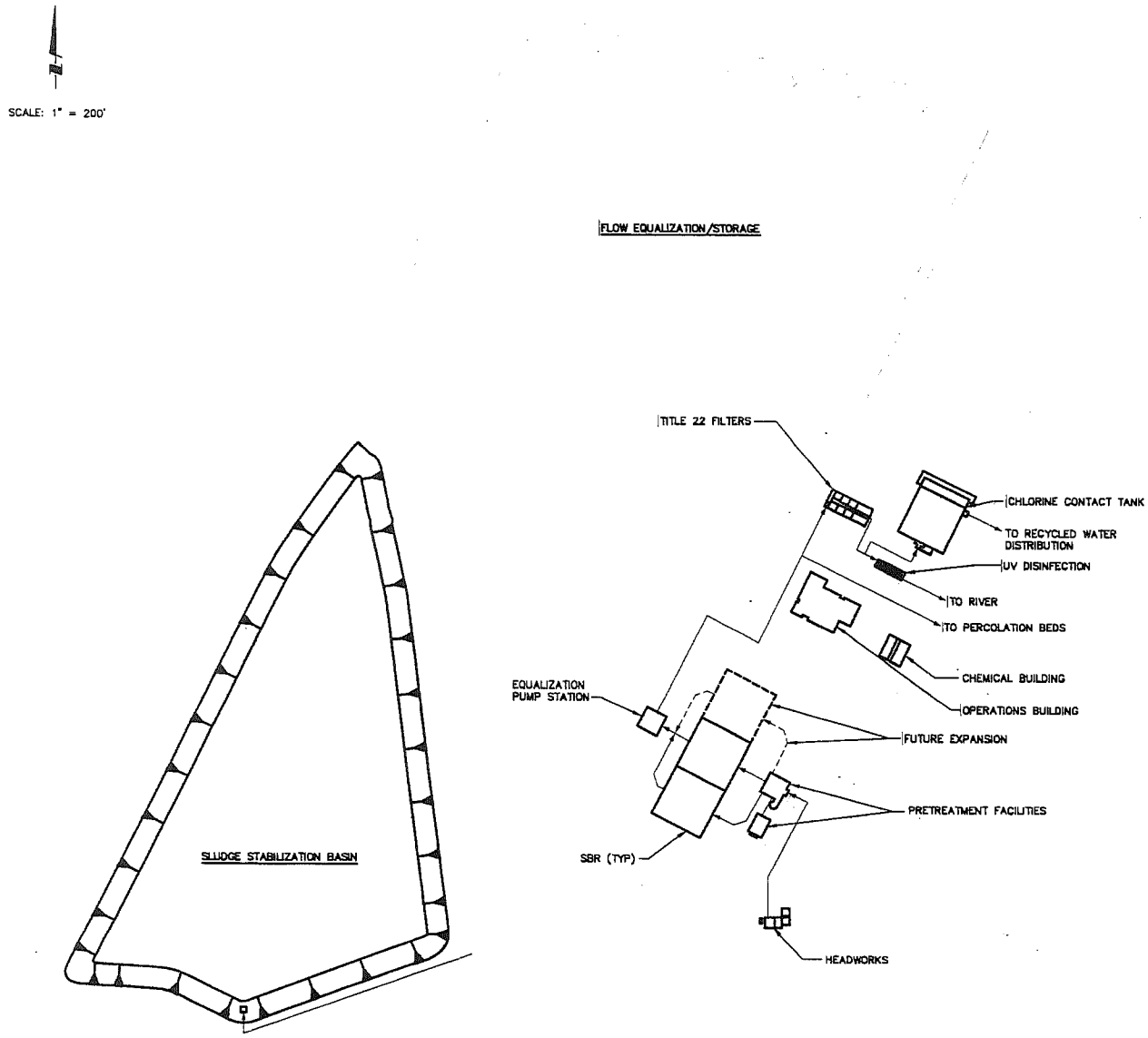
Headworks

The design of the headworks would utilize the same approach detailed previously in **Section 6.3.1.1**.



HydroScience Engineers, Inc.

Figure 6-7
City of Hollister Long-Term Wastewater Management Program
SBR Process Flow Diagram



HydroScience Engineers, Inc.

Figure 6-8
City of Hollister Long-Term Wastewater Management Program
SBR Conceptual Site Layout

Influent Pump Station

In order to minimize excavation required at the location selected for the SBR basins, the influent pump station (incorporated in the existing headworks) would be required to lift the wastewater to the high water level in the pretreatment facilities. Once pumped to this elevation, the remainder of the flow through the biological processes would be by gravity. The influent pump station has a high level overflow that diverts wastewater to an equalization basin (Pond 1B) in the event the pump station fails or cannot match the influent flow. The pump station is designed to handle the design peak hour flow. Space has been provided for addition of future pumps for expansion to the future buildout peak hour flow.

Pretreatment

The pretreatment facilities consist of screening, grit removal and flow distribution. All wastewater flows into a common rectangular channel at the beginning of the pretreatment facility. A flow-splitting structure allows the flow to be split to two identical channels. One channel houses a self-cleaning fine screen. The second channel is a bypass channel and contains a manual bar screen. Under normal operation, all wastewater flows through the self-cleaning coarse screen. However, a weir allows wastewater to either overflow or be diverted to the bypass channel, in the event the self-cleaning screen fails or is down for maintenance.

The self-cleaning screen is an inclined in-channel rotary screen. This type of screen utilizes a slotted or perforated cylinder as the screen. The cylinder is mounted in the rectangular channel at a 45-degree angle and a helical screw/scraper conveys solids up the cylinder into a dewatering section and then into a holding bin. The advantage of using this type of screen is that the screening, washing and compacting of the screened material is accomplished in one unit. Another advantage is that the top portion of the screen (above the channel) can be enclosed for odor control, as well as the solids discharge shaft to the screenings bin.

Following screening, the channel allows future addition of grit removal. Grit removal would not necessarily be required for the SBR alternative. If selected, a vortex type grit chamber would be designed to separate the grit from the screened wastewater. The grit would be pumped to a grit classifier to remove organics from the inert grit and to dewater the grit. The grit classifier and grit bin would be housed in a building to contain odors and minimize vector attraction.

All pretreatment channels, screening and grit facilities are enclosed to contain foul odors. A blower and a biofilter scrub foul air for odor removal. The blower continuously pulls air from the headspace in the enclosed facility. This maintains a negative pressure in the structure so that air cannot escape from the facility. The blower discharges into an odor control biofilter. The biofilter can be a compost design or a packaged synthetic media design.

Sequencing Batch Reactor

The secondary treatment equipment would be installed on the site of the high rate treatment ponds, Pond 2. That area is at a higher elevation than the influent pump station, therefore the wastewater flow would be pumped to the headworks. The site for the SBR would be graded so that it is situated at a lower elevation than the headworks, so that the wastewater would flow by gravity to the SBR.

The SBR system would consist of square concrete basins with a series of aeration headers and diffuser assemblies. Five separate SBR basins would be provided for flexibility for O&M of the system over a wide range of flows. Each basin would be approximately 100 ft wide by 100 ft long by 19.5 ft deep and have a volume of approximately 1.5 MG. Space would be designated for additional SBR basins in the future to meet buildout flows.

From the SBR basins, the process streams would be combined and flow to a wet well to pump water to UV disinfection for percolation or filters for reclamation or river discharge. While, excess sludge would be wasted to the SSBs for additional stabilization.

Title 22 Media Filtration

The design of the media filters would utilize the same approach detailed previously in **Section 6.3.1.1**. However, it is expected that media filtration would be sized for both surface water discharge and recycled water production.

UV Disinfection

For surface water discharge, it is assumed that the disinfection standard will be a total coliform MPN of 2.2 per 100 mL. The type and design of the UV disinfection system would be as described previously in **Section 6.3.1.1**.

Chemical Storage and Handling Facilities

The chlorine disinfection system will require sodium hypochlorite, which would be stored in an 8,000-gallon polyethylene tank. Duty and standby metering pumps would be provided for supply of sodium hypochlorite to the chlorine contact tank. It is expected that the metering pumps and the storage tank would be located outdoors within a bermed area for spill containment. A canopy would be provided to shade the pumps and storage tank.

Sludge Stabilization Basin

Existing Primary Pond 1A would be converted into an SSB. WAS would be collected from the MBRs for further stabilization. The storage basins would have enough capacity to provide long-term storage. Based on the size of existing Pond 1A, it is expected that sludge storage capacity would exceed 10 years.

Solids Dewatering

As an option waste sludge from the clarifiers could be mechanically dewatered. The dewatered sludge would be taken to a landfill for disposal. Note that this sludge would not meet Class B requirements and could not be eligible for beneficial reuse without further treatment. At a minimum a facility including a sludge storage tank, sludge feed pump, polymer feed system and a two-meter belt filter press would be required for the initial construction. Provisions for adding a second belt press would be made. The belt press and ancillary equipment would be housed in building to protect the equipment from weather and to contain any odors. Dewatered sludge from the belt filter press would be conveyed via a screw conveyor to a waste container or truck trailer.

Flow Equalization and Storage

Ponds 1B, 3A, and 3B would be converted for storage of treated effluent. Accumulated solids in the digesters would be removed and inlet/outlet structures would be added.

6.3.4.2. Non-economic Advantages/Disadvantages

The non-economic advantages and disadvantages of the sequencing batch reactor system are summarized in **Table 6-9**.

Table 6-9: Non-economic Advantages and Disadvantages of the Sequencing Batch Reactor

Advantages	Disadvantages
Equalization, biological treatment, clarification can be achieved in a single reactor. Operating flexibility and control.	High level of sophistication is required for timing units and control compared to other alternatives. Higher level of maintenance associated with greater sophisticated controls, automated switches, and automated valves.

Advantages	Disadvantages
Minimal footprint. Potential cost savings by eliminating clarifiers and other equipment. Capable of producing secondary-treated wastewater.	Tendency to develop algae growth due to the longer retention time in each basin. Susceptible to public nuisance problems when basins are not fully loaded. Potential of discharging floating or settling sludge during the draw or decant phase. Potential plugging of aeration devices during selected operating cycles. Potential requirement for equalization after the SBR due to batch operation. Batch solids wasting requires immediate attention to solids handling and disposal. Increased power costs due to increased mixing requirements. Unable to achieve nitrogen removal without adding treatment processes.

6.4. Wastewater Alternatives Estimated Costs

Capital and annual cost estimates were prepared for the LTWMP to provide comparative order of magnitude costs for upgrading the existing DWTP into the treatment alternatives considered at a capacity of 5.0 MGD ADF. This estimate, summarized in **Table 6-10**, was prepared in accordance with the guidelines of the American Association of Cost Engineers (AACE). According to the definitions of AACE, the order of magnitude estimate is defined as an approximate estimate made without detailed engineering data. It is normally expected that an estimate of this type would be accurate within +50% or -30%. These percentages should be viewed as statistical confidence limits, and should not be confused with contingencies.

The cost estimates shown, and any resulting conclusions on project financial or economic feasibility or funding requirements, have been prepared for guidance in project evaluation and implementation from the information available at the time of the estimate. The final costs of the project and resulting feasibility will depend on actual labor and material costs, competitive market conditions, actual site conditions, final project scope, implementation schedule, continuity of personnel and engineering, and other variable factors. As a result, the final project costs will vary from estimates presented here. Because of these factors, project feasibility, benefit/cost ratios, risks, and funding needs must be carefully reviewed prior to making specific financial decisions or establishing project budgets to help ensure project evaluation and adequate funding.

Table 6-10: Order of Magnitude Cost Estimate on DWTP Upgrade Alternatives (5.0 MGD)

Description	Extended Aeration	Oxidation Ditch	Membrane Bioreactor	Sequencing Batch Reactor
		2005 Costs in x1,000 of dollars		
Paving and grading	$2,722	$2,722	$2,722	$2,722
Demolition	$325	$325	$325	$325
Yard Piping	$3,070	$3,070	$3,070	$3,070
Pretreatment Facilities	$905	$905	$905	$905
Septic Receiving Station	$241	$241	$241	$241
Extended Aeration Equipment	$4,720	--	--	--
Oxidation Ditch Equipment	--	$8,368	--	--
MBR Equipment	--	--	$14,422	--
SBR Equipment	--	--	--	$6,390
Secondary Clarifier	$2,760	$2,760	--	$2,760

Description	Extended Aeration	Oxidation Ditch	Membrane Bioreactor	Sequencing Batch Reactor
Title 22 Filtration	$4,895	$4,895	--	$4,895
Chlorine Contact Basin	$1,621	$1,621	$1,621	$1,621
UV Disinfection	$1,845	$1,845	$1,845	$1,845
Solids Handling Facilities	$810	$810	$810	$810
Effluent Pump Station	$52	$52	$52	$52
Odor Control Biofilter	$172	$172	$172	$172
Solids Stabilization Basin	$158	$158	$158	$158
Vactor Truck Dump Facility	$32	$32	$32	$32
Chemical Handling Facilities	$299	$299	$299	$299
Plant Water Pump Station	$129	$129	$129	$129
Plant Drain Pump Station	$84	$84	$84	$84
Operations Building	$1,415	$1,415	$1,415	$1,415
Electrical/Instrumentation	$8,150	$7,899	$8,395	$8,250
General Conditions	$2,355	$2,355	$2,355	$2,355
Liquefaction Mitigation	$2,670	$2,670	$2,670	$2,670
Subtotal	$39,430	$42,827	$41,722	$41,200
Contingency 20%	$7,886	$8,565	$8,344	$8,240
Total Construction Costs	$47,316	$51,392	$50,066	$49,440

6.5. Recommended Treatment Design

Process Alternative 3, the Immersed Membrane Bioreactor (MBR), was recommended as the preferred long-term treatment upgrade for the DWTP. The MBR is a cost competitive alternative with a proven operational track record. All four process alternatives considered in this study are feasible designs able to produce high-quality effluent to meet the DWTP's LTWMP requirements and cost differentials are not significant. Where the advantages of the MBR alternative become distinguished over the other process alternatives is in the high quality effluent, reliability, compatibility with all effluent management alternatives and compactness of the process. The City of Hollister considered a number of factors in selecting the MBR alternative over the other alternatives. These factors included:

- Treatment process must produce Title 22 disinfected-tertiary recycled water
- Treatment process must meet strict nitrate limits anticipated
- Treatment process must be compatible with future dissolved solids removal

While all the alternatives could be designed to accommodate the first two factors, only the MBR process is readily compatible for a dissolved solids removal process such as reverse osmosis (RO). The other alternatives would require the addition of expensive microfiltration equipment as a pretreatment for an RO treatment system. The MBR includes microfiltration within its treatment process.

A more detailed description of the selected MBR treatment plant is presented in **Section 9**. The process flow diagram for the recommended WWTP is shown in **Figure 6-5**. A conceptual plan of the DWTP is contained in **Figure 6-6**.

State of Washington
Capital Projects Advisory Review Board (CPARB)
Project Review Committee (PRC)

APPLICATION FOR PROJECT APPROVAL

TO USE THE
GENERAL CONTRACTOR/CONSTRUCTION MANAGER (GC/CM)
or DESIGN-BUILD (D-B) ALTERNATIVE CONTRACTING PROCEDURE

The CPARB PRC will only consider complete applications: Incomplete applications may result in delay of action on your application. Responses to Questions 1-8 and 10 should not exceed 20 pages (font size 11 or larger). Provide no more than six sketches, diagrams or drawings under Question 9. ***(Note: A Public Body that is certified to use the GC/CM procedure and is seeking approval to use this procedure on a GC/CM project with a total project cost of less than $10 million is not required to submit information for Questions 7 or 8.)***

1. Identification of Applicant

(a) Legal name of Public Body (your organization):
City of Gig Harbor

(b) Address:
3510 Grandview Street
Gig Harbor, WA 98335

(c) Contact Person Name: Stephen T. Misiurak, P.E.
Title: City Engineer

(d) Phone No.: 253-853-7626 Fax: 253-853-7597
E-mail: misiuraks@cityofgigharbor.net

2. Brief Description of Proposed Project

Please describe the project in no more than two short paragraphs. *(See Attachment A for an example.)*

The proposed project at the City's Wastewater Treatment Plant (WWTP) consists of multi-phase modifications to replace aging facilities, increase in wastewater treatment capacity, and improvement to effluent water quality. The work proposed in Phase I includes site work; selective demolition; pumping and piping modifications; and construction of a new centrifuge building and centrifuge, a new clarifier and associated piping, three new concrete anoxic basins and associated electrical upgrades, and a new headworks building and associated new equipment. Phase II includes construction of a new lab and employee building, UV disinfection, third effluent pump, vactor truck load-out station, fourth clarifier, aeration basin #4 mechanical equipment, utility water pumps, blower, final paving, landscaping, and site work.

3. Projected Total Cost for the Project:

Note: By law, the D-B contracting procedure cannot be used unless the total cost of the project is over $10 million. Although there is no total project cost requirement for using the GC/CM contracting procedure, every applicant must provide the information requested in Question 3.

A. Project Budget

Costs for Professional Services (A/E, Legal etc.)	$ 1,200,000
Estimated project construction costs (includes 10% contingency):	$16,500,000
Equipment and furnishing costs	$ included
Off-site costs	$ n/a
Contract administration costs (owner, cm etc)	$ 500,000
Other related project costs (briefly describe)	$ n/a
Total (*with sales tax & contingency*)	$18,200,000

B. Funding Status

Please describe the funding status for the whole project.
(If funding is not available, please explain how and when funding is anticipated)

A Public Works Trust Fund Loan (PWTF) has been secured in the amount of $10,000,000.00 for Phase I. Additional PWTF loans will be sought for Phase II. The remaining funding required to complete the work will be funded through revenue bonds and general facility charges. The City is currently establishing an increase to the sewer general facility charge (connection fee) in order to pay for this project and other needed sewer infrastructure projects. The connection fees will increase from approximately $3,000 per sewer connection to over $8,000 per connection.

4. **Anticipated Project Design and Construction Schedule**

Please provide:

- The anticipated project design and construction schedule, including (1) procurement; (2) hiring consultants if not already hired; and (3) employing staff or hiring consultants to manage the project if not already employed or hired. *(See Attachment B for an example schedule.)*

Milestone	Target	Worse Case
Retain GC/CM Project Management Consultant	February 2008	N/A
Submit CPARB Application	March 2008	N/A
Select Legal Council	March 2008	April 2008
PRC Presentation	March 27, 2008	N/A
Establish GC/CM Selection Committee	March 2008	April 2008
30% Construction Documents	March 2008	N/A
Issue RFQ for GC/CM General Contractor	April 2008	May 2008
Select GC/CM Contractor	April 2008	May 2008
VE and Design Review	June 2008	July 2008
90% Construction Documents	June 2008	July 2008
Submit Phase II Engineering Report	July 2008	August 2008
MACC	July 2008	August 2008
Ecology approval Plans and Phase II Engineering Report	August 2008	September 2008
Phase I Construction – Start	August 2008	September 2008
Phase II Construction – Start	January 2009	May 2009
Phase I – Substantially Complete	December 2009	January 2010
Construction Complete	June 2010	January 2011

5. **Why the GC/CM or D-B Contracting Procedure is Appropriate for this Project**

Please provide a detailed explanation of why use of the contracting procedure is appropriate for the proposed project. Please address the following, as appropriate:

For GC/CM projects:

- **If implementation of the project involves complex scheduling, phasing, or coordination, what are the complexities?**

  Implementation of the project involves scheduling, phasing, and coordination complexities. Currently, the City of Gig Harbor WWTP is at capacity. As a result, the City has a moratorium on growth, and specifically side sewer connections. Future sewer connection commitments are in place. Therefore, the development schedule

has been compressed, requiring the overlap of design and selection of the GC as well as the compression of multiple phases of work to complete the system of operation, which includes but is not limited to:

- WWTP Phase I Improvements
- WWTP Phase II Improvements
- On-Shore Outfall Infrastructure Improvements
- Off-Shore Outfall Infrastructure Improvements

Wastewater treatment plants are complex facilities that require specialized structures and systems. Constructing improvements to an existing operational WWTP involves an added complexity due to the operational challenges of installing the improvements while maintaining the operation of the plant. This added complexity further increases the need for well choreographed scheduling, phasing, and coordination of construction and operational needs.

These complexities arise at each stage of construction and include sequencing of demolition, electrical control and supply systems, temporary pumping and piping systems for by-pass work, and treatment functions. Scheduling, phasing, and coordination of these construction elements are vital in maintaining operation of the WWTP during construction and keeping water quality effluent within the required NPDES permit limits.

Phase I construction activities allow sequencing of startups of process equipment/facilities to make room for new Phase II facilities. The site is very small leaving little area for construction equipment access and storage of material. The constraints limit access to the existing facilities for operation and maintenance of equipment. Limited space for construction, the need for collaboration during this critical construction phase, and maintaining operation of the WWTP drives the need for a general contractor (GC) and construction manager (CM) lead team.

- **If the project involves construction at an existing facility that must continue to operate during construction, what are the operational impacts on occupants that must be addressed?** *(Please identify functions within the existing facility which require relocation during construction and how construction sequencing will affect them. As part of your response you may refer to the drawings or sketches that you provide under Question 9.)*

All connected sewers within the City flow to this one WWTP. Therefore, all aspects of the existing WWTP must remain in operation during construction of the proposed improvements. At 60 percent design, the GC/CM will understand the existing process flow and how construction of the new facilities impact current operations. Reasonable assumptions can then be made on how best to sequence construction activities, phase construction, provide temporary facilities, provide temporary by-pass pumping and temporary power, etc. The GC/CM will provide valuable insight to the most efficient sequencing, and means and methods to accomplish the temporary modes of operation. The GC/CM will work with the design team to determine step-by-step maintenance processes that will allow the work to take place in a staged and well organized manner.

The proposed improvements will involve temporarily relocating the lab and employee area to a modular building until the new permanent lab/operations building is completed. Selective demolition of the present control building will be required in order to access a new clarifier and other improvement work areas. Construction of anoxic aeration basins will be complex because of the depth of necessary grading and lack of working space. The installation of shoring may also be required. The footprint of the existing treatment plant and proposed improvements provides limited space that will drive the contractor's ability to stage and sequence the project. See Attachment A.

- **If involvement of the GC/CM is critical during the design phase, why is this involvement critical?**

  It is critical to the success of the project to develop a solid working relationship with the owner, designer, owner's representative, treatment plant operator, and the contractor. This delivery method will bring forth a collaborative team environment that is less likely to be a confrontational or adversarial relationship as most complex projects can become in a traditional design-bid-build delivery method.

  The City has a limited budget to complete the project and it is anticipated that the GC/CM involvement during the design phase will provide the City with an additional resource for identification and resolution of design issues related to plant operation and constructibility, ensuring that construction cost estimates are accurate. The GC/CM involvement is critical to help ensure that the funds budgeted based on construction cost estimates will be adequate, reducing the potential for cost overruns resulting from errors and omissions. As the project consists of upgrades and modifications to an existing plant, the risk of exposure to unknown existing conditions is relatively high. The GC/CM method of contracting will provide for an additional resource to limit the risk associated with the WWTP modifications.

- **If the project encompasses a complex or technical work environment, what is this environment?**

  Modification to the existing WWTP involves both complex and technical challenges that require a specialized contractor and construction staff. The use of poor record drawings of the existing plant is the basis for the design of the improvements. Utilizing the GC/CM method will provide an opportunity for the contractor to become familiar with the existing conditions, proposed improvements, and plant operation during the design phase, which is a direct contrast to the more limited exposure that a standard design-bid-build process would allow. The GC/CM method would also provide an opportunity for the contractor to independently verify the existing conditions and better coordinate the design and construction of the upgrades and modifications.

- **If the project requires specialized work on a building that has historical significance, why is the building of historical significance and what is the specialized work that must be done?**

  N/A

6. **Public Benefit**

In addition to the above information, please provide information on how use of the GC/CM or D-B contracting procedure will serve the public interest. For example, your description must address, but is not limited to:

- *How this contracting method provides a substantial fiscal benefit; or*
- *How the use of the traditional method of awarding contracts in a lump sum (the "design-bid-build method") is not practical for meeting desired quality standards or delivery schedules.*

The GC/CM process will benefit tax and rate payers of the City of Gig Harbor through better coordination of knowledge and objectives of the design team and the contractor, while incorporating on-going constructibility reviews. The GC/CM will help ensure completion of the project on time and within budget. The City of Gig Harbor is currently not allowing additional connections to the City's sewer system through a self-imposed moratorium. If the project comes in over budget for the traditional design-bid-build method of construction, the taxpayers will lose both time and money if the project has to be re-designed and/or re-bid.

Funding for the modifications will come from a Public Works Trust Fund loan and paid for by connection fees and sewer rate increases. The GC/CM contracting method will provide real time cost estimates that will account for the volatile costs of construction in the past few years. Keeping the project within budget and on time will provide the public with a fiscally responsible solution to the plant expansion.

The GC/CM method of contracting will allow the contractor to build a schedule early and provide insight to potential conflicts. This contract method could also provide information that would allow an early or phased start of portions of the project and therefore reduce the time to construct the project. In addition, required bypassing of certain portions of the plant to maintain operation will be identified and reviewed early.

The GC/CM method of contracting will provide an opportunity to maintain a tighter schedule and allow a higher probability of building the project within budget.

Both of these goals will save the rate- and tax-payers' funds over the 30-year duration of the project loan.

7. **Public Body Qualifications**

Please provide:

a) **A description of your Organization's qualifications to use the GC/CM contracting procedure.**

The City of Gig Harbor has engaged Parametrix, Inc., (PMX) as project management consultants to lead the Wastewater Treatment Plant (WWTP) Upgrade project team. PMX's team leader for this project is Jim Dugan, Principal–in-Charge. Jim is supported by John Burk, PE, Senior Consultant. Through the course of the project, PMX will work closely with Stephen Misiurak, City Engineer, and Darrell Winans, Treatment Plant Supervisor, for Gig Harbor.

Jim Dugan's GC/CM projects are routinely completed within budget, without contract disputes, and with high Owner-satisfaction feedback. Jim's most recent and relevant two GC/CM projects are the Greater Tacoma Convention and Trade Center ($78 million) and Stadium High School renovations ($108 million).

Through his role in the Greater Tacoma Convention and Trade Center, Jim was responsible for management of the design process, management of the bid package process, and contract administration during construction of the Trade Center, which was contracted using the GC/CM process. The overall project was comprised of three major components: the convention center, a multi-story parking garage, and a one-city block of site improvements. A key challenge for the project was to incorporate large architectural program requirements into a sloping site in a tight urban setting. Additionally, project funding and owner bidding preferences required that contract documents be packaged individually for each bid package and carefully integrated into the bid review and contracting phase to ensure mitigation of scope and bidding gaps.

Jim was responsible for design and management of the Stadium High School design process, renovation of the historic school, and contract administration services during construction. This complex 300,000-square-foot project involved an unusual degree of complexity due to its small urban site and the degree of unknowns buried within the site area. Through careful collaboration between the owner and design and construction team, onsite problem solving occurred seamlessly. A deliberate effort occurred on Jim's part to ensure open, positive communication toward all issues. In addition, Jim was responsible for leading or participating in presentations before City and County councils,

community groups, Neighborhood Associations, and user groups to gain alignment, input, and support. Jim also teamed with Bassetti Architects to create the Education Specifications for Stadium High School. This effort included meeting with all academic leads, and facility and administrative staff.

The project delivery method for Stadium High School was GC/CM. Extensive value engineering was accomplished through design flexibility without diluting design integrity. Onsite contract administration further ensured design integrity and cost control as market-driven economic challenges were mitigated and unknown 100-year-old site and building challenges were resolved through innovative design and construction means and methods solutions.

b) A Project organizational chart, showing all existing or planned staff and consultant roles:

See Attachment B.

c) Staffs and consultants short biographies.

Jim Dugan has extensive GC/CM experience managing the planning, design, engineering, and construction phases of GC/CM agreements for clients in both public and private markets.
With 30 years of experience, Jim provides his clients with the necessary project management and leadership skills needed to plan, hire, and manage the design consultants and construction contractors to meet program requirements, budget restrictions, and schedule requirements, as well as work collaboratively with all agencies having jurisdiction.

John Burk, PE has over 18 years of experience providing project and construction management for a wide variety of infrastructure and building projects. His most recent owner's representative role was for the Pilot Travel Center in Tumwater, Washington, where he facilitated planning, design, permitting, coordination, and construction management for a new semi-truck fueling station with a convenience store. The project included extension of utilities more than a mile away from the site.

John's previous relevant experience was with the City of McCleary where he was the owner's representative and acting City Engineer for planning and design of the Wastewater Treatment Plant project. Pursuant to state and federal water quality regulations, the City of McCleary upgraded their wastewater treatment plant to accommodate 20-year growth in the service area, eliminate current NPDES permit exceedances, and replace worn out and aging facilities. Parametrix provided facility planning, permitting, funding, design, and construction management for the project. Key challenges on this project were keeping the facility in operation during construction and within permitted discharge limits.

Improvements to the WWTP included replacement of the existing dual trickling filter/biofilter with a new sequencing batch reactor, new solids handling system including aerobic digesters, belt filter press, and biosolids pumping system, new influent pumps, fine screen and grit tank, new ultraviolet disinfection system to replace chlorination, effluent chiller and heat exchanger, effluent reaeration system, new outfall diffuser, and administration building remodel and new laboratory.

Shannon Thompson is an experienced senior construction manager in a wide range of construction projects. Shannon has managed for private, commercial and environmental projects while specializing in project management, regulatory compliance and construction management. He has experience in negotiating with contractors, suppliers,

and regulatory agencies to achieve his client's goals. Shannon most recently managed the City of Port Angeles Landfill Closure to bring the project in on time and under budget by 1.5 percent.

Steve Misiurak, PE – City Engineer, has more than 20 years of design and distribution experience in water, stormwater, and wastewater, as well as all aspects of public works projects and project management. Steve has extensive experience in all aspects related to the management and oversight of the City's engineering department. His previous project experience provides him with strong construction project management and inspection skills. Steve works well as a team player and provides excellent customer service and public relations to the Gig Harbor community.

Darrell Winans, Treatment Plant Operator has 20 years experience in wastewater treatment with a Group 3 certification. He has a diverse range of experience in the field, from being an operator in a small package plant to design review and has acted as general contractor for the construction of a completely new SBR facility. He has also been physically involved in planning, design review and construction of 3 outfall projects, one extension's and two extension/replacements. He was the assistant lead operator in charge in a 4.1 MGD facility. And currently is the Supervisor in charge of the City of Gig Harbor wastewater treatment and collection system.

Dave McBride, PE, Cosmopolitan Engineering Group, is a senior environmental engineer, project manager, and design engineer specializing in water resources. He has a Master of Science degree in Environmental Fluid Mechanics and Hydrology. His project work includes water and wastewater treatment facilities planning, process design, piping and mechanical and field studies, water quality and reuse evaluations, construction administration, and NPDES permitting assistance.

Legal Counsel – TBD

Kirk Robinson, Robinson Company, is experienced in third party financial analysis, cost estimating, and scheduling.

Select detailed resumes may be found in Attachment C.

d) **Provide the *experience and role on previous GC/CM or D-B projects* for each staff member or consultant in key positions on the proposed project.** ***(See Attachment D for an example.)***

See Section 7-a, above.

e) **The qualifications of existing or planned for project manager and consultants.**
Note: For design-build projects, you must have personnel who are independent of the design-build team, knowledgeable in the design-build process, and able to oversee and administer the contract.

See Section 7-a, above.

f) **The qualifications of an interim project manager until your organization has employed staff or hired a consultant as the project manager. Also indicate whether sufficient funds are available for this purpose and how long it is anticipated the interim project manager will serve.** *Note: This information is required only if your organization has yet to select a project manager at the time of application.*

The project management functions for the WWTP will be completed as a collaborative effort by a number of City staff, members of the design team, and PMX. Each will use his or her own unique talents and experience to manage various components of the project

through the program phase, the design phases, construction, relocation of the laboratory and staff, and operations sequencing. The attached matrix in Attachment D more particularly identifies each team member and the specific project management tasks for which he or she is responsible.

g) **A brief summary of the construction experience of your organization's project management team that is relevant to the project.**

See Section 7-a, above.

h) **A description of the controls your organization will have in place to ensure that the project is adequately managed.**

The project management team, as described above and in Attachment D, will provide the necessary oversight to maintain the construction schedule and adherence to the budget. There are provisions built into the City's management process that will ensure contractor and subcontractor invoice reconciliation and payment, a monthly review of project cost accounting, and preparation of periodic variance reports. A clear and concise record of all construction meetings, change orders, and schedule fluctuations will be established and documented. Close supervision of the onsite construction activities will occur.

i) **A brief description of your planned GC/CM or D-B procurement process.**

The City sees this as a multi-phased process as outlined below:

1. Establish GC/CM Selection Committee
2. Issue RFQ for GC/CM General Contractor
3. Select GC/CM General Contractor using the following criteria:
   GC/CM experience of the proposed workload
   Recent, current, and projected workload
   Approach to executing this project
   Current financial statement and 5-year financial history
   Analysis of proposed fee structure
4. Select apparent successful finalist, conduct interview, and negotiate contract

j) **Verification that your organization has already developed (or provide your plan to develop) specific GC/CM or D-B contract terms.**

The City of Gig Harbor will use the University of Washington's standard GC/CM contract updated January 9, 2008, and tailored for Gig Harbor's project.

8. **Public Body (your organization) Construction History:**
Provide a matrix summary of your organization's construction activity for the past six years outlining project data in content and format per the attached sample provided:

- Project Number, Name, and Description
- Contracting method used
- Planned start and finish dates
- Actual start and finish dates
- Planned and actual budget amounts
- Reasons for budget or schedule overruns

Please see Attachment E.

9. **Preliminary Concepts, sketches or plans depicting the project**
To assist the PRC with understanding your proposed project, please provide a combination of up to six concepts, drawings, sketches, diagrams, or plan/section documents which best depict your project. In electronic submissions these documents must be provided in a PDF or JPEG format for easy distribution. Some examples are included in attachments E1 thru E6. At a minimum, please try to include the following:

- A overview site plan (indicating existing structure and new structures)
- Plan or section views which show existing vs. renovation plans particularly for areas that will remain occupied during construction.

Note: applicant may utilize photos to further depict project issues during their presentation to the PRC

Please see Attachment A – Overall Site Plan and Isometric View.

10. **Resolution of Audit Findings On Previous Public Works Projects**

If your organization had audit findings on any project identified in your response to Question 8, please specify the project, briefly state those findings, and describe how your organization resolved them.

N/A

Caution to Applicants

The definition of the project is at the applicant's discretion. The entire project, including all components, must meet the criteria to be approved.

Signature of Authorized Representative

In submitting this application, you, as the authorized representative of your organization, understand that: (1) the PRC may request additional information about your organization, its construction history, and the proposed project; and (2) your organization is required to submit the information requested by the PRC. . You agree to submit this information in a timely manner and understand that failure to do so shall render your application incomplete.

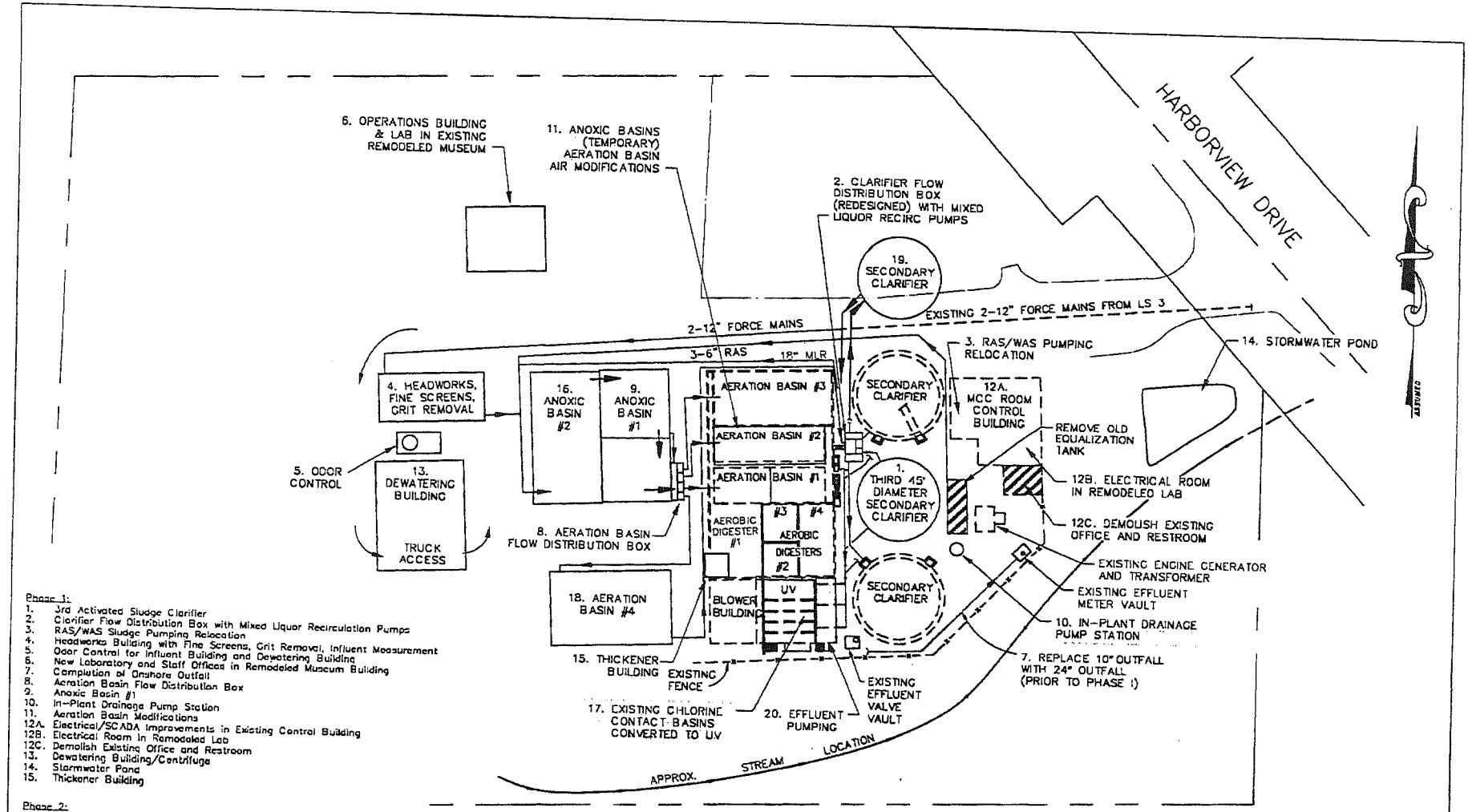
Should the PRC approve your request to use the GC/CM or D-B contracting procedure, you also understand that: (1) your organization is required to participate in brief, state-sponsored surveys at the beginning and the end of your approved project; and (2) the data collected in these surveys will be used in a study by the state to evaluate the effectiveness of the GC/CM or D-B process. You also agree that your organization will complete these surveys within the time required by CPARB

Name (please print) STEPHEN MISIURAK

Title: CITY ENGINEER

Date: 3/3/2008

Attachment A



Phase 1:
1. 3rd Activated Sludge Clarifier
2. Clarifier Flow Distribution Box with Mixed Liquor Recirculation Pumps
3. RAS/WAS Sludge Pumping Relocation
4. Headworks Building with Fine Screens, Grit Removal, Influent Measurement
5. Odor Control for Influent Building and Dewatering Building
6. New Laboratory and Staff Offices in Remodeled Museum Building
7. Completion of Onshore Outfall
8. Aeration Basin Flow Distribution Box
9. Anoxic Basin #1
10. In-Plant Drainage Pump Station
11. Aeration Basin Modifications
12A. Electrical/SCADA Improvements in Existing Control Building
12B. Electrical Room in Remodeled Lab
12C. Demolish Existing Office and Restroom
13. Dewatering Building/Centrifuge
14. Stormwater Pond
15. Thickener Building

Phase 2:
16. Anoxic Basins for Nitrogen Removal, as determined in 20-Year Engineering Report
17. UV Disinfection
18. 4th Aeration Basin
19. 4th Activated Sludge Clarifier
20. Effluent Pumping Upgrade

SCALE: 0 25' 50' 100'

LEGEND

- - - - EXISTING STRUCTURE
——— PROPOSED STRUCTURE

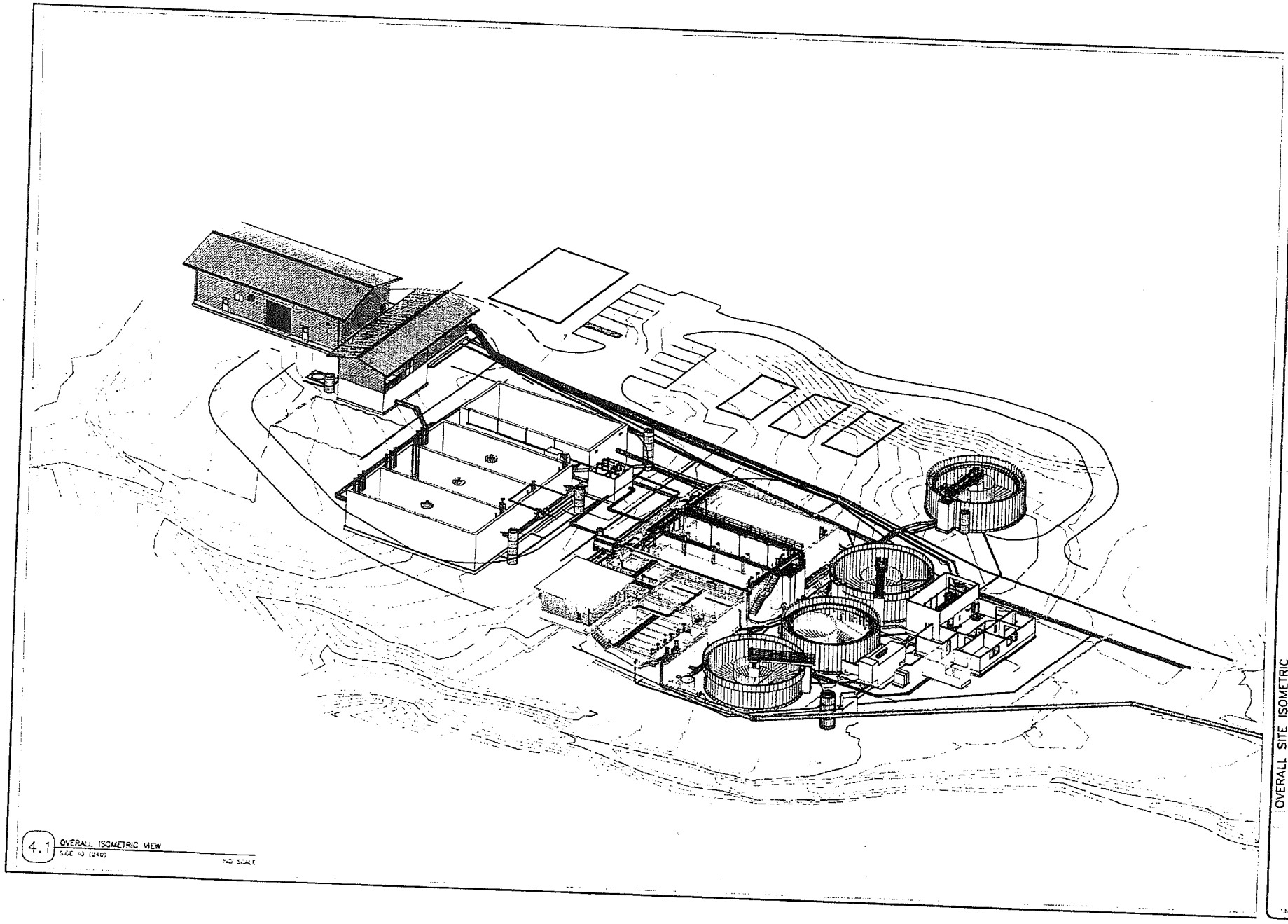
GIGH1 August 2, 2007

Cardinal Engineering Group — Civil, Environmental, and Recreational Consulting — 711 Pacific Avenue, Tacoma, WA 98402, (253) 272-7220, (253) 272-7250 fax

H. R. Esvelt Engineering — Environmental Engineering — H. Richard Esvelt, P.E. (206) 842-7986, 6450 N.E. Brighton Rd. Bainbridge Is. WA 98110 (W) 842-5072, FAX (206) 780-0811

Figure 1 to Exhibit A – City of Gig Harbor Wastewater Treatment Plant Proposed Improvements

Attachment A



Structural Research Company

WWTP EXPANSION DESIGN TEAM

OVERALL SITE ISOMETRIC

City of Gig Harbor
Wastewater Treatment Plant
Phase 1 Improvements

preliminary

S1

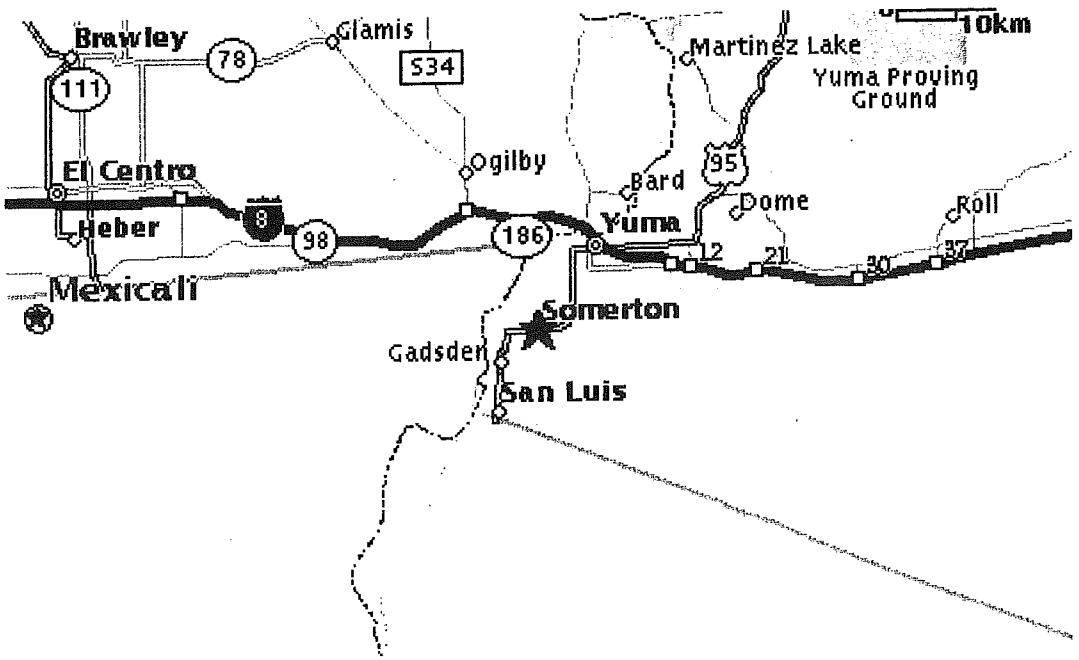
Border Environment Cooperation Commission

Construction of a Wastewater Treatment Plant in Somerton, Arizona

General Criteria
Human Health and Environment
Technical Feasibility
Financial Feasibility
Public Participation
Sustainable Development
Available Documents

General Criteria

1. **Type of Project.** The project consists of the construction of a wastewater treatment plant in Somerton, Arizona.
2. **Location of Project.** The City of Somerton is located in Yuma County, Arizona, approximately 10 miles [16 km] southwest of Yuma, Arizona, 10 miles [16 km] south of the California/Arizona border, and 10 miles [16 km] north of the southern Arizona/Mexico border. The project is located within the 100 km border region as defined by the La Paz agreement. The City of Somerton is a community of approximately 7,500 residents and the population is expected to reach 16,000 by the year 2020 (4.2% annual increase). The City limits bound an area of approximately one square mile. The City of Somerton is shown in the figure below:



Description of Project and Tasks. The project consists of constructing a sequencing batch reactor (SBR) wastewater treatment plant with a total treatment capacity of 0.8 million gallons per day (MGD) to replace the existing lagoon system.

Compliance with International Treaties and Agreements. The project will not have any international impacts as all construction, maintenance, and project effects will occur within U.S. territory in a very localized zone. The wastewater treatment plant discharge is to the Yuma Drain Canal, that eventually flows into Mexico and is used for agricultural reuse. The new wastewater treatment plant will guarantee that the effluent discharged complies with U.S. standards for protection of water bodies and its subsequent use for irrigation in Mexico.

Human Health and Environment

Human Health/Environmental Needs. This project will address human health and environmental concerns by providing improved wastewater treatment that conforms to current US standards. Although there is currently no evidence of health effects from the deteriorated standards of the current treatment plant, it is subject to violation of the NPDES permit.

The construction and operation of the new wastewater treatment plant will result in water quality improvements in the Yuma Drain Canal surface waters and the underlying groundwater aquifer by reducing levels of conventional pollutants (BOD_5 and TSS) and of total nitrogen. Potential increased volume of discharged chlorinated wastewater effluent can be mitigated the establishment and proper monitoring of a Mixing Zone. The new plant will also eliminate current seepage of approximately 30,000 gpd from the lagoons into the groundwater.

The plant will be a good neighbor. Foul odors generated from the lagoon system adversely impacting the adjacent residential area will cease. The elimination of gaseous chlorine as a disinfectant agent will reduce the public health and safety risk to plant staff, farm workers on the adjacent agricultural fields, and nearby residential areas.

Environmental Assessment. An Environmental Assessment (EA) was performed in compliance with BECC Project Certification Criteria and EPA 40 CFR Part 6 requirements. The assessment considered the following criteria:

- Discussion of the direct, indirect, cumulative and short-term positive and negative effects of the project on the environmental components of the affected area (e.g. ecosystem integrity, biological diversity, sensitive environmental habitats, and human health);
- Description of unavoidable negative impacts and actions to be taken to mitigate these impacts;
- Discussion of the environmental benefits, risks, and costs of the proposed project as well as the environmental standards and objectives of the affective area.

Significant transboundary effects are not likely.

EPA has reviewed the EA and issued a Finding of No Significant Impact on mid-May, 2002.

Compliance with Ecology and Cultural Laws and Regulations. A consultation with the Arizona State Historic Preservation Office and with different Arizona tribes was performed as part of the environmental assessment process. The environmental evaluation of the process indicated that there are no potential impacts, direct or indirect, to any historical, cultural, and/or archaeological resources in the area.

Technical Feasibility

Appropriate Technology. The selected alternative is a Sequencing Batch Reactor system, which is described below.

a) Project Specifications

The recommended activated sludge treatment process in Hazen and Sawyer's report is the sequencing batch reactor due for a variety of reasons with the cost effectiveness, process flexibility, and ease of modular expansion being the primary selection factors.

The sequencing batch reactor (SBR) process is a cyclic activated sludge treatment process. Multiple reactors are

provided to treat the wastewater in batches. Somerton's sequencing batch reactors will be and operated to oxidize the carbonaceous BOD, nitrify the ammonia, and denitrify to reduce the total nitrogen to a level that meets the permit limits.

All treatment processes including equalization, aeration, denitrification, and sedimentation, and decanting occur in the SBRs eliminating the need for separate clarification and return activated sludge systems.

The typical SBR treatment sequence for nitrification-denitrification systems is as follows:

1. The reactor is allowed to fill with raw wastewater. The filling phase is often divided into stages that include aeration to reduce BOD and to nitrify ammonia and then mixing without aeration to promote denitrification (removal of nitrogen).
2. A reaction phase is generally provided to promote additional treatment.
3. A settling or quiescent phase then follows to allow the biological solids to settle.
4. A decanting phase is provided to draw off the clarified effluent from the upper portion of the reactor.
5. Often a small idle phase is provided to allow time for miscellaneous operations that may need to occur to keep the reactors in sequence.

Wasting of the biological solids that are produced by converting BOD to bacteria needs to occur periodically to maintain the design mixed liquor concentration and sludge age. Wasting can occur at anytime in the process sequence. Frequently, wasting is performed following the decant phase when the sludge concentration is highest.

The Hazen and Sawyer Report recommended a two SBR basin configuration. While economical, the two SBR configuration does not provide much operational flexibility and process redundancy. Two methods are commonly used if one of the reactors is removed from service for cleaning or repairs. The first method is to convert the remaining in-service reactor to a continuous flow operation. This is viable for short periods of time especially when the system is well below its design loadings. As loadings approach design loads, achieving treatment objectives by this method becomes difficult. The second method is to provide an aerated and mixed basin where the flow can be stored during the cycling of the in-service reactor.

Stanley Consultants proposes to provide four basins for Somerton. The four-basin configuration offers much more process flexibility and redundancy. One of the four basins can be taken out of service without severe impact to the three remaining in-service basins. The design will be set up so the four basins can be paired together for dual cell cycling during normal operations. In the event a basin needs to be taken out-of-service, the remaining three basins can be cycled independently.

The SBRs will be equipped with diffused aeration, mechanical mixers, and decanting facilities. A submersible pump will be provided in each basin to pump waste solids to the sludge thickener. Jet mixing, a type of aeration system offered by some vendors, will not be utilized on this project based on poor experiences at other facilities.

The discharge from SBR systems is higher than the inflow because the same volume of water that entered the SBR is discharged over a shorter time period. Flow equalization downstream of the SBRs was considered to dampen the discharge flows from the SBRs. Separate flow equalization was found to cost more than sizing the disinfection facilities for the higher peak flows.

A. Major Equipment

1. SBR Design Criteria

Average Flow:	0.8 mgd
Maximum Day Flow:	1.6 mgd
BOD_5	225 mg/l avg, 270 mg/l sustained peak
TKN	39 mg/l average, 47 mg/l sustained
NH_3N	29 mg/l average, 33 mg/l maximum
SRT	16 to 19 days
Volumetric Loading	10 lbs BOD/1000 CF

Hydraulic Retention Time	29 hrs
Dissolved Oxygen	2.0 mg/l minimum during aerobic phase
O2 Requirements BOD	1.1 lb O_2 per lb BOD_5
O2 Requirements NH_3N	4.56 lb O_2 per lb NH_3N
Oxygen Transfer Efficiency (Based on new, clean water transfer efficiency)	25%

2. SBR Design

Number of Basins:	4
Capacity, Each:	0.2 MG
Nominal Length:	39 feet
Width:	39 feet
Maximum SWD:	21 feet
Normal SWD:	17.5 feet
Minimum SWD:	14 feet
Freeboard at maximum water depth:	2 feet
Number of Cycles per basin:	5 per day
Cycle Time:	4.8 hours
Actual Oxygen Required:	3541 lb day
Est. Net Sludge Yield:	0.701 lbs. WAS/lb BOD
Waste Sludge, mass	579 lb/day
Waste Sludge, % solids	0.35
Waste Sludge, Flow	162 to 196 gpm
Number of WAS pumps per Basin:	1
Type:	Submersible
Flow:	200 gpm
Number of Mixers per Basin:	1
Mixer Horsepower:	10 hp

Note one uninstalled mixer and one uninstalled WAS pump will be provided for redundancy.

3. Aeration System

Diffuser Type:	Fine Bubble Diffused Air
Air flow per Basin, SCFM	TBD
Number of Blowers:	3
Blower Capacity, ea.	TBD
Blower Horsepower:	100
Blower Type:	Positive Displacement

Decant devices vary significantly from vendor to vendor. An appropriate decant mechanism will be provided to decant clarified treated wastewater from the SBR. The decant mechanism will have provisions for accounting for varying liquid levels and will minimize entrance of solids into the mechanism during all phases of operation or will automatically flush solids accumulated in the mechanism prior to discharge.

O&M Plan. The Operation and Maintenance(O&M) Manual will be prepared by the design engineer upon completion of the construction of the plant with support from the construction contractor and equipment manufacturers. Development of this manual is not possible at this time since no equipment has been selected or installed.

Operation and maintenance manuals for each piece of equipment should also be maintained. Each of these

should contain the following for each system component:

- Specifications and cut sheet drawings
- Maintenance schedules
- Replacement parts list.

The O&M manual for the treatment plant as a whole should include the following elements:

Plan Element	Description
Start-Up Operation Plan	The Operation Plan will be developed by the design engineer to ensure that Treatment plant staff understand how to properly start-up and operate the facility. Traditionally, the contractor and equipment supplier conduct the initial start-up of plant equipment to permit the detection that equipment is installed and started properly. Start-up operations and training of the permanent staff should be part of this activity.
Contingency Plan	The Contractor will be required to submit an emergency response and contingency plan covering the construction and start-up phase, upon the issuance of the contract award notice. This plan will be updated and maintained by Publilc Works Division personnel to cover any emergency that might occur during normal operation.
Safety Plan	A safety and health plan will be developed by the WWTP Superintendent and implemented by all Public Works Division personnel involved with plant operation and maintenance. It should include safety training before start-up, with periodic refresher training.
Quality Assurance Plan	The quality assurance plan should be developed during the start-up
Pollution Prevention Plan	The construction operator will provide a Pollution Prevention Plan, including a Storm Water Pollution Prevention Plan required by the NPDES permit.
Facility Closure Plan and Post-Closure Plan	The existing lagoons will be decommissioned during and after the start-up of the new facilities. A closure plan will be submitted to ADEQ with the facility closure application.

Compliance with applicable design norms and regulations. Currently, Stanley Consultants is under contract to the City of Somerton, Arizona to prepare final design for the wastewater treatment plant. Sixty percent design has been completed. Also, a Value Engineering was performed to the final design.

Financial Feasibility and Project Management

1. **Financial Feasibility.**

The NADB completed the financial analysis to determine the funding structure of the project and the user rates to guarantee the financial sustainability of the operating agency.

The project costs are as follows:

Capital Cost Estimate
New Wastewater Treatment Plant
City of Somerton

Construction	6,424,389
Administration	488,325
Engineering Fee	973,979
Legal Fee	15,000
Contingency	642,439
CONSTRUCTION COST	8,544,132

Funding sources for the project are as follows:

Financial Structure

The NADB also awarded a $864,168 BEIF transition assistance grant in order to make the user fees affordable based on the City's Median Household Income.

2. **Rate Model:** The NADBank prepared a rate study to determine the water user fees that will guarantee the financial sustainability of the project. The proposed water user fees are presented below.

Monthly Water and Sewer Rates: Before and After Recent Adjustment

	Rates Before September 2000	New Rates (Resolution 631)
Water Rates		
Residential Class		
First 5,000 gallons + Base Fee	$10.50	$8.25
Over 5,000 gallons (per each 1,000)	$0.75	$1.25
Multi-Family Class		
First 5,000 gallons + Base Fee	$10.50	$8.00
Over 5,000 gallons (per each 1,000)	$0.75	$1.25
Commercial Class		
First 5,000 gallons + Base Fee	$10.50	$8.50
Over 5,000 gallons (per each 1,000)	$0.75	$1.40
Sewer Rates		
Residential Class		
Flat Rate	$12.00	$14.50
Multi-Family Class		
Meter Charge	$12.00	$7.00
Per Unit Fee	n.a.	$7.00
Commercial Class		
Base Fee	$12.00	$6.67
Per 1,000 Gallons	$0.15	$1.12

Public Participation

Public Participation Plan. The City of Somerton submitted a public participation plan to BECC on November 21, 2000 and was approved on the 27th of that month.

Steering Committee: The steering committee was formed on October 12, 2000. Its membership is composed of: Oscar Joanicot, citizen; Fred Gloria, Accountant; Enrique Porchas, Equipment Salesman and Luis Heredia, Oscar Sanchez, and Carmen Juarez, local citizens. The steering committee has a technical support group composed of Eddie Mendez, Public Works Director, Leo Lomelí, City Water Specialist and Cliff O'Neill, Community Development Director. The committee was responsible for the development of the public participation plan and met ten times since its formation to follow-up on the public process.

Local Organizations: The Somerton School Parents League, Somerton Rotary Club, Somerton Merchants, Senior Nutrition Center, and the Immaculate Heart of Mary Catholic Church were contacted to present the proposed project and solicit their support. Approximately one hundred people attended these meetings.

Public Information: The project proposal was available at the Somerton City Hall and after work hours at the Somerton Police Station. The Yuma Daily Sun published articles on the city's efforts to improve the wastewater plant Feb. 7, April 6, and May 16, 2001. Committee members and volunteers delivered to about 900 customers a flyer that contained information on the election, and a project fact sheet. Additional flyers were handed out at the Immaculate Heart Catholic Church with meeting notices included in the church bulletin. The engineering consultant

provided the technical presentation at the Feb.8, 2001 public meeting.

Public Meetings: Public meetings were held on October 30, 2000, January 29 & 30, Feb. 8, March 12 & 15, and April 11, 2001 to present the technical aspects, project costs, and ballot information to local residents. A final public meeting was held on April 30, 2003 to present the rates to the residents of the city.

Election Authorization: At a General Election on May 15, 2001, local voters authorized the City to incur indebtedness in an amount not to exceed $4.4 million to improve and expand the wastewater system. The election results were 180 in favor and 26 opposed.

Sustainable Development

1. **Definition and Principles.** The project complies with BECC's definition of Sustainable Development: *"An economic and social development based on the conservation and protection of the environment and the rational use of natural resources, but considering current and future needs, as well as present and future impacts of human activities".*

   The Wastewater Treatment Plant Replacement Project was developed in full conformity with the following four principles of sustainable development:

   Principle 1 - Human beings are at the center of concerns for sustainable development. They are entitled to a healthy and productive life in harmony with nature.

   Principle 2 - The right to development must be fulfilled so as to equitably meet developmental and environmental needs of present and future generations.

   Principle 3 - In order to achieve sustainable development, environmental protection shall constitute an integral part of the development process and cannot be considered isolation from it.

   Principle 4 - The stakeholders (e.g. groups and individuals impacted by, and having an impact on development projects, must be part of any related activity. Specifically, this means that: Border residents experiencing environmental problems first hand must be given the opportunity to participate in the decision-making process on ways to protect, manage, and employ environmental resources in their communities; and the efforts and expertise of the different institutions involved in environmental, social, and economic endeavors within all sectors of the society must be brought together for better balanced development planning and better use of scarce resources.

   The project will improve the quality of life in the community by ensuring the capacity to properly treat the effluent generated by Somerton's growing population, before its discharge, thus avoiding the human health and environmental problems associated with a degradation of the water quality of the receiving Yuma Main drain.

2. **Institutional and Human Capacity Building.** The new wastewater treatment plant will be operated and maintained by the City's Water and Sewer Division personnel. For this purpose, the Public Works Department will need to hire one new operator, increasing the capabilities of the Division as a whole. Either this operator or one of the current operators will need to achieve a Grade III certification according to the Arizona Administrative Code.

   Somerton has a history of providing training opportunities to their operators and encouraging them to attain higher certification levels. The current operators have begun the certification process and undoubtedly will be able to advance concurrently with the anticipated increase of certification level required for the new facility.

   As has been noted throughout this document, the project will require a series of additional capacity building activities in addition to the hiring and grade certification of their operators. These are summarized below:

- An Operation and Maintenance (O&M) Manual will be developed with project funding for the new treatment plant. This manual will be a reference document for setting up routine maintenance and for trouble-shooting non-routine maintenance, thereby improving the capabilities of the Public Works Department.

- Start-up training in treatment plant operation will be offered by the contractor and equipment providers to Public Works Department staff.

- A work safety and health training program below project start-up, followed by periodic refresher courses.

In general, the advancement of administration and operations personnel is supported by available training programs, such as those offered by the ADEQ's Outreach Program. The selected treatment facility will provide the ability to serve an increased client base, which in turn generates greater revenues for the City through user charges.

Finally, the update of the NADBank rate study will allow the City to make the necessary adjustments to the rate design currently being implemented so as to improve its institutional and financial capacity.

3. **Conformance with Applicable Local/Regional Conservation and Development Plans.** The project complies with the City of Somerton General Plan.

4. **Natural Resource Conservation.** The construction of a new SBR treatment plant to replace the current lagoon system will allow the City to effectively treat the influent sewage flows to their facility. The existing plant has not been able to maintain NPDES compliance and has been cited for other violations of applicable environmental regulations. The existing plant is also not capable of handling expected future flows that will accompany population growth. The new plant will improve the quality of surface water in the Yuma Main Drain and the quality of groundwater by eliminating the current seepage from the lagoons.

   The project will have no impact on available land or biological resources as the new plant will be constructed on a filled lagoon and will not require additional land.

5. **Community Development.** The City of Somerton has a significant recurring unemployment problem as employment is centered on the highly seasonal agricultural industry. Reported unemployment rates are have surpassed 50%. Somerton's household income is also quite low, ranking 150 out of Arizona's 176 cities and unincorporated areas.

   The new wastewater treatment plant can have a positive impact on these weak economic indicators by helping to provide improved services and environmental conditions that can attract new businesses, which in turn can have a multiplier effect on the local economy through payrolls, taxes and additional housing requirements.

Potential negative effects of building the new treatment plant are primarily related to an increase in utility rates. The net effect of the new project is to increase average monthly residential and commercial sewer bills by approximately 35% to 40% over the next 5 years, which could offset the indirect development impact of improved service. But these negative effects could be mitigated by the fact that the total projected water and sewer bills will still be competitive with many other representative cities in the state.

Available Documents

- Environmental Assessment
- Finding of No Significant Impact

- Project Certification Document
- Preliminary Engineering Report
- Value Engineering Report
- 60 percent design drawings.

Argos™ Sequencing Batch Reactor
STANDARD SPECIFICATIONS

PART 1 – GENERAL

1.01 SCOPE

A. (Single/Dual/Triple/Quadruple) train sequencing batch reactor system for treating (municipal/industrial) wastewater.

B. Equipment and controls, including, but not limited to, the following:

1. Motor actuated control valves.
2. Electric motor-driven, direct drive, propeller-type floating aerator/mixer.
3. Portable davit crane.
4. Decant mechanisms.
5. Waste sludge pumps.
6. Telescoping valve.
7. Dissolved oxygen control system.
8. Process control system with Programmable Logic Controller (PLC) and graphic operator interface.

C. Installation and start-up assistance and training.

D. Process guarantee.

1.02 SYSTEM DESCRIPTION

A. Design Requirements

1. The system incorporates activated sludge technology with (continuous/intermittent) influent feed to the reactor(s). The activated sludge in each reactor vessel is alternately aerated and mixed over a number of pre-determined cycles. Solids liquid separation occurs during the settling phase of the cycle. After the settling phase, treated effluent is decanted or withdrawn from the liquid surface. Flow to the vessel is (not interrupted at any time/stopped during the settling and decant cycles). The

functions of flow equalization, biological oxidation, nitrification, denitrification, sedimentation, and aerobic sludge stabilization can all be carried out in the same treatment system.

2. Influent Wastewater Characteristics & Site Conditions

   a. Average Daily Flow: _____ (MGD/m^3/d)

   b. Peak Dry Weather Flow: _____ (MGD/m^3/d)

   c. Peak Wet Weather Flow: _____ (MGD/m^3/d)

   d. BOD_5: _____ mg/l

   e. Total Suspended Solids: _____ mg/l

   f. Ammonia Nitrogen: _____ mg/l

   g. Total Phosphorus: _____ mg/l

   h. Temperature Range (Water): _____ °C

   i. Temperature Range (Air): _____ °C

   j. Site Elevation: _____ (feet/meters)

B. Performance Requirements

1. The following effluent limits shall be on a 30-day arithmetic average:

   a. BOD_5: _____ mg/l

   b. Total Suspended Solids: _____ mg/l

   c. Ammonia Nitrogen (NH_3-N): _____ mg/l

   d. Total Nitrogen: _____ mg/l

   e. Total Phosphorus: _____ mg/l

2. It is the intent of these specifications that a single manufacturer-supplier, regularly engaged in the design, manufacture, assembly and production of sequencing batch reactor systems of the type specified, shall have complete responsibility for the final design, furnishing, coordination, and installation supervision of all components in the sequencing batch reactor system. It is also intended that said manufacturer-supplier make all

adjustments, alterations, replacements and tests specified and required for a complete, satisfactory and trouble-free operating installation.

C. Related Work Specified Elsewhere

Engineer to place referenced specification sections here.

1) Section _____ - Aeration and Mixing Equipment

1.03 SUBMITTALS

A. Shop Drawings

1. Submit under provisions of Division 1. Submittal shall contain, as a minimum:

   a. Product and dimensional data.

   b. Process calculations.

   c. Electrical connections and specifications.

   d. Installation instructions.

   e. System accessories.

   f. Electric motor data.

B. Operation and Maintenance Data

1. Submit under provisions of and in conformance with Division 1.

2. Submittal shall include:

   a. Operational, maintenance, and trouble-shooting procedures.

   b. Installation information.

   c. Replacement part numbers.

   d. Electrical control diagrams.

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C. Start-Up

1. Provide trip report, Certificate of Proper Installation, and Certificate of Contract Conformance prior to final acceptance by the OWNER.

D. Pre-Qualification Requirements

1. The following manufacturer is pre-qualified:

   a. Aeration Industries International, Inc. – Argos™ SBR

2. Other manufacturers must pre-qualify prior to bidding, as specified below.

3. This project was designed around the Aeration Industries Argos SBR system. If modifications to the current design are required, other manufacturers shall include the re-design cost in their bid price.

4. Any manufacturers not listed above shall furnish the ENGINEER the following information a minimum of 15 days prior to opening of bids:

   a. Operation data from a minimum of five (5) SBR installations using the proposed equipment.

   b. Photographic submittal, including:

      i. Overall view of the plants for which operational data is supplied.

      ii. Details of the aeration and mixing equipment and how this equipment is installed and operates in the basin and how the equipment is accessed for maintenance.

      iii. Effluent decanter details.

   c. Engineering reports conducted by an independent testing laboratory stating clean water oxygen transfer efficiency, including description of test facility, methods of sampling, calculations, and certified oxygen transfer curves.

   d. A listing of sewage treatment plants in which sequencing batch reactor (SBR) systems with similar flows and loadings have been installed, including location, date of installation, operator name, and current telephone number.

   e. A statement from the equipment manufacturer listing any deviations or exceptions taken to these specifications. Include specification reference and proposed alternative with reason stated for exception.

5. Within 5 days prior to opening of bids, the ENGINEER shall issue an addendum listing manufacturers who have pre-qualified. Equipment Suppliers listing equipment manufacturers who have not pre-qualified shall be considered non-responsive and shall subject their bid to automatic rejection.

6. Incomplete pre-qualification submittals shall not be evaluated by the ENGINEER, and shall automatically represent rejection of the submittal.

PART 2 – PRODUCTS

2.01 MANUFACTURERS

A. Aeration Industries Argos SBR, or pre-qualified equal.

B. Refer to Paragraph 1.03.D. for Pre-Qualification requirements.

2.02 DESIGN CRITERIA

A. Parameters

1. Number of SBR Basins: _____

2. Inside Width/SBR Basin: _____

3. Inside Length/SBR Basin: _____

4. Water Depth at Top SBR Water Level: _____

5. Water Depth at Bottom SBR Water Level: _____

6. Inside Width Sludge Holding Basin: _____

7. Inside Length Sludge Holding Basin: _____

B. (for single SBR basin and/or continuous flow designs) The influent shall be continuously and simultaneously received by all SBR basins at all times, irrespective of the sequence of operation of the treatment system. The system shall be designed so that the basin configurations prevents short circuiting of the influent during the decant sequence. In addition, the influent feed piping to the system shall include a distribution header located on the inside bottom of each SBR basin at the opposite end of the basin from the decanter. The distribution header shall distribute the influent flow evenly into the bottom of

the SBR basins to minimize disturbance of the settled sludge blanket during the settling and decant cycles.

2.03 EQUIPMENT

A. Provide the following equipment:

1. Motor actuated control valves.
2. Electric motor-driven direct drive propeller-type floating aerator/mixer.
3. Portable Davit Crane.
4. Decant mechanisms.
5. Waste sludge pumps.
6. Telescoping valve.
7. Dissolved oxygen control system.
8. Process control system.

2.04 SBR BASINS

A. The treatment plant basins shall be constructed of poured-in-place or precast concrete, as shown on the drawings. All materials for construction of the concrete basins, including wall fittings and handrail, shall be furnished by the CONTRACTOR.

B. Each basin shall be equipped with a high level float switch to trigger an alarm should the basins maximum design water level be exceeded.

C. The treatment plant manufacturer shall provide all internal piping for connection to the wall fittings as delineated on the drawings.

2.05 VALVES

A. Raw wastewater shall be directed to each reactor basin in accordance with the operating sequence of the SBR system utilizing the influent control valves. The main SBR panel controller will select the influent valve to open to provide inflow to the designated reactor(s) in accordance with the sequencing program.

B. Valves furnished shall be suitable for the intended service and, in general, shall meet the following requirements:

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1. Shall open clockwise or to the left.

2. Shall be of the same manufacturer wherever possible.

3. Shall have manufacturer's name and pressure rating clearly marked on the outside of body (except wafer style).

4. Wheels or levers shall be provided with an arrow indicating direction to open.

D. Valves shall rotate 90 degrees from full open to tight shut with operators designed to hold valve in any intermediate position without fluttering.

E. Butterfly valves to be of the tight-closed rubber seat type with rubber or other synthetic permanently bonded to valve body. Butterfly valves to be Ultra Flow wafer style with iron body and nickel plated disc or equal.

F. Plug valves to be non-lubricated, eccentric type with resilient faced plugs. Plug valves to be DeZurik, Valmatic, or equal.

G. Electric motor actuators shall be ____ Vac, sized to suit each valve and service.

1. Valve actuators shall be capable of operating the valve under the maximum load.

2. Actuators shall be designed for indoor or outdoor service, and capable of mounting in any position.

3. Actuators shall consist of one integral unit including motor, power gearing, drive unit, travel switches, torque limit switches, dial position indicator, handwheel override with declutch mechanism, and integral motor controls. A worm gear reducer shall be supplied for quarter-turn valve applications.

4. Electric motor actuators shall be manufactured by Limitorque, Rotork, or equal.

5. All electrical service cable including conduit and junction boxes shall be provided by the installing CONTRACTOR.

2.06 AERATION AND MIXING COMPONENTS

A. The aeration and mixing equipment shall be comprised of AIRE-O_2 float mounted aerator/mixers to provide aeration and mixing below the water surface while at

the same time imparting a horizontal velocity to the liquid in the aerated basin to facilitate movement of the wastewater.

B. Size and location of the aerator/mixers shall be properly selected to provide the proper amount of oxygen and mixing as required by the Manufacturer for the application.

C. Aerator/mixers shall conform to the requirements of Section _____.

D. Slide Rails

1. Slide pole assemblies constructed of stainless steel pipe shall be provided for anchoring to the basin walls.

2. The slide pole assemblies shall be designed to handle the thrust and torque produced by the aerator/mixer and shall allow for free vertical movement of the aerator/mixer without binding as the water level in the basin changes.

3. The pipe shall be filled with concrete by the CONTRACTOR after installation to seal the piping and minimize vibration during operation of the equipment.

E. Controls

1. Local control stations shall be provided for operation of the Triton mixer and blower motors.

2.07 PORTABLE DAVIT CRANE AND BASES

A. A portable davit crane shall be provided for ease of removal of the aerator/mixer units for periodic maintenance. Each aerator/mixer shall have a crane base installed on the walkway near each unit to accept the davit crane and allow for the main drive unit of each aerator/mixer to be lifted off of the float assembly and onto the walkway for inspection, servicing, or transport. Openings in the handrail on the walkway or removable sections of handrail shall be provided to enable the unit to be swung onto the walkway. The portable davit crane shall be manufactured by Thern, Inc. or approved equal.

B. The crane shall be designed with an ultimate design factor greater than 3:1 for all components including the lifting winch and base.

C. Boom shall telescope up to 4 different lengths allowing for variable hook reach. Hook height shall be adjustable by moving the boom up or down between horizontal and 45 degrees from vertical. Boom angle shall be

adjustable at all times including when under full rated load with a hand operated screw jack acting to raise or lower the boom.

D. Wire rope shall pass over a sheave at the end of the boom. Sheave shall have a bronze bearing.

E. Mast and boom shall rotate 360 degrees in the base on pin bearing and bearing sleeve, with a rotational handle attached to mast to facilitate rotation.

F. Crane components shall be fastened together using stainless steel clevis style pins, secured with lynch pins with lanyards fastening the lynch pins to primary structural components.

G. Davit crane shall break down into portable components with no single component weighting more than 100 pounds (45.4 kg). Carrying handles shall be welded to mast and boom.

H. Lifting winches shall be located such that the center point of the drive shaft is behind the centerline of the mast.

I. Wire rope construction shall be 7 x 19 type stainless steel cable. Latch type hooks shall be used and shall be either non-rotating eye type or swivel type to allow 360 degree rotation under all load conditions. Hooks shall be heat treated drop forged type stainless steel.

J. Crane bases shall allow for easy removal of the mast. Bases shall have a pin bearing to support the end of the mast and a Nylatron GSM bearing sleeve to support the mast at the top of the base.

K. Lifting winches shall have machine cut gears, an adjustable handle that mounts securely to the drive shaft, bronze and radial ball bearings, and a positive load holding Weston style brake able to stop and hold the load automatically if the winch handle is released.

L. Lifting winch shall have a zinc and iridescent dichromate plated corrosion resistant finish. Crane boom, mast, and base shall be fabricated from steel meeting ASTM standards and have a corrosion resistant finish.

2.08 DECANTERS

A. Each SBR aeration basin shall include a solids limiting decanter controlled by the SBR logic system to provide sequencing decants compatible with the hydraulic requirements of the system.

B. The logic controls may be adjusted to modify the duration and/or frequency of the decant mode.

C. The solids limiting decanter shall be SS construction.

D. The decanter shall be a four-sided flat weir decanter with an integral solids exclusion baffle.

E. The decanter shall be operated in a vertical direction. Decanters operating at an angle and/or floating decanters are not acceptable.

F. The decanter shall be moved up and down by a jack screw. The speed and direction of the decanter shall be controlled by a Duff-Norton (or equal) translating machine screw actuator connected to a ____ HP, _____ volts, _____ phase, _____ cycle gear motor.

G. The actuator shall be supplied with a steel base plate for anchoring to the basin wall to support the load of the actuator and decanter.

H. The actuator and decanter shall be located near the side of the basin to allow for easy inspection and maintenance.

I. The decanter slip tube welded to the decanter pan shall be stainless steel and shall be sized to fit the connecting riser pipe. The slip tube shall be a minimum of 16 ga. stainless steel and incorporate a 150 lbs. stainless steel companion flange and 1/4" (7mm) thick neoprene wipe gasket.

J. The decanter shall be parked above top water level during aeration and settling periods, thereby eliminating any possibility of solids carryover during these periods.

K. At top park position, the decanter shall provide "fail safe" overflow protection in the event of a power failure. Settled supernatant will flow via gravity out of the decanter into the effluent collections system. The decanter solids exclusion weir shall prevent the carry over of any floatables during such emergency periods.

L. The actuator drive shall incorporate limit switches at the top and bottom of travel to ensure reliable operation. The limit switches shall be fully integrated with process control time overrides and interlocks.

M. Local control stations shall be provided for operation of the decanters.

N. All electrical service cable including conduit and junction boxes shall be provided by the installing CONTRACTOR.

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2.09 WASTE ACTIVATE SLUDGE PUMPS

A. Each SBR unit shall also include a waste activated sludge (WAS) submersible pump for pumping waste sludge from the reactor basin to the sludge holding basin.

B. The WAS pumps shall be controlled by SBR logic system. The logic controls may be adjusted to modify the duration and/or frequency of the sludge wasting.

C. The waste activated sludge pumps shall be submersible pumps capable of pumping ____ (gpm/lpm) against a total dynamic head of _____ (ft/m). The pumps shall be Model _____ as manufactured by Myers (or equal), _____ HP, _____ volt, ____ phase, _____hertz.

D. The pump motors shall be fully submerged in an oil filled chamber for efficient heat dissipation, permanent lubrication of bearings and seal and for protection against submerged environment.

E. A heavy-duty submersible power cord shall be provided. The cable shall be heavy-duty STO type, water and oil resistant. An epoxy seal at the motor end provides a secondary moisture barrier in case of damage to the jacketing.

F. Pump impeller to be two-vane design keyed to shaft and with ejector vanes on the backside for further protection of the seal chamber. The pumped liquid shall flow through a passage providing true full-diameter solids passing capability of ____ (in/mm).

G. A twin guide rail system with floor mounted break-away coupling shall be provided for each pump. No additional sealing measures are required as the pump weight provides sufficient force for a proper seal. The system shall be self-cleaning in that during pump engagement, shearing action wipes the sealing surface clean. Guide rails to be fabricated of ____ (in/mm) diameter schedule 40 galvanized pipe.

H. A galvanized steel lifting chain of adequate strength shall be attached to each pump and hook onto the station top. The chain shall be utilized to pull the pumps from the chamber for service/inspection.

I. All electrical service cable above the water surface including conduit and junction boxes shall be provided by the installing CONTRACTOR.

2.10 SLUDGE HOLDING BASIN SUPERNATANT TELESCOPING VALVE

A. The sludge holding basin shall include a telescoping valve for removal of the supernatant for return to the head of the plant.

B. The telescoping valve assembly shall be manufactured by Halliday Products, Inc., or equal.

C. The telescoping valve shall be sized to fit riser pipe and penetrate the riser pipe a minimum of 9" (229mm) in the up position.

D. The unit shall have a floor stand of 4" (102mm) square stainless steel tube with 1/8" (3mm) wall and mounted to a 1/2" (13mm) thick stainless steel base plate.

E. The handwheel shall be 16" (406mm) diameter cast aluminum and work in conjunction with a brass lifting nut and 1 1/8" (29mm) diameter stainless steel triple lead acme rod, requiring a maximum of 16 turns for one foot (305mm) of travel. Polymer bearing pads shall be incorporated above and below the brass nut.

F. The slip tube shall be a minimum of 16 ga. stainless steel and incorporate a 150 lbs. stainless steel companion flange and 1/4" (7mm) thick neoprene wipe gasket.

2.11 DISSOLVED OXYGEN CONTROL SYSTEM

A. Provide one (1) dissolved oxygen (DO) control system for each SBR aeration basin and sludge holding basin. The dissolved oxygen control system shall be integrated with the sequencing batch reactor aeration system and process control system.

B. The dissolved oxygen control system shall be a Hach SC100 Controller with a compatible Luminescent Dissolve Oxygen (LDO) sensor, or approved equal. The system shall, as a minimum, consist of the transmitter, sensor, and mounting hardware for monitoring dissolved oxygen on a continuous basis. The equipment should be designed for wastewater treatment applications.

C. The mounting hardware for the LDO sensor shall consist of a pole mount assembly and a ball float mount allowing the probe to move up and down in the basins to accommodate fluctuating water levels.

D. The DO signal shall be displayed at the SBR control panel Operator Interface Terminal (OIT) and shall have a 4-20 mA input to the PLC. The PLC, using a PID control function will output a signal to the aerator/mixer blower motor to control the operation of the blower as needed to maintain the dissolved oxygen setpoint.

2.12 PROCESS CONTROL SYSTEM

A. A complete SBR control system shall be provided. This shall include:

1. A SBR control panel with OIT, PLC, control switches, pilot lights and motor starters.

2. Local control stations for the aerator/mixers and decanters.

B. An NEMA12 electrical control panel, designed for a _____ volt, ___ phase, __ hertz electrical distribution system, shall be provided for the SBR treatment plant and components.

C. The control panel shall include main breaker, motor circuit breakers, magnetic starters for the pumps and decanter drives, and slow speed magnetic starters for the aerator/mixer motors as well as all selector switches, relays, timers and all additional secondary circuit controls required for manual and/or automatic control of the treatment plant.

D. All internal devices shall be clearly marked and identified on the outside and inside of the panel. All terminals and wires shall be clearly tagged in accordance with the schematic and wiring diagrams.

E. Secondary control circuit voltage shall be ___ volt, __ cycle provided from a direct step down of the incoming electrical service and provided with surge suppression.

F. The SBR treatment plant shall be controlled by a microprocessor based automatic programmable logic controller. The PLC shall be an Allen-Bradley Micrologix series, or equal.

G. The PLC processor shall be equipped with two RS232 ports for communications. A modem shall be provided with auto answer for remote technical support. The modem shall be a Motorola 3220+, or equal.

H. The OIT shall have a sixteen position key pad menu controller and a LED status display. The OIT shall be an Allen-Bradley PanelView series, or equal.

I. The menu screen shall provide a readout for both stage time and status of operating stage time (time elapsed or time remaining). The controller shall automatically start and stop the SBR cycles based on adjustable field settings. At the completion of the react time (aeration/mix), the SBR unit will settle for a preset adjustable length of time. It will then automatically decant through the decanter for a preset length of time. The above react, settle and decant cycles will then automatically be repeated in accordance with an operator adjustable preset sequence.

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J. An override selector switch shall be provided to allow the operator to manually override the aeration cycle and stop the system for manual sludge pumping.

PART 3 - EXECUTION

3.01 GENERAL

A. All work shall be accomplished to the satisfaction and approval of the OWNER/ENGINEER and in accordance with these specifications.

B. In case of conflict between any of the contract requirements, the ENGINEER shall be the sole judge of the criteria to be used to resolve the conflict. The intent, however, is that the contract documents complement each other in the following order of precedence: (1) These Specifications, (2) National Standards (AWWA, ASTM, ASSHTO, etc.), and (3) Contract Drawings.

C. The CONTRACTOR shall provide temporary connections and by-passes where necessary to maintain continuous operation of any and all existing mechanical systems and equipment as necessary until new systems and equipment to be furnished under this contract are ready for operation.

D. The CONTRACTOR shall verify the location and inverts of all existing utilities at the various points of connection and/or crossing prior to starting any work. Any discrepancies in locations or inverts shall be brought to the attention of the OWNER in order that the designs may be adjusted accordingly. Damages suffered or additional costs incurred by the CONTRACTOR as a result of his failure to conform to the requirements of this paragraph shall be the sole responsibility of the CONTRACTOR. Connections to existing utilities shall be made by the CONTRACTOR at such a time and in such a manner as the OWNER may direct, and the cost shall be borne by the CONTRACTOR. No valve, switch, hydrant or other control on existing utility systems shall be operated for any purpose by the CONTRACTOR without written approval of the OWNER and the ENGINEER.

3.02 INSTALLATION

A. The components of the treatment plant shall be installed in strict accordance with the Manufacturer's recommendations and instructions and as indicated

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on the drawings, installation instructions, and elsewhere in these specifications.

B. Aerator/mixer units shall NOT be operated for ANY PERIOD OF TIME out of water.

C. The CONTRACTOR shall supply paint for field touch-up and field painting. The CONTRACTOR shall touch-up all shipping damage to the paint and stainless steel as soon as the equipment arrives on the job site.

D. All anchor bolts shall be specified by the Manufacturer and provided by the CONTRACTOR.

E. Prior to assembly, the CONTRACTOR shall coat all stainless steel bolts and nut threads with a non-seizing compound.

F. The Manufacturer shall include in their Bid the services of a competent factory representative familiar with the installation of the equipment as required to instruct the CONTRACTOR prior to installation of the equipment and to instruct the OWNER's personnel in the operation and maintenance of the equipment.

G. CONTRACTOR shall test the operation of the system per the manufacturer's recommendations.

H. CONTRACTOR shall form and pour all concrete structures and bases in accordance with the project plans and manufacturer's installation drawings, paint equipment and piping, and grout in embedded items where required.

I. Electrical CONTRACTOR shall wire in all motors and controls.

3.03 PROTECTION

A. The CONTRACTOR shall properly and efficiently protect, at all times, mechanical units and equipment from damage and the intrusion of foreign materials. The open ends of all piping shall be effectively closed at the end of each day's work or before backfilling.

B. The CONTRACTOR shall assume responsibility for any damage done by him, his agent or employees to any work already in place, the building, grounds, trees, or appurtenances by reason of his work or any part of same.

C. All paved roads, curbs and gutters, driveways and walkways surfaces damaged in the course of this work shall be replaced equivalent to existing surfaces in a manner approved by the OWNER.

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D. All lawn and grass areas disturbed in the course of this work shall be backfilled as described above and shall be finished with topsoil, seeding and mulch approved by the OWNER.

3.04 SERVICES

A. The CONTRACTOR shall provide the services of the manufacturer to: inspect/advise during installation, supervise start-up and provide general operational adjustments as required, and thoroughly train the OWNER's operators in the operation of all process equipment. In addition, one inspection visit will be made during the warranty period to observe plant operations and report results to the OWNER/ENGINEER. A total of 5 days on site shall be allotted for the preceding services, excluding travel and set-up time.

B. At start-up, the following at a minimum shall be performed:

1. Inspect all rotating equipment to see if it is properly lubricated.
2. Check rotation of all motors.
3. Check all instrumentation and controls to determine that they function properly at all stages of the treatment process.
4. Check and correct equipment malfunctions.
5. Report all malfunctions to the ENGINEER.

C. At substantial completion of the treatment facilities, the CONTRACTOR shall direct sewage flow through the new sewage treatment plant. The CONTRACTOR shall operate the plant and demonstrate to the OWNER and ENGINEER that the facility is operational and in substantial compliance with the discharge permit limitations. If the plant is unacceptable to the OWNER and ENGINEER, or if discharges are in violation of the permit limitations, necessary modifications shall be made by the CONTRACTOR at no additional cost to the OWNER. All chemical materials utilized during the demonstration period shall be furnished by the CONTRACTOR.

D. During the demonstration period, the CONTRACTOR shall provide training of the OWNER's operators for a minimum of 8 hours in the operation of all process equipment.

3.05 WARRANTIES

A. The manufacturer shall guarantee that all items furnished and installed will be warranted against defects in material and workmanship for a period of 12

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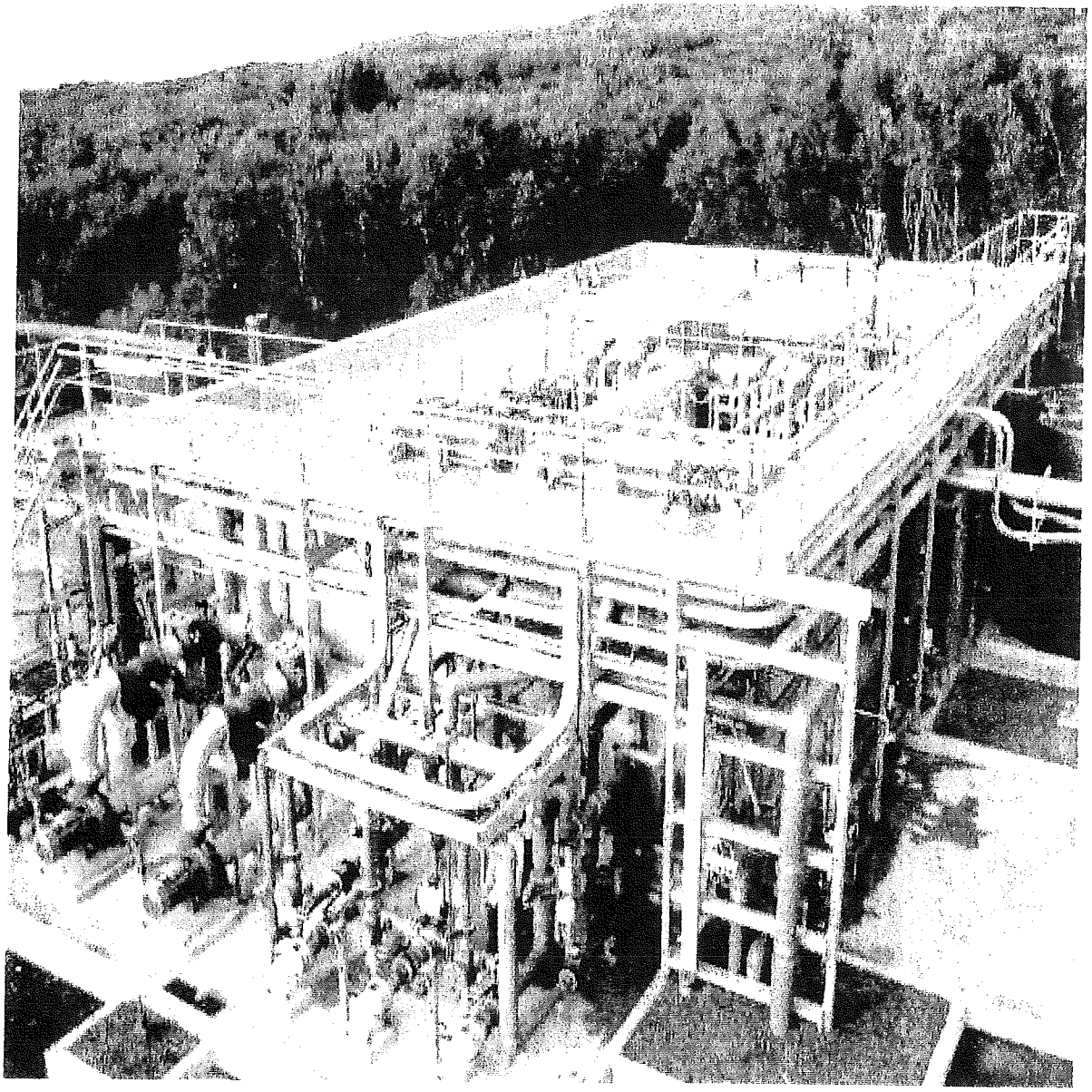
months after start-up or 18 months after shipment, whichever occurs first. The aerator/mixer equipment shall be warranted for a period of 36 months after start-up or 42 months after shipment, whichever occurs first. Exempted from this warranty are expendable items such as drive belts, light bulbs, etc.

B. In addition, the manufacturer shall guarantee to the OWNER and ENGINEER that the system shall operate in such a fashion as to ensure compliance with the effluent standards imposed by the state in their operating permit for a period of 12 months after start-up. The warranty shall consider operation at flow rates and raw wastewater characteristics anywhere from 75% to the permitted levels, with occasional instantaneous peak variations of up to 125% in both flows and strengths.

END OF SECTION



MemPulse™ Membrane Bioreactor System Proposal

Lytle Creek Ranch WRP

Proposal #09P-0867M
March 26, 2009

Water Technologies

SIEMENS

Water Technologies

Taking care of the world's water

March 26, 2009

To: Don Roberson

Subject: MemPulse™ Membrane Bioreactor System Proposal for Lytle Creek Ranch WRP

Dear Don Roberson:

Siemens Water Technologies welcomes the opportunity to offer a biological treatment and membrane filtration solution for this project. Based on a review of your wastewater application, we feel that the Siemens MemPulse™ Membrane Bioreactor System will provide a cost effect solution that will reliably meet your treatment needs. We look forward to continuing discussions with you as you evaluate our offering.

Key aspects of the MemPulse™ System we would like to draw your attention to include:

- MemPulse™ Technology – Siemens MemPulse™ technology increases membrane scouring effectiveness, reduces energy consumption and decreases operation and maintenance costs.
- Small footprint – Siemens MBR system is designed at elevated mixed liquor suspended solids concentrations which decreases overall site footprint requirements.
- Advanced Process – Siemens MBR system uses Title 22 approved membrane modules ensuring high quality effluent from the MBR that will meet the most demanding effluent requirements.
- Aerated Anoxic Nitrification – Siemens MBR System promotes nitrification through alternate pathways at near zero dissolved oxygen levels. The aerated anoxic nitrification concept was pioneered by Siemens and its advantages in terms of aeration power savings and biological nutrient removal will be addressed in the Proposal.
- Two-phase MemPulse™ technology – prolongs membrane life and provides a stable operating environment.
- Service Support – Siemens offers a number of service programs which can be customized to the individual needs of the application. Periodic inspection and full membrane cleaning programs are available through our nationwide service network.
- Remote Monitoring – The Siemens MBR is equipped with the ability to monitor critical operating parameters via the internet, allowing trained Siemens process engineers to easily support local service people in troubleshooting any problems which may occur.

Membrane Bioreactor Systems provide dependable wastewater treatment, simplicity of operation, and process flexibiity that combine to produce a proven, cost effective solution. The budgetary price for the MBR System is $2.7 million and additional information regarding the basis for that budgetary price can be found in the attached document. We hope that you will find all of the information

1901 South Prairie Avenue, Waukesha WI 53189 telephone: 800/524-6324 facsimile: 262/547-4120

necessary to evaluate the MBR System in this Proposal; however, should you require additional information or wish to discuss the contents of this Proposal further, please contact:

Nathan Antonneau, P.E.

Telephone: (262) 521-8401

E-mail: Nathan.Antonneau@Siemens.com

We appreciate your interest in Siemens Water Technologies Products and trust that as you review this offering, you will find the information provided to be helpful in your decision making process.

Regards,

Nathan Antonneau
Siemens Water Technologies

cc: Tom Roberson / MISCO – Foothill Ranch, CA

Taking care of the world's water

SIEMENS

Water Technologies

MemPulse™
Membrane Bioreactor System Proposal

to

Don Roberson

for

Lytle Creek Ranch WRP

March 26, 2009

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1 DESIGN BASIS

The design basis for our solution is summarized in this section. Please review these design criteria carefully to insure that they reflect your latest project needs.

1.1.1 Influent Flows

Design influent flows are shown in the table that follows:

Influent Flows		
Parameter	Value	Units
Average Daily Flow	2.2	million gallons per day (MGD)
Flow Capacity during CIP	1.8	MGD

1.1.2 Influent Water Quality

Influent parameters that form the basis of the information contained in this Proposal are shown in the table that follows:

Influent Water Quality		
Parameter	Value	Units
Biochemical Oxygen Demand (BOD_5)	250	milligrams/liter (mg/L)
Chemical Oxygen Demand (COD)	500	mg/L
Total Suspended Solids (TSS)	250	mg/L
Ammonia Nitrogen (NH_3-N)	33	mg/L
Total Kjeldahl Nitrogen (TKN)	50	mg/L
Total Phosphorus	6.0	mg/L
Alkalinity(2)	275	mg/L as $CaCO_3$
Fats, Oils & Grease (FOG)	<50	mg/L
Maximum Influent Temperature	25.0	degrees Celsius (°C)
Minimum Influent Temperature	15.0	degrees Celsius (°C)

Notes:

(1) Customer must confirm for any associated process guarantee and membrane warranty.

(2) If the wastewater alkalinity is less than the Table 1.2 value, supplemental alkalinity may be required to ensure the pH does not inhibit bacterium growth.

1.1.3 Effluent Requirements

The proposed MemPulse™ MBR system is designed to meet the following effluent requirements:

Effluent Requirements		
Parameter	Value	Units
BOD_5	5.0	mg/L
Total Suspended Solids	5.0	mg/L
Total Nitrogen	10.0	mg/L

2 PROCESS FLOW DIAGRAM

The proposed Membrane Bioreactor Treatment System consists of the following unit processes which operate in series:

- Primary treatment using fine screening
- Biological treatment system
- Membrane Operating System (MOS)

The process train flow diagram of the Siemens MBR System is as follows.

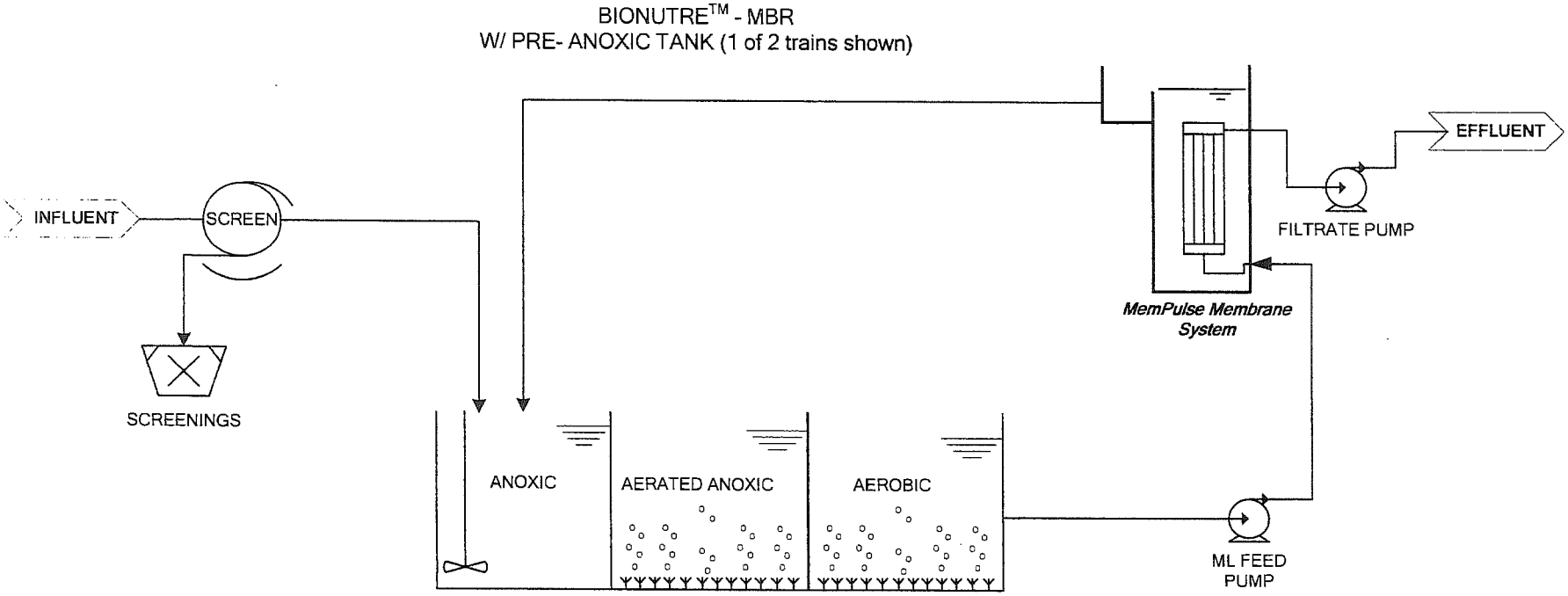
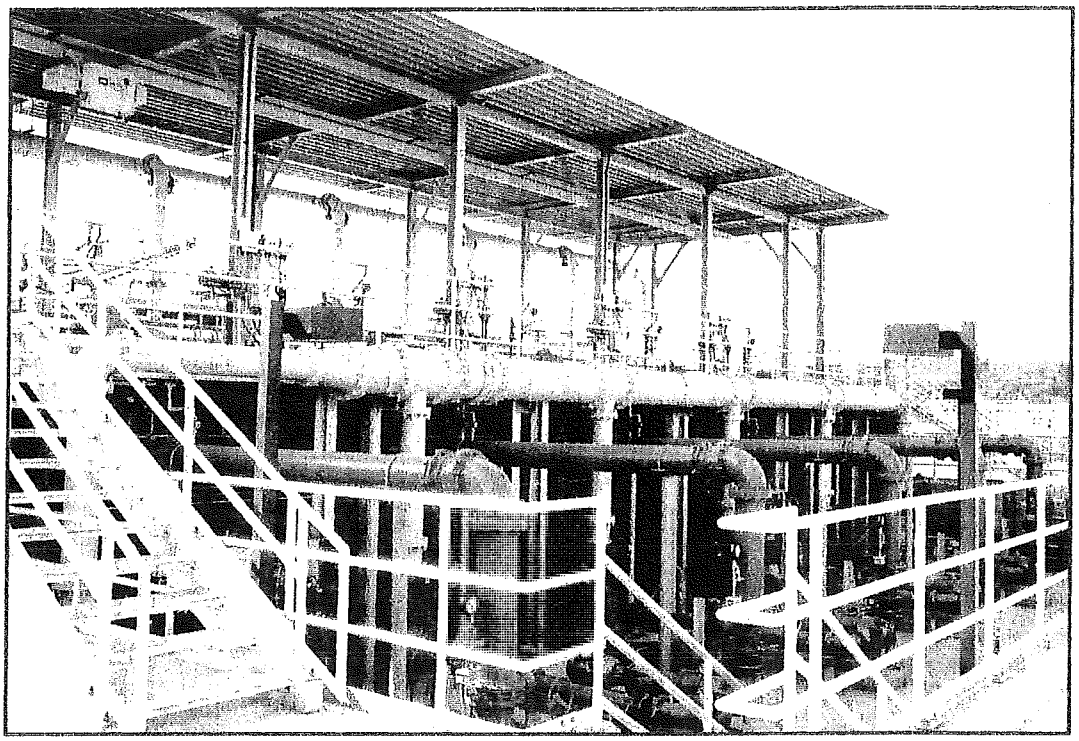


Figure 1 – Membrane Bioreactor System block flow diagram.

MEMPULSE™ MBR SYSTEM



3 PROCESS DESCRIPTION

3.1 Fine Screening

Prior to entering the MBR process, the influent wastewater must first pass through a fine screen system to remove trash and fibrous materials that could otherwise become tangled in the membrane fiber bundles. Provisions to remove leaves or other debris that may blow into the aeration tanks are also required.

A 5mm static screen or basket strainer is recommended in the MOS pumping line to remove leaves or other debris that may blow into the biological reactor tanks.

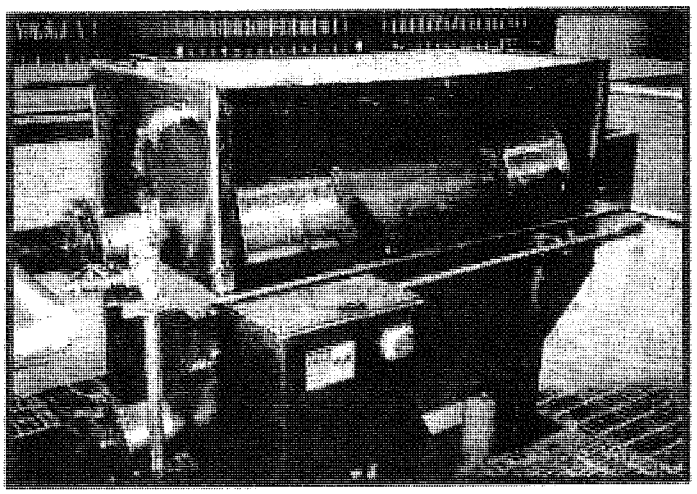
Any of the three screening systems described below would be compatible with the Siemens MBR system:

- **Preferable** - Two stage influent screens, 6 mm followed by 1 mm perforated plate screen.

- 2 mm perforated plate influent screen with a 5mm static screen or basket strainer in the MOS pumping line.
- 2 mm perforated plate influent screen, with the ability to intermittently rescreen a portion of the mixed liquor back to the influent screen.

Note: The rotary screen requires a manufacturer-approved water source to enable self-cleaning and odor mitigation.

INFLUENT 2 MM ROTARY DRUM SCREEN



3.2 BioNutre™ System Description

The proposed biological treatment process is based upon Siemens BioNutre™ biological process, which is a suspended growth activated sludge process designed for energy efficiency and biological nutrient removal (BNR) performance. The proposed BioNutre™ activated sludge system utilizes two parallel treatment trains, each with one (1) pre-anoxic zones, one(1) aerated-anoxic zone, and one (1) aerobic zone operated in series.

In the anoxic reactor, the influent wastewater is mixed with recycled wastewater from the membrane tanks for denitrification. Denitrification is the process by which nitrates are converted into inert nitrogen gas. The denitrification process also consumes organic carbon sources while producing alkalinity for pH control. Oxygen entering the anoxic zone with the MOS overflow stream will be utilized by autotrophic bacteria to nitrify some of the ammonia in this reactor. At the loading rates proposed for this project, the oxygen introduced with the MOS overflow stream will quickly be consumed, resulting in a dissolved oxygen concentration near zero, so that denitrification occurs as well as nitrification. Simultaneous

nitrification and denitrification results in higher total nitrogen removal efficiencies and reduces energy. The denitrified wastewater gravity flows into the first of two aerated reactor(s).

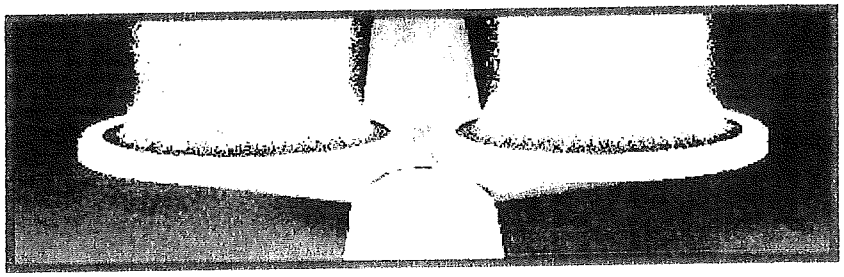
Typically, the first aerated reactor is operated as an aerated-anoxic reactor. Oxygen added by the diffusers will be utilized by autotrophic bacteria to nitrify some of the ammonia in this reactor. Using our patented Smart MBR™ control system, oxidation reduction potential (ORP) is used to control the oxygen supply rate, so that the oxygen introduced by the aerators will quickly be consumed, resulting in a dissolved oxygen concentration near zero, so that denitrification occurs as well as nitrification. Operating a system with simultaneous nitrification/denitrification will conserve energy. The aerated-anoxic reactor overflows into the aerobic reactor.

The final aerated reactor is the aerobic zone which is generally operated at 2.0 mg/L dissolved oxygen to remove any residual ammonia not oxidized in the aerated anoxic reactors. Because the nitrification process consumes alkalinity, supplemental alkalinity may be required if the natural alkalinity is insufficient to maintain a stable pH near 7.0.

3.2.1 Aeration System

Siemens typically uses the DualAir diffuser assembly for fine bubble aeration. The DualAir diffuser assembly includes two diffuser bases molded together with a curved saddle formed between the diffusers. The EPDM membrane media is a high pressure molded compound with superior rebound memory. The membrane includes perforated "I" slits that resist tearing and stay cleaner for longer time periods. They open when airflow is present; and close when airflow is stopped reducing the chance for backflow of solids to clog the diffuser. The photo below shows our DualAir diffuser assembly.

DUALAIR FINE BUBBLE DIFFUSER



Besides being energy efficient, the BioNutre process is designed with operational flexibility to allow routine maintenance to be performed. The multiple-tank fine bubble aeration process allows one of the trains to be taken out of service to inspect, clean or replace the diffusers, while continuing to treat wastewater with the other train.

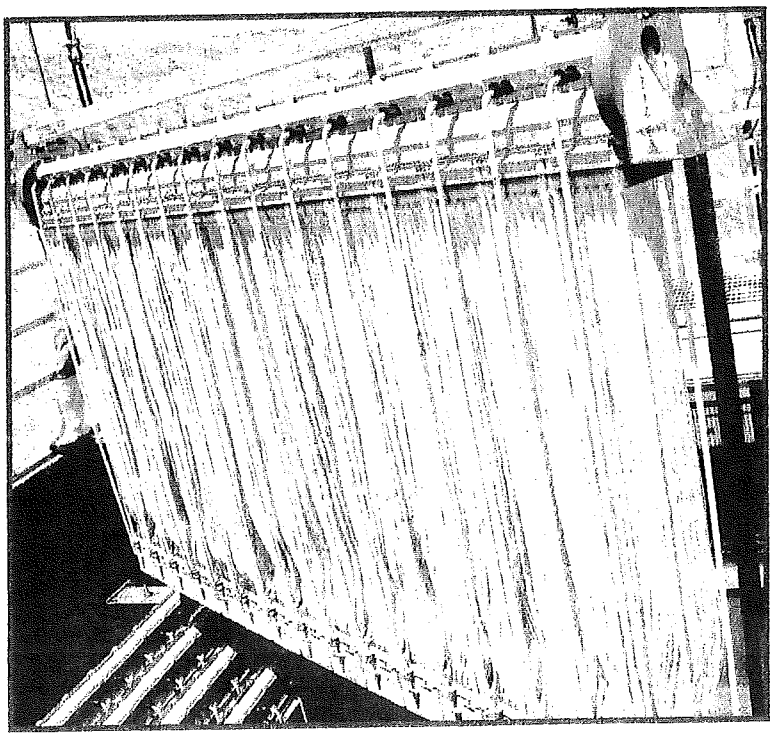
3.3 Membrane Operating System (MOS)

The membrane operating system replaces secondary clarifiers used in conventional wastewater treatment systems and provides a more stable and advanced treatment process within a much smaller footprint. Membrane fibers provide an absolute barrier to all wastewater solids greater than 0.1 micron in size, ensuring a consistently high quality effluent.

3.3.1 Membrane Module

The central component of the Siemens MBR system is the B40N membrane module. The B40N membrane module consists of thousands of hollow fibers fabricated from polyvinylidene fluoride (PVDF) sealed with polyurethane "pots" at both ends. The individual modules are configured into a rack assembly in manifolds of sixteen (16) which are then installed within the membrane tank.

MEMBRANE MODULE AND RACK ASSEMBLY

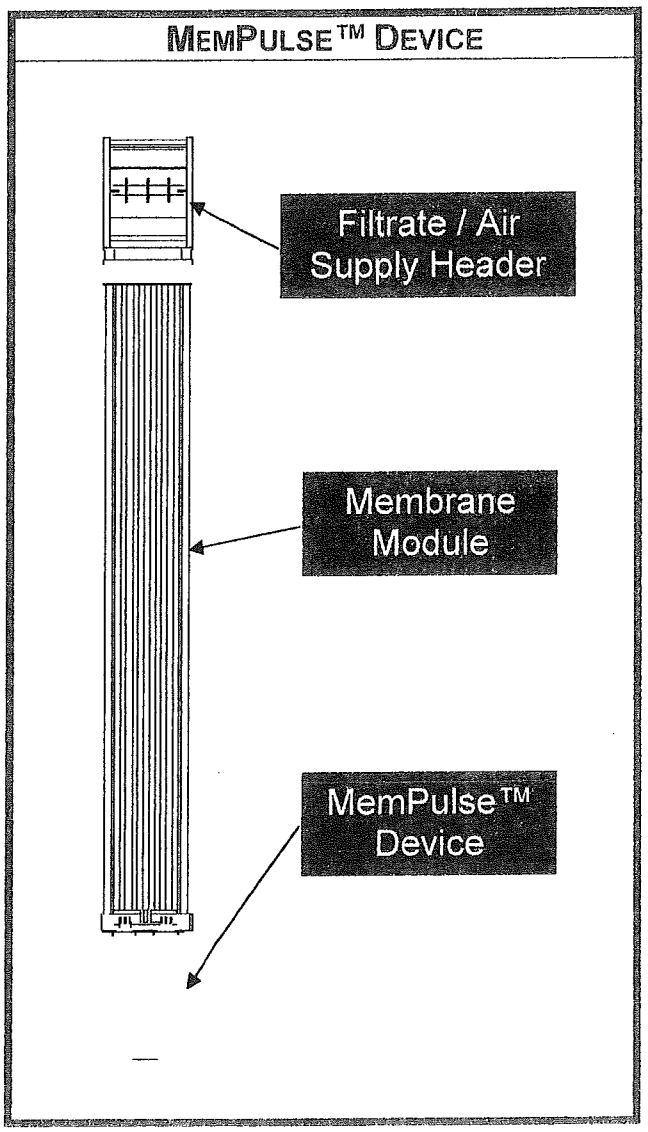


During filtration, wastewater is drawn through the membranes using the vacuum developed by the suction of the filtrate pump. As water flows through the porous membrane, particulate matter is retained at the surface of the membrane.

3.3.2 MemPulse™ Technology

MemPulse™ Technology is Siemens latest advancement in membrane bioreactor systems. Siemens MemPulse™ technology uses a simple non-mechanical device at the base of each membrane module which provides significant energy reduction, lowers maintenance costs, and preserves Siemens proven Two Phase Jet concept from previous MBR advancements.

The MemPulse™ technology can be used in a wide range of municipal and industrial wastewater treatment applications and can be easily retrofitted to existing plants. The following diagram shows the MemPulse™ device located at the base of a membrane module.



3.3.3 MemPulse™ Technology – How it Works

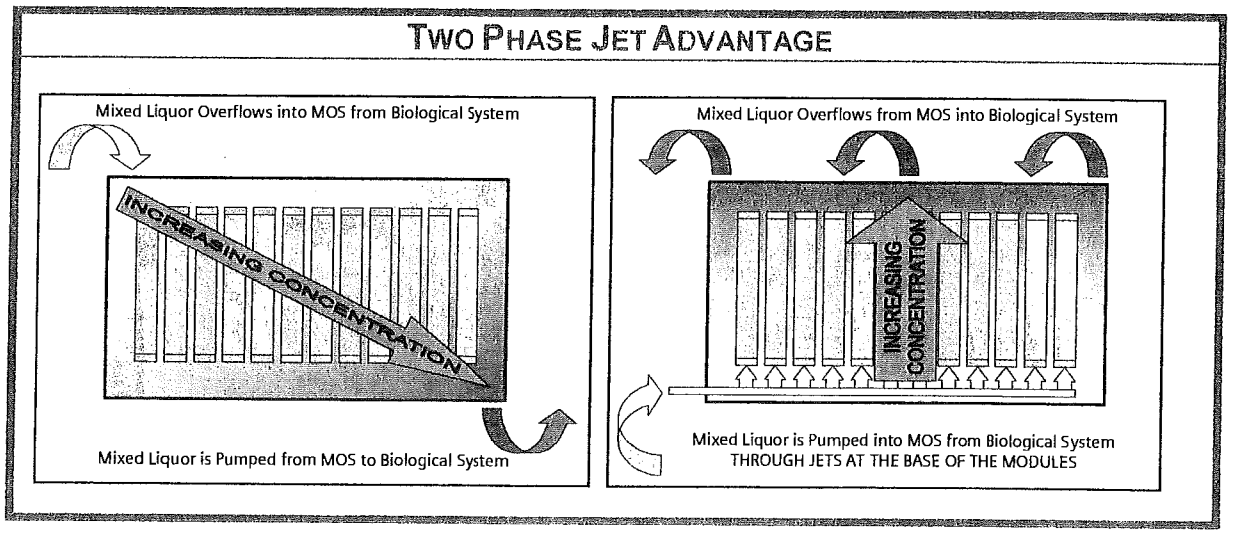
The MemPulse™ device works by converting continuous airflow into irregular pulses of air at the base of each membrane module which creates and "airlift effect". This results in an increase in scouring effectiveness, and an overall reduction in air scour energy consumption.

The "airlift effect" created by the MemPulse™ device is also used to draw mixed liquor into the bottom of each membrane module which mixes the air bubbles with mixed liquor to create a Two Phase Jet effect.

The Two-Phase Jet effect is an important part of Siemens membrane systems and performs the following critical functions:

- The combination of air and mixed liquor introduced at the base of each sub-module provides an enhanced scouring effect (turbulence) across the membrane surface, which is more effect than air alone.
- The two phase jet system provides uniform distribution of mixed liquor and air across the entire membrane tank ensuring a consistent mixed liquor environment for each sub-module preventing preferential fouling of membranes.
- The two phase jet effect prevents unnecessary cake formation on the membrane fibers caused by concentration polarization.

The following diagram highlights the affect of the Two Phase Jet effect.



3.4 Membrane System Cleaning Protocol

3.4.1 Relaxation

During normal operation of any membrane filtration system the membrane fibers develop a filter cake layer which causes an increase in the hydraulic resistance of the membrane system. To minimize this resistance, the MemPulse™ membrane system is set up to automatically initiate a relaxation process for each membrane tank after every 12 minutes of filtration. The relaxation process lasts for 1 minute and is initiated in a sequential manner, ensuring that only one tank is in relaxation at any given time. During this 1 minute relaxation period the filtrate pump for the tank in relaxation stops drawing water through the membranes. Mixed liquor and air scour continue to be introduced through the MemPulse™

during the relaxation period. By shutting off the filtrate pump, the filter cake layer is allowed to decompress which improves the efficiency of the jet scrubbing action of the MemPulse™ as the solids are swept from the membrane fibers.

3.4.2 Maintenance Clean

Maintenance cleans are performed to provide interim disinfection of the membrane modules and filtrate pipe work between scheduled chemical cleans. They are less comprehensive and require less downtime than full chemical cleans, but more effective than regular relaxations and backwashes at removing particles from the membrane surface.

During a maintenance clean, filtration is paused and chlorinated filtrate is pumped backwards (inside to out) through the fibers at an average flow rate of 2.5 gpm per module and a concentration of 300 mg/L The solution flows through the fiber in the mixed liquor and any residual chlorine is consumed. The mixed liquor feed pump and aeration continue throughout the maintenance clean.

Maintenance cleans are performed on a weekly basis in normal conditions. In periods of abnormally high organic loading, the maintenance clean can be conducted more frequently.

3.4.3 Clean-In-Place (CIP)

Over a period of time, some fouling of the membranes may occur which cannot be removed by physical processes alone. CIP is an intensive chemical clean used to restore a membrane's permeability. A CIP uses a chemical solution, either 1500 ppm sodium hypochlorite or 0.50 % w/w citric acid to degrade and destroy the fouling layer. The modules are soaked in chemical solution for several hours to oxidize the fouling layer on the membrane surface.

Siemens Water Technologies recommends the following CIP parameters:

Chlorine CIP

Frequency:	Every 90 days
Make-up Chemical:	12.5 % sodium hypochlorite

Acid CIP

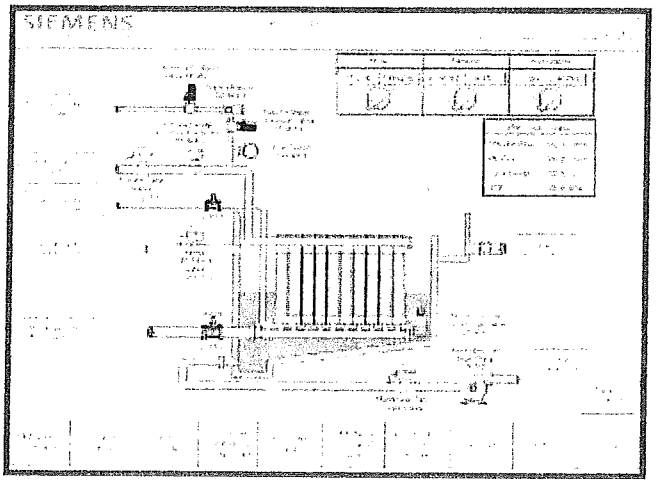
Frequency:	Every 180 days
Make-up Chemicals:	50.0% citric acid and sulfuric acid

3.5 SmartMBR™ Control System

The Siemens SmartMBR™ control system is designed with reliability and ease of use in mind. The system will be equipped with a programmable logic controller (PLC) operated, pre-programmed process control panel utilizing conventional I/O.

The Master control panel (MCP), houses a Siemens S7-300 PLC. The PLC executes all control functions required for operation of the biological and membrane system, including individual tank items as well as common equipment.

SIEMENS SIMATIC MP 377 HMI



The MCP operates the equipment according to a preset treatment strategy that is field adjustable to meet changing conditions or requirements. Included in the control design are complete diagnostic capabilities, automated membrane maintenance sequences, and automated control of the oxygen supply to each aeration tank to optimize effluent quality and conserve energy.

The MCP houses the main communications interfaces, including a local human/machine interface (HMI). The HMI is based on the Siemens MP377 touch panel and provides for the ability to control and monitor all aspects of the MBR system including equipment status, alarms, set point entry and maintenance cleaning. The HMI communicates directly with the PLC via a Ethernet connection. The operator interface uses a graphical PID overview of the entire MBR system incorporating easily recognizable icons for each component.

In addition, a "slave" control panel is provided for each pair of membrane tanks to house the I/O cards for the tanks.

Direct coordination with the contractor will be required to ensure a system that is both functional and cost effective.

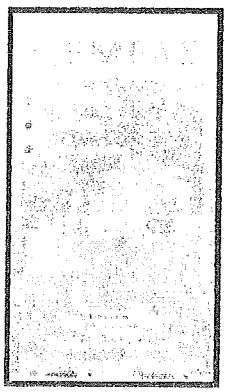
Additional interface would also be accomplished in the areas of software. Software coordination would involve the review of operator screens, I/O naming standards as established by the client and coordination of tag name interface for the SCADA system.

In addition to the local control panels and the MCP, a motor control center (MCC) and SCADA system can be provided upon request. The MCC will contain all motor starters and variable frequency drives. The SCADA system will consolidate system information and coordinate control of the facility.

3.6 Remote Monitoring

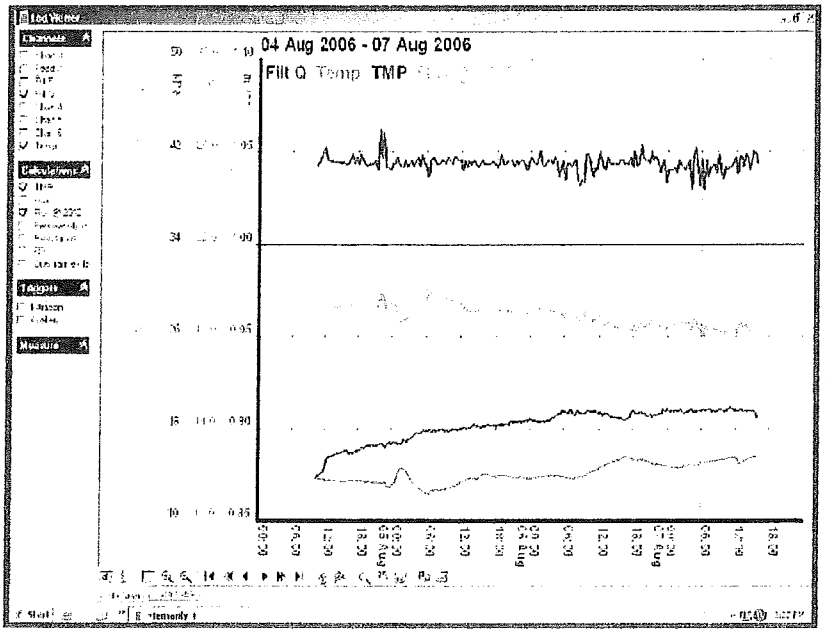
A modem along with a MEMLOG® data logger complete with MEMANLY® system performance software will be supplied as part of the controls system of the MemPulse™ MBR to enable remote monitoring. The combination of a MEMLOG® data logger and MEMANLY® software creates a powerful virtual instrument which can provide immediate graphical "snapshots" of selected inputs to monitor system performance. The data logger also allows long term data to be collected, then graphed and analyzed to ensure optimum performance of the system.

MEMLOG® DATA LOGGER



The following chart is an example of a data chart from the MEMANLY® software. This chart shows filtrate flow, TMP, flux and temperature. Many other data chart options are available, such as permeability, instrumentation outputs (i.e. dissolved oxygen), tank levels, UV transmittance, etc.

MEMANLY® SOFTWARE



4 PROCESS DESIGN

The equipment offered has been designed around the following parameters:

4.1 BioNutre™ Biological Design Information

The following sections outline the design basis for the biological system. The parameters detailed below are based on average daily flow conditions and the average wastewater concentrations outline in Section 1.1.2 of this proposal.

4.1.1 Biological Design Parameters

The following design parameters were used as the basis of design for sizing the proposed biological system.

Design Parameters		
Parameter	Value	Units
Max Mixed Liquor Suspended Solids (MLSS)	10,000	mg/l
Design MLSS	9,890	mg/l
Design Total SRT	18.0	days
Site Elevation	1,300	feet above sea level

4.1.2 Biological System Configuration

The proposed biological system is designed with the following configuration:

System Configuration	
Parameter	Value
Number of Parallel Trains	2
Number of Tanks per train	3

4.1.3 Biological Process Information

The following design parameters were used as the basis of design for sizing the proposed biological system:

Process Information		
Parameter	Value	Units
Sludge Yield	0.82	lb TSS/ lb BOD
Waste Activated Sludge	1881	gpd
RAS Rate	400%	of ADF

4.1.4 Anoxic Zone Information

The dimensions of the proposed aerated anoxic zone are:

Anoxic Zone Information		
Parameter	Value	Units
Total Number of Anoxic Zones	1	per train
Volume (per tank)	141,372	gallons
Basic Length (inside dimension)	30.0	ft
Basic Width (inside dimension)	30.0	ft
Basin Side Water Depth	21.0	ft
AOR satisfied by O_2 in RAS stream	12.9	lb/hr

4.1.5 Aerated Anoxic Zone Information

The dimensions and oxygen requirements for the proposed aerated anoxic zone are:

Aerated Anoxic Zone Information		
Parameter	Value	Units
Total Number of Aerated Anoxic Zones	1	per train
Volume (per tank)	134640	gallons
Basic Length (inside dimension)	30	ft
Basic Width (inside dimension)	30	ft
Basin Side Water Depth	20	ft
DO Set point	0.2	mg/L
Aerated Anoxic Zone AOR per basin	58	lb/hr
Design Air flow per basin	476	SCFM
Max air flow per basin	910.56	SCFM
Number of Diffusers per basin	336	-

4.1.6 Aerobic Zone Information

The dimensions and oxygen requirements for the proposed aerobic zone are:

Aerobic Zone Information		
Parameter	Value	Units
Total Number of Aerobic Zones	1	per train
Volume (per tank)	134,640	gallons
Basic Length (inside dimension)	30.0	ft
Basic Width (inside dimension)	30.0	ft
Basin Side Water Depth	20.0	ft
DO Set point	2.0	mg/L
Aerobic zone AOR per basin	75.4	lb/hr
Design Air flow per basin	477	SCFM
Max air flow per basin	910	SCFM
Number of Diffusers per basin	336	-

4.2 Membrane Operating System Design

This section outlines the design basis for the MemPulse™ membrane system.

4.2.1 MemPulse™ Membrane System Layout

The total number of membrane tanks, modules per tank and the dimensions of each membrane tank are described in the following table.

Membrane System Layout		
Parameter	Value	Units
Total Number of Membrane Tanks	2	-
Installed Membrane Modules per tank	240	-
Max Membrane Modules per tank	240	-
Surface Area per Membrane Module	404.7	ft^2
Membrane tank width (inner dimension)	15.3	ft
Membrane tank Length (inner dimension)	19.9	ft
Membrane tank height (top of concrete)	12	ft

4.2.2 MemPulse™ Membrane System Design Information

The proposed membrane system is designed to operate at the following flux rates.

Membrane System Design Information			
Parameter	ADF	During CIP	Units
No. of Membrane Tanks in operation	2	1	-
No. of Membrane Tanks in standby	0	1	-
Number of Modules per Tank	240	240	-
Number of Racks per Tank	15	15	-
Net Flux	11.3	18.54	gfd

4.2.3 Membrane System Air Scour Requirements

The following table summarizes the air scour requirements during average and peak flow events.

Air Scour Information			
Parameter	Average	During CIP	Units
No. of Blowers in operation	2	1	-
Air Flow per Tank	669	1,070	SCFM
Discharge pressure	4.5	5.3	psi

4.2.4 Membrane System Mixed Liquor Feed Requirements

The following table summarizes the mixed liquor feed flow requirements for average and peak flow events. The feed pump requirements are based on maintaining a MLSS concentration below the maximum allowable concentration in the membrane tank.

Mixed Liquor Feed Requirements			
Parameter	ADF	During CIP	Units
Max MLSS in Membrane Tank	12,500	13,500	mg/L
No. of Pumps in Operation	2	2	-
Flow per Tank	3819	4821	gpm
Head Requirement	10.2	11.0	ft

4.2.5 Membrane System Cleaning Frequency and Duration

The following table summarizes the cleaning frequency and duration to complete the cleaning procedures to ensure optimal performance of the MemPulse™ membrane system.

Cleaning Protocols				
Parameter	Relaxation	Maintenance Clean	Sodium Hypochlorite CIP	Citric Acid/ Sulfuric Acid CIP
Interval between cycle	12 min	7 days	90 days	180 days
Cleaning cycle Duration	60 sec	50 min	8 hr	8 hr

5 SIEMENS MBR SYSTEM ADVANTAGES

The Siemens MBR System uses the latest advances in filtration and biological treatment in a combination specifically designed to create highly efficient aeration in conjunction with effective nutrient control with the absolute barrier of membrane filtration. The Siemens MBR have several key advantages over both conventional treatment processes.

5.1 Small Footprint

- Elevated mixed liquor suspended solids concentrations up to 10,000 mg/L reduce the required biological volume by up to 70%.
- The compact nature of the Siemens membrane tanks greatly reduces the required space for tertiary treatment.
- Membrane system is a modular design which allows flexible tank configurations to accommodate the space that is available.
- Use of DualAir Fine Bubble Diffused Aeration minimizes fine bubble diffused aeration piping and installation costs.

5.2 Advanced Process

- The Title 22 approved membranes enable effluent from the MBR to meet the most demanding effluent requirements and can be designed to meet stringent permit requirements or beneficial reuse such as urban irrigation, cooling tower make water or non-portable reuse.
- Much of the system operates at low DO concentrations and low ORP readings; therefore, oxygen transfer is efficient reducing power costs.
- Continuous monitoring of oxidation reduction potentials and dissolved oxygen concentrations allows the SmartBNR™ Control System to manage dissolved oxygen input to the system based upon demand. The results is reduced power costs.

5.3 Minimized Maintenance Requirements

- MemPulse™ provides uniform distribution of mixed liquor and air across the entire membrane tank ensuring a consistent mixed liquor environment for each membrane module preventing preferential fouling of membranes.
- Two phase effect of MemPulse™ eliminates the chance of dead zones in the membrane tank.

- Built in control safeguards prevent erratic treatment performance even when sensors malfunction.
- SmartBNR™ Control System capabilities allow the system to function effectively with less operator attention and remote monitoring is possible allowing unattended operation.

5.4 Service Capabilities

Siemens combines our in-depth system knowledge with our extensive company owned service organization to provide you with qualified local personnel that can manage the preventive and on-going service needs of the proposed MBR system. Our service programs are individually designed to meet the needs of each customer situation. Our service programs can be designed to provide any of the following services:

- Remote data analysis with actionable summary reports
- Completion of on-site membrane clean-in-place procedures
- Treatment system audits and membrane fiber analysis
- Completion of preventive maintenance and parts replacement

5.5 Remote Monitoring

- Remote monitoring capability allows for real time analysis of critical system parameters to help troubleshoot and support local service people.
- Remote monitoring data logging system allows Siemens process engineers to analyze system performance and optimize the system configuration for your specific application.

6 OPERATIONAL COSTS

6.1 Power Requirements

The following table lists the power consumption associated with the proposed membrane operating system at average flow conditions:

Estimated Power Requirements At Average Flow Conditions		
Equipment	Annual Power Requirement	Units
Anoxic Tank Mixers	98,112	kW-hr/yr
Biological Blowers	635,830	kW-hr/yr
ML Feed Pump	223,619	kW-hr/yr
Filtration Pump	65,078	kW-hr/yr
Membrane Blower	253,204	kW-hr/yr
TOTAL	**1,275,843**	**kW-hr/yr**

6.2 Chemical Cleaning Requirements

The following table lists the estimated bulk chemical consumption associated with the proposed membrane operating system:

Estimated Chemical Requirements			
Cleaning Procedure	Bulk Liquid Chemical Conc.	Annual Cleaning Procedures	Bulk Chemical per year
Chlorine MC	12.5% w/w	104	1,253 gal
Chlorine CIP	12.5% w/w	8	1,374 gal
Citric Acid CIP	50.0% w/w	4	553 gal
Sulfuric Acid CIP	98.8% w/w	4	18 gal

6.3 Labor Costs

Labor Costs are dependent on the specific site. As a general guide, the operator would be required to do the following:

- Testing of the biological samples from the plant including but not limited to MLSS, nitrates, ammonia, TSS and phosphates on a site specific frequency.
- Collection of samples from various locations in the plant including but not limited to the membrane tanks, aeration basins, raw feed.
- Monitor clean-in-place of membrane system
- Maintenance of mechanical equipment of the system

7 EQUIPMENT PROVIDED BY SIEMENS WITH THE MBR SYSTEM

When supplying a Siemens MBR System, the items noted in this section are typically provided by Siemens and are included in the budgetary pricing found in this Proposal.

7.1 Biological Process Equipment

Biological Process Equipment	
Qty.	Description
2	Floating mixer for anoxic reactors.
2	Aerated anoxic zone aeration system.
2	Aerobic zone aeration system.
3	Positive displacement biological process aeration blower.
1 lot	Instrumentation integral to the biological system including level transmitters, oxidation reduction potential (ORP) sensors, dissolved oxygen (DO) sensors, and pressure gauges.
1 lot	Valves required for equipment isolation and control of the BioNutre™ process including manual and automated valves with pneumatic actuators, and check valves.

7.2 Membrane Operating System Equipment

Membrane Operating System Equipment	
Qty.	Description
480	B40N membrane submodules fabricated of oxidant-resistant polyvinylidene fluoride (PVDF) membrane material.
30	Rack assembly (16 module capacity) consisting of header assemblies, guide racks, mixing skirt, and air dropper tube.
4	Stainless Steel wall support guides.
2	ROTARY-LOBE filtrate suction pump controlled by Variable Frequency Drive.
2	SUBMERSIBLE mixed liquor feed pump designed to feed mixed liquor to the membrane tanks.
2	Positive displacement membrane air scour blower designed to meet average and peak air flow requirements.
2	Turbidimeter to measure the turbidity of the filtrate from each membrane tank.
1	Compressed air system to operate Siemens supplied valves and leak testing with one air receiver and lead/lag rotary screw compressors.

Membrane Operating System Equipment	
Qty.	Description
1 lot	Valves required for equipment isolation and control of the membrane system including manual and automated valves with pneumatic actuators, check valves, and solenoid valves.
1 lot	Instrumentation integral to monitor and control the membrane system including level transmitters, level switches, flow meters, pressure transmitters, and pressure gauges.
2	Filtrate air release systems.

7.3 CIP Chemical Dosing System Equipment

CIP Chemical Dosing System Equipment	
Qty.	Description
1	Sodium hypochlorite dosing system skid. Includes two (2) dosing pumps and valves and instruments necessary for proper operation and calibration.
1	Citric acid dosing system skid. Includes one (1) dosing pump and valves and instruments necessary for proper operation and calibration.
1	Sulfuric acid dosing system skid. Includes one (1) dosing pump and valves and instruments necessary for proper operation and calibration.
1 lot	All valves and instruments necessary to monitor and control the CIP process, including: pneumatic valves, chemical injection quills, turbidimeter, pH probe analyzer, etc.

7.4 MBR System Control System Equipment

MBR System Control System Equipment	
Qty.	Description
1	Siemens S7-300C PLC.
1	Siemens MP 370 touch screen Human Machine Interface (HMI) with 512MB compact flash data storage card.
1	Master Control Panel (MCP).
1	UPS sized for the PLC and HMI.
1	Remote monitoring system (i.e. Memlog). Includes modem, software, and hardwarer.
1 lot	Digital and Analog I/O (Input/Output) modules.

7.5 Engineering Support

In addition to the mechanical components, instruments, electrical components and control system supplied, the proposed MemPulse™ MBR will be supported by Siemens Water Technologies' experienced engineering team. The following table details the personal support your MemPulse™ MBR project will receive.

Engineering Support	
Qty.	Description
N/A	MemPulse™ MBR drawings.
3 sets	MemPulse™ MBR O&M manuals in English language.
1	Siemens Water Technologies Project Engineer assigned to the project to ensure that the supplied system is engineered to perfectly fit the needs of the customer.
1	Siemens Water Technologies Project Manager assigned to the project to successfully execute the project.

7.6 Field Service

A Siemens Water Technologies Field Service Technician will be on site to supervise the installation, commissioning and start up of the proposed MBR system and train operators. This would include:

Field Service Support		
Man-days	Trips	Description
5	1	System inspection and verification.
3	1	Membrane installation supervision.
13	4	Start-up and commissioning.
10	3	Operator training.
6	2	Process testing.

7.7 Optional Equipment/Services

In addition to the supplied equipment mentioned above, Siemens can also supply the following equipment and/or services.

Optional Equipment/Services	
Qty.	Description
1 lot	Recommended spare parts package for critical equipment components, instruments, and valves.
1	Supplemental alkalinity (sodium hydroxide) dosing system skid. Includes two (2) dosing pumps and valves and instruments necessary for proper operation and calibration.
1	Motor control center, included all motor starters and variable frequency drives (VFDs).
1	Supervisory Control And Data Acquisition (SCADA) computer.

8 ITEMS TYPICALLY NOT PROVIDED BY SIEMENS

When supplying an MBR System, there are items associated with construction of a complete facility that are typically provided by the constructor rather than Siemens.

8.1 General Items Not Included

General Items not Included
• Compliance permitting and approval (Federal, State and/or local).
• Detail shop fabrication drawings.
• Electrical, hydraulic, or pneumatic controls unless specifically noted.
• Engineering and supervision of all equipment and labor for civil works.
• Laboratory, shop, or field testing other than supervision of start-up testing.
• Taxes, bonds, fees, permits, lien waivers, licenses, etc.
• Tools or spare parts.
• Unloading of equipment and protected storage of equipment at jobsite.
• Utilities connections.

8.2 Civil Works and Mechanical Items Not Included

Civil Works and Mechanical Items not Included
• Adhesives, adhesive dispensers, grout, mastic & anti-seize compounds.
• Anchor bolts and/or expansion anchors unless otherwise noted.
• Base slabs, equipment mounting pads, or shims.
• Chemical storage drums or totes
• Concrete work of any sort, grout, mastic, sealing compounds, shims.
• Demolition, removal, or transfer of anything that is existing.
• Engineering, permitting, and surveying.
• Headworks Equipment (Grit removal and fine screen)
• Effluent disinfection
• Waste activated sludge (WAS) equipment or solids handling system.
• Equipment lifting hoists, cranes, or other lifting devices.
• Field surface preparation and/or painting.
• Floor grating, stairways, ladders, platforms, handrailing unless noted.
• Installation of equipment.
• Interconnecting materials external to enclosures such as cable, pressure taps, tubing, etc.
• Labor for field testing.
• Lubricants, grease piping, grease guns.
• Modifications to existing equipment or structures.
• Pipe supports and hangers for piping.
• Piping, pumps, valves, wall sleeves, gates, drains, weirs, baffles not mentioned.
• Plumbing associated with waste disposal, floor drains, and/or emergency and safety wash stations.
• PVC solvent weld materials.

8.3 Electrical Items Not Included

Electrical Items not Included
• Conduit or wiring in the field.
• Cable trays, fittings, and supports.
• Influent instrumentation including, but not limited to flowmeters, pH analyzers, temperature transmitters and/or pressure transducers.
• Instrumentation required for post treatment monitoring.
• Power to Siemens supplied equipment.
• Motor control centers.
• Plant lighting.
• Supply and installation of building power, lighting, main service disconnects and control panels.
• Supply, installation and control of a remote telemetry system (SCADA) to monitor and control the operation of the system and overall plant operation other than SmartBNR.
• Underwriters Laboratory inspection of electrical controls.
• Variable frequency drives unless specifically noted.

BUDGETARY PRICING

In order to assist in the evaluation of this Siemens offering, budgetary pricing is provided below for the MBR System.

MBR Budgetary Pricing	
Equipment Offering	Price
MBR System as described in this Proposal	$2.7 million

In the absence of detailed project specifications and a specific purchase date, this pricing is intended to be conservative in nature making the assumption that the equipment in question will be purchased approximately one year in the future. If circumstances dictate, firm pricing can readily be provided for a contemplated purchase within the next sixty (60) days.

Return

SIEMENS
Water Technologies

APPENDIX A – MBR SYSTEM DRAWINGS

Membrane Tank Layout – Plan & Sectional	
BioNutre Plant Layout	

SIEMENS

Water Technologies

APPENDIX B – MEMBRANE WARRANTY TERMS

MEMBRANE WARRANTY TERMS

SIEMENS WATER TECHNOLOGIES CORP.
MEMBRANE MODULE WARRANTY
For

LYTLE CREEK RANCH WRP
dated
March 26, 2009

This document provides a Membrane Module Warranty (the "Warranty") by Siemens Water Technologies Corp. ("Siemens") to Lytle Creek WRP (the "OWNER") for the Lytle Creek WRP.

Section 1 – Membrane Module Warranty

Subject to the terms of this Membrane Module Warranty (the "Warranty"), Siemens Water Technologies Corp. ("Siemens") warrants that the membrane modules shall materially conform to Warranty conditions specified in Section 4 below. This Warranty shall commence on the earlier of (i) Start-Up of the membrane modules, or (ii) 6 months after the delivery of the membrane modules to the OWNER ("Commencement Date"), and shall thereafter continue for a period of five (5) years from such Commencement Date (the "Warranty Period"). If influent characteristics, other than those specified, deviate from the parameters given in section 4 and cause damage or irreversible fouling (such as high levels of oil, grease, etc.), the Warranty will be subject to review by Siemens and may nullify a claim.

Section 2 –Warranty Claim Procedures

To report a claim during the Warranty Period, the OWNER shall provide written notification to Siemens detailing the nature and basis of the claim, and shall also contact the Siemens Installation Support Center at +1-229-227-8718 (or their designated project manager) within 30 days of their discovery of the claim. Siemens will initiate the evaluation of the claim within 14 business days of such notification. At Siemens discretion, the claim evaluation may consist of data analysis, an on-site audit, and/or membrane fiber analysis.

If such claim evaluation results in a valid and legitimate Warranty claim, Siemens shall provide a Warranty remedy as set forth and detailed in Section 3 below. If the findings of Siemens' evaluation of the membrane module do not constitute a Warranty claim, Siemens reserves the right to invoice the OWNER at our standard rates for the services rendered for the Warranty claim evaluation.

Section 3 –Warranty Remedy

At Siemens' option and discretion, and as OWNER'S sole remedy under this Warranty, Siemens' sole liability for a valid and legitimate Warranty claim shall be as follows:

(a) If, as a result of such investigation, a membrane module shall prove to be defective within twelve (12) months of the Warranty Commencement Date, and not due to one or more of the Warranty exclusions set forth and detailed in Section 4 below, Siemens shall repair the membrane module if possible, or replace the membrane module, at no charge to OWNER.

(b) If, as a result of such investigation, a membrane module shall prove to be defective during the next forty-eight (48) months, and not due to one or more of the Warranty exclusions set forth and detailed in Section 4 below, Siemens shall repair the membrane module if possible, or replace the membrane module, and invoice the Owner based upon a pro-rata value of a total of sixty (60) months. This price for a replacement membrane module is calculated by using either US$1,650.00 per module or the prevailing list price, whichever is less, and reducing this price by one sixtieth (1/60th) for each month then remaining in the 60-month warranty period.

Section 4 –Warranty Limitations

The Warranty is subject to the following conditions:

(a) Siemens shall furnish replacement membrane modules per the repair or replacement schedule set forth and detailed in Section 3 above under the following conditions:

- If the membrane module(s) cannot be repaired
- If the membrane modules fail to meet the plant production capacity, as outlined in the Design Basis in the proposal
- If the membrane module(s) causes the system to exceed the effluent turbidity and/or total suspended solids requirements for this project, as outlined in the Design Basis in the proposal.

(b) Siemens shall not be liable under this Warranty in the case of any of the following conditions:

a. Unless written notice of any claim is received within 30 days of the claim event and the claim event occurs within the Warranty Period; or

b. If any person other than an employee or representative of Siemens has altered the membrane operating system without prior written approval by Siemens; or

c. For any damages caused by the OWNER causing or permitting the membrane modules to dry or to have moisture content below that specified in the operating instructions either during storage or operation. Shutdown, storage, maintenance and start-up procedures of membranes must be as specified in the Operation & Maintenance Manual; or

d. In the even the mixed liquor suspended solids concentration exceeds a maximum of 14,500 mg/L in the membrane tank; or

e. If evidence exists of (1) unusual plant upsets, (2) other potential transients, or (3) other undefined operating conditions that can affect membrane performance or life. This includes but is not limited to polymer "dumps", fats, oil and grease content in excess of 100 mg/L entering the biological system, the use, malfunction or by-pass of any equipment which allows the accumulation of non-biodegradable material in the membrane tanks, any bypass of the pre-screen ahead of the aeration basins and/or basket strainers on the membrane tank inlet, rags or debris that fall into the biological or membrane tanks, toxic wastes entering the plant that upset the biological process; or

f. For any damage/defect caused by chemical or physical conditions such as (but not limited to) pH, temperature, chemicals, effluent COD is greater than 50 mg/L or climatic factors outside the recommended operating parameters in the appropriate section of the Operation & Maintenance Manual; or

g. Unless the total membrane permeability and influent and effluent flow rates are continuously monitored and recorded; or

h. Unless the membranes undergo periodical chemical cleans as specified in the appropriate section of the Operation & Maintenance Manual; or

i. If neutralization and/or reduction of chemical cleaning solutions are performed in the membrane tank without written authorization from Siemens; or

j. If the sludge retention time (SRT) is less than 6 days or greater than 80 days over a 2-day history; or

k. Unless the influent, effluent, and mixed liquor parameters are monitored as per the Operation & Maintenance Manual; or

l. Unless the capillary suction time (CST) is less than 100 seconds for municipal mixed liquor before the membrane tank.

(c) THE WARRANTIES SET FORTH HEREIN ARE SIEMENS' SOLE AND EXCLUSIVE WARRANTIES. SIEMENS MAKES NO OTHER WARRANTIES OF ANY KIND, EXPRESS OR IMPLIED, INCLUDING WITHOUT LIMITATION, ANY WARRANTY OF MERCHANTABILITY OR FITNESS FOR PURPOSE. FULFILLMENT BY SIEMENS OF ITS OBLIGATIONS UNDER SECTION 2, SHALL BE THE OWNER'S SOLE AND EXCLUSIVE REMEDY FOR ANY FAILURE BY SIEMENS TO SATISFY ANY REQUIREMENT OF THIS WARRANTY. EXCEPT FOR SUCH OBLIGATIONS, IN NO EVENT SHALL SIEMENS BE LIABLE FOR ANY DAMAGES OF ANY NATURE WHATSOEVER FOR ANY BREACH OF THIS WARRANTY, INCLUDING WITHOUT LIMITATION ANY DIRECT, INDIRECT, CONSEQUENTIAL, INCIDENTAL, SPECIAL, PUNITIVE OR OTHER DAMAGES. SIEMENS' TOTAL LIABILITY UNDER THIS WARRANTY, WHEN ADDED TO ALL LIABILITY OF SIEMENS TO OWNER AND TO PURCHASER UNDER THE EQUIPMENT SALE CONTRACT, INCLUDING WITHOUT LIMITATION ANY LIABILITY FOR MECHANICAL WARRANTY CLAIMS OR FOR ANY BREACH OR FAILURE TO PERFORM UNDER THE EQUIPMENT SALE CONTRACT, SHALL NOT EXCEED THE LIABILITY LIMITATION SET FORTH IN THE EQUIPMENT SALE CONTRACT. THE FOREGOING LIMITATIONS APPLY REGARDLESS OF WHETHER THE LIABILITIES OR DAMAGES ARISE OR ARE ALLEGED TO ARISE UNDER CONTRACT, TORT, STRICT LIABILITY OR ANY OTHER THEORY. The Warranty is expressly excluded from all bonding requirements, such as performance and payments bonds or bid bonds, which may be associated with the execution or completion of the referenced project.

RO Add Pricing

From: "Tom Roberson" <troberson@miscowater.com>
To: <drrobie@cox.net>
Subject: Lytle Creek WDR Requirements - Budgetary Proposal & MOS Layout
Date: Tuesday, April 14, 2009 9:24 AM

Here ya go. I haven't had a chance to view. Let me know what you think.

Tom

Sent using BlackBerry

From: Galvan, Anthony G (WT)
To: Tom Roberson
Cc: Barnes, Dennis J (WT) ; Antonneau, Nathan T (WT) ; Tuomala, Jayme M (WT) ; Koziol, Robert J (WT)
Sent: Tue Apr 14 09:20:35 2009
Subject: RE: Lytle Creek WDR Requirements - Budgetary Proposal & MOS Layout

Tom,
We have a couple options here as the 2.2 MGD does not fall on a standard size. I have provided a couple options below. Note the RO unit design is based on the following:

Design Parameters:
Maximum turbidity: 1NTU
Maximum chlorine and chloramine: <0.1 ppm
Maximum water fouling index: Silt density index (SDI) <3
Inlet temperature: 60oF (15.6oC)
Inlet pressure requirements: 30 psig minimum
Product pressure availability: 20 pisg
System recovery (nominal): 75%
Performance basis: As specific computer projection must be run for each individual application.

Option A. Two (2) Vantage M86-162 RO units

We are pleased to provide budget pricing and information for the Vantage™ Series Reverse Osmosis membrane treatment system. The system will consist of the following equipment:

Two (2) Vantage M86 Reverse Osmosis skids, each rated for 694 gpm permeate flow, and each pre-piped and skid mounted on a painted steel skid with the following with each skid:

- Membrane elements as manufactured by DOW FILMTEC™, model LE-400.
- FRP membrane housings adequate for above membranes.
- Control panel with Siemens PLC controller and Siemens touch screen Human Machine Interface (HMI).
- Schedule 10 316L Stainless Steel high pressure piping.
- Schedule 80 PVC low pressure piping.
- Stainless steel pre-filter housing with first 2 sets of cartridge filters (about 1 month worth).
- Booster pump (VFD for booster pump by others).

- Manual and automatic control valves.

- Instrumentation including flow meters/transmitters, pH and ORP meters, conductivity and pressure gauges.

- Product water divert line and reject flush line.

- Raw water blend line including diaphragm valve and rotameter.

- Air compressor with receiver and starter panel for automatic valve operation.

- Model CIP-400 CIP skid with tank, recirculation pump, cartridge filter, local panel with piping and valves (common to all skids).

- Freight to the jobsite.

- Technical direction during plant installation, membrane loading, start-up and training in the amount of nine (9) days in four (4) trips.

The budget price for the above equipment is $964,500. This price does not include installation and field assembly; interconnecting piping, interconnecting wiring, backwash pumps, motor starters not specifically called out, and finished water storage.

In addition, we offer a variety of on-site Membrane System Service packages for long term care and optimization of your Vantage system. A budgetary Service Proposal is included for your review and consideration.

We can also offer Siemens Financing for this project. Please let me know if you would like further information on this option.

In addition to your equipment quote we are pleased to offer the following proposal for an equipment service contract.
Membrane equipment systems are dynamic treatment processes that require an ongoing preventative maintenance and cleaning services. Since protecting the quality of your effluent water means protecting your membrane treatment system investment, Siemens Water Technologies offers a complete range of services to help you manage and maintain your RO/NF membrane system. Our custom service contracts help to ensure that your plant is operating efficiently and reliably; producing quality water. With over 85 local service branches in North America we are your local service supplier.
Siemens Water Technologies service programs are designed to provide a proactive practical monitoring package to reduce system downtime, ensure optimum membrane performance, and minimum operating cost. This is accomplished by combining scheduled services visits with periodic membrane cleaning using a combination of on-site CIP and off site intensive membrane cleaning programs. In addition we have provided replacement parts including membranes and system components at a reduced price to you.

Schedule Services

Our service program covers four key areas:

Inspect & Record - Data collection with all key system parameters. If a current reading is outside the engineering limits then you are notified immediately. Further corrective action(s) and potential problems are clearly outlined in a follow-up letter after each service visit.
Mechanical & Electrical Function Checks - Our technician will take the equipment through its process functions and record the operational performance data.
Calibration Services -Siemens technicians are factory trained to perform field calibration of your RO/NF instrumentation. And if a factory calibration is needed, we can supply rental instruments while your equipment is serviced at the

manufacturer.
Analytical Support - Siemens also supplies comprehensive water analysis to meet your specific requirements.

In addition, between service visits Siemens Field Service Engineers and Applications Engineers are available by phone for simple troubleshooting and operation questions.

Annual System Reviews

Each year our service and engineering team will sit down with your staff and review the previous year's operation data, review safety compliance, discuss membrane life and performance and then identify areas for process improvement. We will make specific recommendations to improve your plant performance and reduce your future operating cost.

Training Seminars

One of the most important aspects of proper operation and maintenance of the membrane filtration system is the control of the units by plant personnel. We will provide an annual training session to assist in the training of new operators and refresh the knowledge of existing operators.

Membrane Maintenance and Parts Replacement

Siemens has the capability to provide complete membrane services including removing and reinstalling membranes, membrane replacement, on site cleaning using existing Clean in Place (CIP) skids, and off site cleaning at one of our seven regional membrane centers. These regional centers have membrane a proprietary designed cleaning process and single membrane vessels that achieve the highest restoration of membrane performance possible. If needed, new membranes are also available from Siemens at attractive prices.

Experience Service Crews

However, what has made our membrane service programs successful is the field support that we provide. Siemens Water Technologies has over 30 years experience in servicing membrane systems. Operating from over 85 service branches in North America, we service hundreds of systems. The service team for this job will be dispatched from a local branch office.
Siemens Water Technologies' service personnel are full time, trained and certified, employees of Siemens Water Technologies. They each have undergone the following:

- Physical exams and drug screens
- 40 Hour OSHA (8 hour refresher as needed)
- Forklift operator certification
- Confined space entry
- HM-181 training
- First Aid/CPR

In addition their training is kept current through monthly in service technical and safety training.

Annual Contract Price

Although we offer a wide range of service contracts for membrane systems our most common service contract is the Level II Partnership which is described in the scope of work table on the following page.

Annual pricing for this contract would be: $12,450.00

Please note that both service frequencies and the contracted scope of work can be altered to meet your specific needs. In addition we provide discounts for multiple year service contracts.

RO Add Pricing

We are pleased to provide budget pricing and information for the Vantage™ Series Reverse Osmosis membrane treatment system. The system will consist of the following equipment:

Three (3) Vantage M86 Reverse Osmosis skids, each rated for 525 gpm permeate flow, and each pre-piped and skid mounted on a painted steel skid with the following with each skid:

- Membrane elements as manufactured by DOW FILMTEC™, model LE-400.
- FRP membrane housings adequate for above membranes.
- Control panel with Siemens PLC controller and Siemens touch screen Human Machine Interface (HMI).
- Schedule 10 316L Stainless Steel high pressure piping.
- Schedule 80 PVC low pressure piping.
- Stainless steel pre-filter housing with first 2 sets of cartridge filters (about 1 month worth).
- Booster pump (VFD for booster pump by others).
- Manual and automatic control valves.
- Instrumentation including flow meters/transmitters, pH and ORP meters, conductivity and pressure gauges.
- Product water divert line and reject flush line.
- Raw water blend line including diaphragm valve and rotameter.
- Air compressor with receiver and starter panel for automatic valve operation.
- Model CIP-400 CIP skid with tank, recirculation pump, cartridge filter, local panel with piping and valves (common to all skids).
- Freight to the jobsite.
- Technical direction during plant installation, membrane loading, start-up and training in the amount of nine (9) days in four (4) trips.

The budget price for the above equipment is $1,163,300. This price does not include installation and field assembly; interconnecting piping, interconnecting wiring, backwash pumps, motor starters not specifically called out, and finished water storage.

In addition, we offer a variety of on-site Membrane System Service packages for long term care and optimization of your Vantage system. A budgetary Service Proposal is included for your review and consideration.

We can also offer Siemens Financing for this project. Please let me know if you would like further information on this option.

We are pleased to provide budget pricing and information for the Vantage™ Series Reverse Osmosis membrane treatment system. The system will consist of the following equipment:

RO Add Pricing

Three (3) Vantage M86 Reverse Osmosis skids, each rated for 525 gpm permeate flow, and each pre-piped and skid mounted on a painted steel skid with the following with each skid:

- Membrane elements as manufactured by DOW FILMTEC™, model LE-400.
- FRP membrane housings adequate for above membranes.
- Control panel with Siemens PLC controller and Siemens touch screen Human Machine Interface (HMI).
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Siemens Water Technologies service programs are designed to provide a proactive practical monitoring package to reduce system downtime, ensure optimum membrane performance, and minimum operating cost. This is accomplished by combining scheduled services visits with periodic membrane cleaning using a combination of on-site CIP and off site intensive membrane cleaning programs. In addition we have provided replacement parts including membranes and system components at a reduced price to you.

Schedule Services

Our service program covers four key areas:
Inspect & Record - Data collection with all key system parameters. If a current reading is outside the engineering limits then you are notified immediately. Further corrective action(s) and potential problems are clearly outlined in a follow-up letter after each service visit.
Mechanical & Electrical Function Checks - Our technician will take the equipment through its process functions and record the operational performance data.
Calibration Services -Siemens technicians are factory trained to perform field calibration of your RO/NF instrumentation. And if a factory calibration is needed, we can supply rental instruments while your equipment is serviced at the manufacturer.
Analytical Support - Siemens also supplies comprehensive water analysis to meet your specific requirements.

In addition, between service visits Siemens Field Service Engineers and Applications Engineers are available by phone for simple troubleshooting and operation questions.

Annual System Reviews

Each year our service and engineering team will sit down with your staff and review the previous year's operation data, review safety compliance, discuss membrane life and performance and then identify areas for process improvement. We will make specific recommendations to improve your plant performance and reduce your future operating cost.

Training Seminars

One of the most important aspects of proper operation and maintenance of the membrane filtration system is the control of the units by plant personnel. We will provide an annual training session to assist in the training of new operators and refresh the knowledge of existing operators.

Membrane Maintenance and Parts Replacement

Siemens has the capability to provide complete membrane services including removing and reinstalling membranes, membrane replacement, on site cleaning using existing Clean in Place (CIP) skids, and off site cleaning at one of our seven regional membrane centers. These regional centers have membrane a proprietary designed cleaning process and single membrane vessels that achieve the highest restoration of membrane performance possible. If needed, new membranes are also available from Siemens at attractive prices.

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However, what has made our membrane service programs successful is the field support that we provide. Siemens Water Technologies has over 30 years experience in servicing membrane systems. Operating from over 85 service branches in North America, we service hundreds of systems. The service team for this job will be dispatched from a local branch office.
Siemens Water Technologies' service personnel are full time, trained and certified, employees of Siemens Water Technologies. They each have undergone the following:

- Physical exams and drug screens
- 40 Hour OSHA (8 hour refresher as needed)

- Forklift operator certification
- Confined space entry
- HM-181 training
- First Aid/CPR

In addition their training is kept current through monthly in service technical and safety training.

Annual Contracting Pricing

Although we offer a wide range of service contracts for membrane systems our most common service contract is the Level II Partnership which is described in the scope of work table on the following page.

Annual pricing for this contract would be: $15,450.00

Please note that both service frequencies and the contracted scope of work can be altered to meet your specific needs. In addition we provide discounts for multiple year service contracts.

If I can provide further information regarding this service or membrane quotation, please don't hesitate to contact us.

Best Regards,

Anthony Galvan
Technical Sales Manager, General Filter and Microfloc Products
Siemens Water Technologies Corp.
725 Wooten Road
Colorado Springs, CO, 80915
email: Anthony.Galvan@siemens.com<mailto:Anthony.Galvan@siemens.com>
phone: +1 (719) 622-5324
cell: +1 (719) 440-6710
fax: +1 (719) 622-5399
www.siemens.com/water<http://www.siemens.com/water>

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From: Antonneau, Nathan T (WT)
Sent: Tuesday, March 31, 2009 12:32 PM
To: Galvan, Anthony G (WT)
Cc: Tom Roberson; Barnes, Dennis J (WT)
Subject: FW: Lytle Creek WDR Requirements - Budgetary Proposal & MOS Layout

Tony,

Can you please put together a budgetary price proposal for Don Roberson.

He is looking to go from a TDS of 500 or so to 240, post UF filtration via a MBR system. NF/RO seems to make the most sense.

The attached proposal details the MBR design and anticipated effluent quality.

Let me know if you need anything further.

Tom Roberson is the MISCO rep.

Thanks,

Nathan Antonneau, P.E.
Sales Process Engineer, Envirex Products
Siemens Water Technologies Corp.
1901 South Prairie Avenue
Waukesha, WI 53189
email: Nathan.Antonneau@Siemens.com
office: (262) 521-8401
cell: (414) 418-9994
fax: (262) 547-4120
www.water.siemens.com

For more information on our MBR Technology, please check out:
http://www.brainshark.com/siemenswater/membrane_bioreactor

For more information on MBR Support Services, please check out:
http://www.brainshark.com/siemenswater/MBRSupportServices

Looking for financing options? Siemens Financial Services offers several options for your project. Check out:
https://finance.siemens.com/financialservices/hq/en/aboutus/Documents/sfs_image_brochure_1096398.pdf

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From: Antonneau, Nathan T (WT)
Sent: Tuesday, March 31, 2009 12:51 PM
To: 'Tom Roberson'
Cc: Barnes, Dennis J (WT)
Subject: RE: Lytle Creek WDR Requirements - Budgetary Proposal & MOS Layout

Tom,

Please find the attached budgetary proposal and layout.

Description:

Membrane System

We sized the MOS tanks for approx. 15 gfd at ADF with both tanks in service

During CIP, capacity of plant will be slightly less than ADF with one MOS cell off-line (1.8 MGD vs. 2.2 MGD = 82% of design flow)

For ancillary equipment, we provided a dedicated pump and blower for each MOS tank. If a pump or blower is down, they can only operate one MOS tank at 82% of ADF for up to three days. If they don't fix the pump or blower within three days, they will need to decrease the flow of the plant down to 50% of ADF until the device is repaired. For a scalping plant, this is a typical level of redundancy.

Biological

We designed a dual-train BioNutre (multi-stage fine bubble system with variable DO concentrations), with 1/3 of volume as anoxic zone and 18-day system SRT. Each train has 2 fine bubble stages, separated by a non-hydrostatic baffle wall. If one fine bubble train is taken out of service, they can operate at ADF using only one fine bubble train by decreasing system SRT to 12 days. Typically, for a scalping plant, the load to the plant can be held fairly constant, so that we should be able to maintain the dissolved oxygen concentration in the anoxic tank close to zero even with oxygen introduced to this reactor from the MOS tanks. If they want to be able to operate the scalping plant at mass loadings less than about 1/4 of the design flow, we could supply nitrate recycle pumps to allow the oxygen-rich MOS overflow stream to be diverted to the aerobic zone to maintain denitrification during low-load conditions.

Please let me know if you have questions/comments.

Thank you,

Nathan Antonneau, P.E.
Sales Process Engineer, Envirex Products
Siemens Water Technologies Corp.
1901 South Prairie Avenue
Waukesha, WI 53189
email: Nathan.Antonneau@Siemens.com
office: (262) 521-8401
cell: (414) 418-9994
fax: (262) 547-4120
www.water.siemens.com

For more information on our MBR Technology, please check out:
http://www.brainshark.com/siemenswater/membrane_bioreactor

For more information on MBR Support Services, please check out:
http://www.brainshark.com/siemenswater/MBRSupportServices

Looking for financing options? Siemens Financial Services offers several options for your project. Check out:
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From: Tom Roberson [mailto:troberson@miscowater.com]
Sent: Wednesday, March 25, 2009 12:11 PM
To: Antonneau, Nathan T (WT)
Subject: RE: Lytle Creek WDR Requirements

Lets assume standard parameters…

From: Antonneau, Nathan T (WT) [mailto:nathan.antonneau@siemens.com]
Sent: Wednesday, March 25, 2009 10:10 AM
To: Tom Roberson
Cc: Barnes, Dennis J (WT)
Subject: RE: Lytle Creek WDR Requirements

RO Add Pricing

Tom,

Do you have influent parameters? Or should we assume some typical numbers?

Ballpark price is $2.5MM for MOS assuming standard temperatures and peaks.

Thanks,

Nathan Antonneau, P.E.
Sales Process Engineer, Envirex Products
Siemens Water Technologies Corp.
1901 South Prairie Avenue
Waukesha, WI 53189
email: Nathan.Antonneau@Siemens.com
office: (262) 521-8401
cell: (414) 418-9994
fax: (262) 547-4120
www.water.siemens.com

For more information on our MBR Technology, please check out:
http://www.brainshark.com/siemenswater/membrane_bioreactor

For more information on MBR Support Services, please check out:
http://www.brainshark.com/siemenswater/MBRSupportServices

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From: Tom Roberson [mailto:troberson@miscowater.com]
Sent: Wednesday, March 25, 2009 11:53 AM
To: Antonneau, Nathan T (WT)
Subject: Lytle Creek WDR Requirements
Importance: High

Nathan,

Please see below. Need to get a budgetary for the project detailed below. The influent will be mostly residential wastewater. At this point just need a budget number and an idea of the footprint.

Regards,

Tom Roberson

From: Don Roberson [mailto:drrobie@cox.net]
Sent: Wednesday, March 25, 2009 9:34 AM
To: Tom Roberson
Cc: Mike Hardy
Subject: Lytle Creek WDR Requirements
Importance: High

Tom and Mike,

RO Add Pricing

Here are the same discharge reqirements to apply to the NEW Lytle Creek Ranch Water Reclamation Plant that will have about 2.20 MGD flows and serve the new development area.

Cannot find the old preliminary budget stuff from 2007 and figure I never got a Budget number from anyone at that time.

We need to start over with a Ballpark figure for :
One 2.2mgd WWTP
One 1.3mgd Desalter (500tds to 240tds)

This WWTP is going to need everything except solids handling since it is a flow clipping plant that will send all waste solids flows to the City of Rialto sewers for recovery by the COR Veolia Plant.
Can be whatever is proven and needs a small footprint.

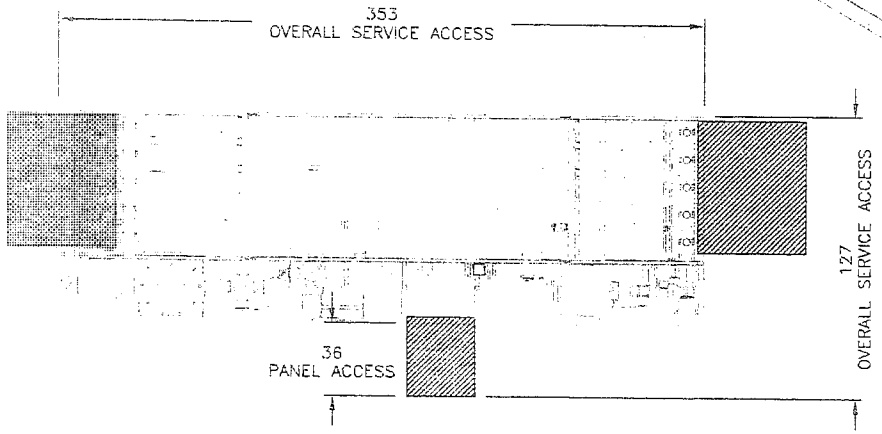
Refer to the Lytle Creek North Process Diagram attached.

We need to add on an RO stage at the end that will be 1.30 mgd to reduce tds from 500 in the WWTP effluent to 240tds since the reclaimed water is going for open space and golf course use.

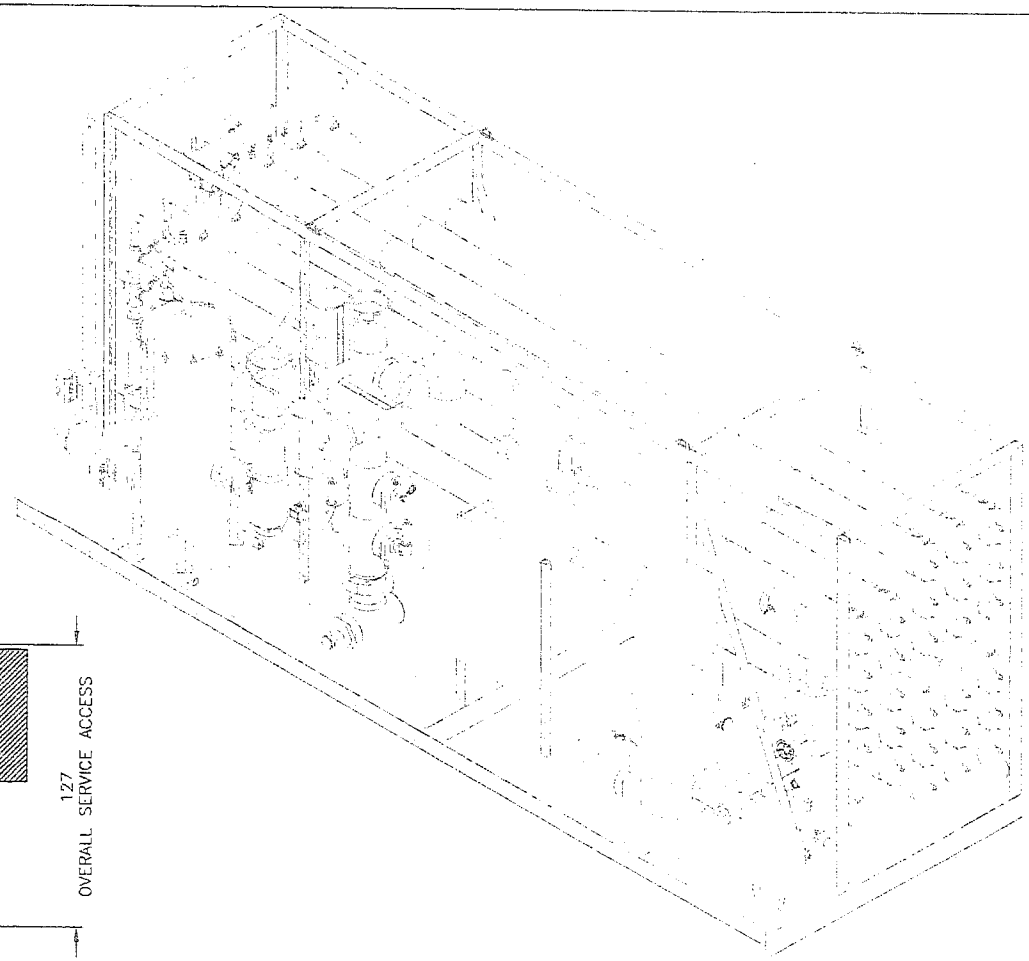
I do not need details just a budget for the smallest footprint and proven technology.

Don

NOTES:
1. ALL DIMENSIONS ARE IN INCHES +/- 1/2"
2. ALL WEIGHTS ASSOCIATED WITH GENERAL ARRANGEMENT DRAWINGS ARE NOMINAL.
3. TAGS TO BE LAMICOID HANG WITH TIE-WRAPS.
4. BOLT HOLE PATTERN OF FLANGES TO STRADDLE PRINCIPLE CENTERLINE OF PIPE.
5. ALL TUBING TO BE PE.
6. ALL FLANGE GASKETS TO BE EPDM UNLESS OTHERWISE NOTED.
7. ALL MOUNTING HARDWARE TO BE PLATED CARBON STEEL.
8. EMT & FLEXIBLE CONDUIT TO BE USED BETWEEN PUMP AND PANEL, S.O. CABLE FOR ALL INSTRUMENTATION.
9. PRESSURE TEST ALL PNEUMATIC TUBING TO 90psi.



NORMAL SERVICE ACCESS REQUIREMENT
(MODELS M86-126 AND M86-162)



MODEL M86-162 SHOWN

REV	DESCRIPTION	DATE	DWN	CHKD	APVD	ECN

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DESIGNER	COS	DATE 6-07-07
CHECKER		DATE
ENGINEER		DATE
MANAGER		DATE
FILE:		
SCALE: NTS		

TITLE VANTAGE M86 MEMBRANE SYSTEM
NANOFILTRATION/REVERSE OSMOSIS
GENERAL INFO. FOR MODELS M86-126 & M86-162

CLIENT

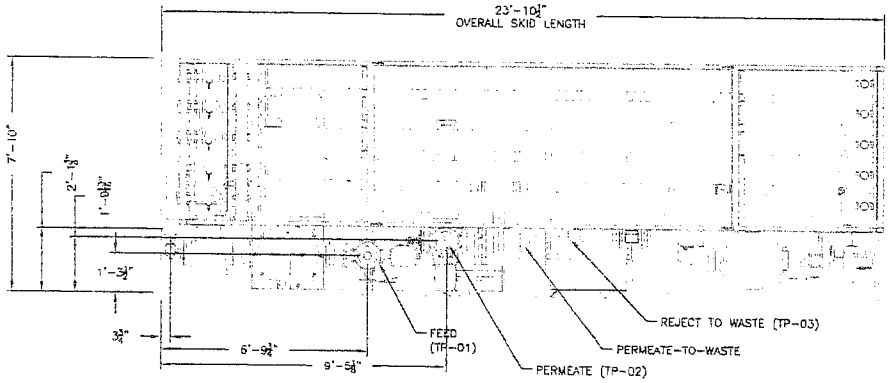
SIEMENS Water Technologies
Ames, IA
515-268-8400

PROJECT	CODE	DRAWING	SHEET	REV
		M86-GEN-02	1 OF 1	

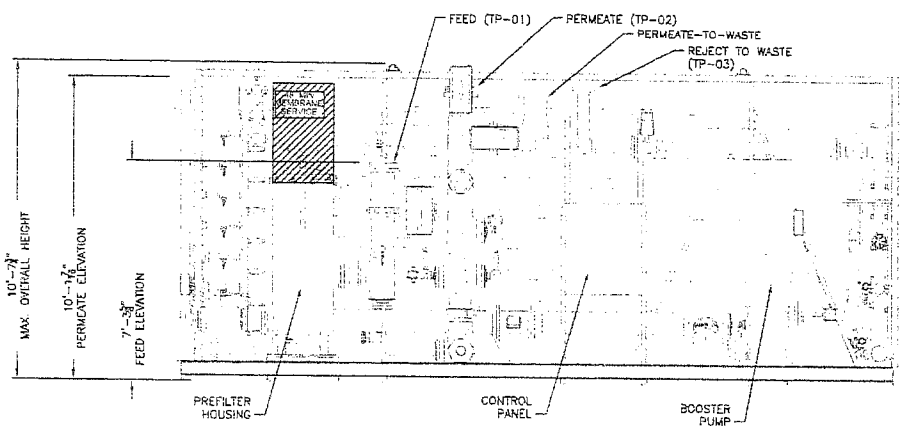
1 INCH REF.
= 1" AT PLOT SCALE

CONNECTION TABLE

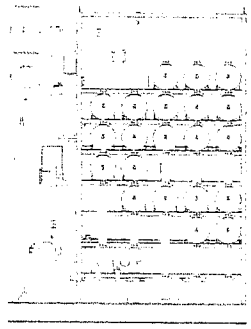
MEMBRANES	TP-01 FEED	TP-02 PRODUCT	TP-03 REJECT
126	8" 150# PVC80 FLNG	6" 150# PVC80 FLNG	4" 150# PVC80 FLNG



TOP VIEW



FRONT VIEW



RIGHT SIDE VIEW

REV	DESCRIPTION	DATE	DWN	CHKD	APVD	ECN

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CHECKER		DATE
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MANAGER		DATE
FILE:		
SCALE: 1/4"=1'-0"		

TITLE: VANTAGE M86 MEMBRANE SYSTEM
NANOFILTRATION/REVERSE OSMOSIS
MODEL: M86-126 14:7 6M ARRAY

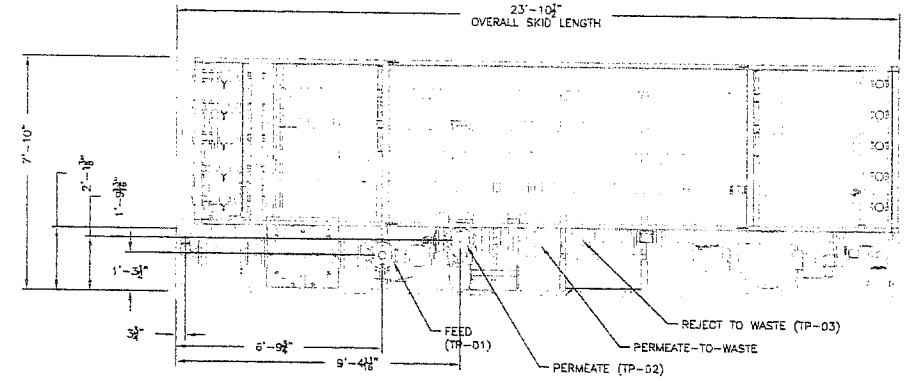
CLIENT

SIEMENS Water Technologies
Ames, IA
515-268-8400

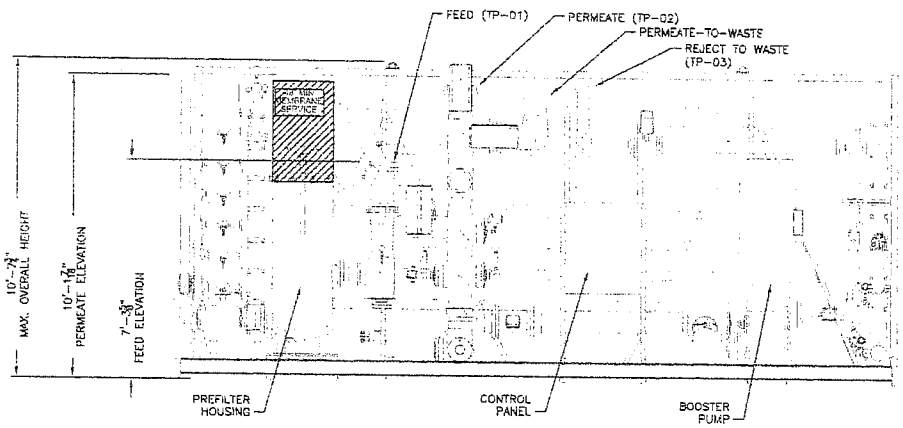
PROJECT	CODE	DRAWING	SHEET	REV
		M86-126-01	1 OF 1	

CONNECTION TABLE

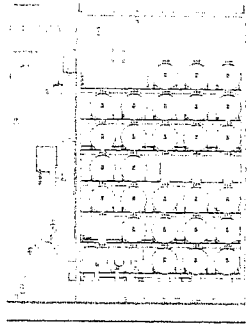
MEMBRANES	TP-01 FEED	TP-02 PRODUCT	TP-03 REJECT
162	8" 150# PVC80 FLNG	6" 150# PVC80 FLNG	4" 150# PVC80 FLNG



TOP VIEW



FRONT VIEW



RIGHT SIDE VIEW

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DESIGNER	COS	DATE 8-7-07
CHECKER		DATE
ENGINEER		DATE
MANAGER		DATE
FILE:		
SCALE:	1/4"=1'-0"	

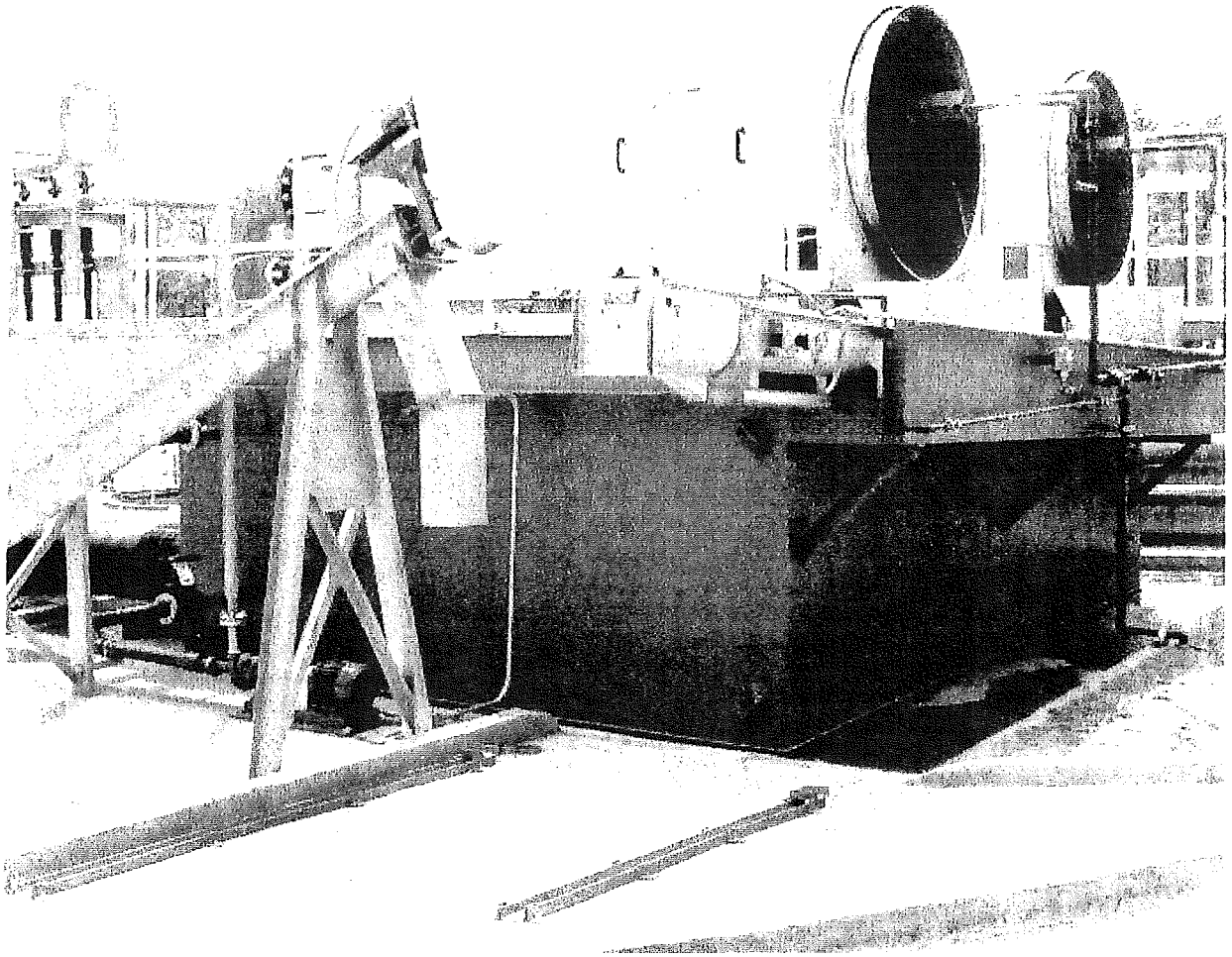
TITLE: VANTAGE M86 MEMBRANE SYSTEM
NANOFILTRATION/REVERSE OSMOSIS
MODEL: M86-162 18:9 6M ARRAY

CLIENT:

SIEMENS Water Technologies
Ames, IA
515-268-8400

PROJECT	CODE	DRAWING	SHEET	REV
		M86-162-01	1 OF 1	

STD. BORDER-110-11x17B | INT. REF | 1" AT PLOT SCALE



Cannibal® Solids Reduction Process Proposal

For Lytle Creek Ranch WWTP

Water Technologies

SIEMENS

Water Technologies

Taking care of the world's water

April 21, 2009

Mr. Don Roberson

Subject: Cannibal® Solids Reduction Process[1] Proposal for Lytle Creek Ranch WWTP

Dear Mr. Roberson:

Siemens Water Technologies is pleased to have the opportunity of proposing the Cannibal® Solids Reduction Process for the Lytle Creek Ranch WWTP. Based on a review of the information provided to us, we feel that the Cannibal Process is the most cost effective solution available to address your needs. The attached proposal elaborates on how our proposed solution meets your needs. We look forward to continuing discussions with you as you evaluate our offering.

The revolutionary Cannibal process significantly reduces biological sludge from wastewater treatment systems. Therefore, the annual operating costs associated with sludge treatment and sludge disposal are also considerably reduced. The reduction of biological solids is accomplished through an interchange recycle flow between the aerobic activated sludge process and a specially controlled side-stream interchange bioreactor. In addition, fine trash and inerts are continuously removed from the mixed liquor through a patented solids separation module. As a result of this, inactive materials are purged from the activated sludge process.

The major benefits from the Cannibal Process include:

Equipment:

- Conventional aerobic or anaerobic digestion can be reduced or even eliminated
- Unit operations can be eliminated from new plants
- Reduce the need for solids handling upgrade for existing facilities

Operation:

- Significant reduction in quantity of biosolids for disposal
- Reduces sludge hauling costs
- Only trash, grit, and inerts are removed on a regular basis
- Power costs of biosolids handling are greatly reduced
- Reduces polymer costs of sludge dewatering
- Routine operation of dewatering equipment is reduced or eliminated
- Redirects labor from solids handling to other critical plant tasks

---

[1] Cannibal is a registered trademark of Siemens Water Technologies Corp.

1901 South Prairie Avenue, Waukesha, WI 53189 · telephone: 800.524.6324 · facsimile: 262.547.4120

Based on our preliminary design for the Lytle Creek Ranch WWTP with a design flow of 2.2 million gallons per day, the Cannibal Process will require a total volume of 0.52 million gallons for the Cannibal interchange bioreactor and a solids separation module for inerts removal. The budget price for the Cannibal process, equipment, and services is $1,170,000. Additional information regarding the basis for this budgetary price can be found in the attached document. We hope that you will find all of the information necessary to evaluate the Cannibal Process in this Proposal; however, should you require additional information or wish to discuss the contents of this Proposal further, please contact us.

We appreciate your interest in Siemens Water Technologies Products and trust that as you review this offering, you will find the information provided to be helpful in your decision making process.

Regards,

Tim Lindemann
Process Sales Engineer
Siemens Water Technologies

Taking care of the world's water

SIEMENS

Water Technologies

Cannibal®
Solids Reduction Process Proposal

to

Mr. Don Roberson

for

Lytle Creek Ranch WWTP

April 21, 2009

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[2] Note that the page numbers above are hyperlinks – press "ctrl" and click a page number to go to that page. Throughout the document in the header, you will find "Contents". Pressing "ctrl" and clicking on "Contents" will bring you back to this Table of Contents. Occasionally, you will find other blue, underlined "Hyperlinks" which you can press along with "crtl" to go to the link and view the desired information.

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PROJECT SUMMARY

Siemens Water Technologies recommends the use of the Cannibal Solids Reduction Process for this project.

1 DESIGN BASIS

The design basis for our solution is summarized in this section. Please review these design criteria carefully to ensure that they reflect your latest project needs.

1.1 Influent Flows

Design influent flows are shown in the table that follows:

Influent Flows		
Parameter	Value	Units
Average Daily Flow	2.2	million gallons per day (MGD)

1.2 Influent Water Quality

Influent parameters that form the basis of the information contained in this Proposal are shown in the table that follows:

Influent Water Quality		
Parameter	Value	Units
Biological Oxygen Demand (BOD_5)	250	milligrams/liter (mg/l)
Total Suspended Solids (TSS)	250	mg/l
Total Kjeldahl Nitrogen (TKN)	50	mg/l
Total Phosphorus	8	mg/l

1.3 Effluent Requirements

The effluent requirements which this facility must meet are shown in the table that follows:

Effluent Requirements		
Parameter	Value	Units
BOD_5	5	mg/l
Total Suspended Solids	1	mg/l
NH_3-N	1	mg/l
Total Nitrogen	10	mg/l

2 PROCESS FLOW DIAGRAM

The Cannibal Process by Siemens Water Technologies is a revolutionary technology that significantly reduces the quantity of biological solids produced by wastewater treatment plants. Most types of activated sludge wastewater treatment processes can incorporate the Cannibal process into their flowsheet to achieve significant savings in solids handling, sludge hauling, energy, chemical usage, and labor. New plants can substantially simplify their solids handling and dewatering facilities resulting in significant savings in capital costs. The following diagram depicts how Cannibal fits into a typical plant flowsheet.

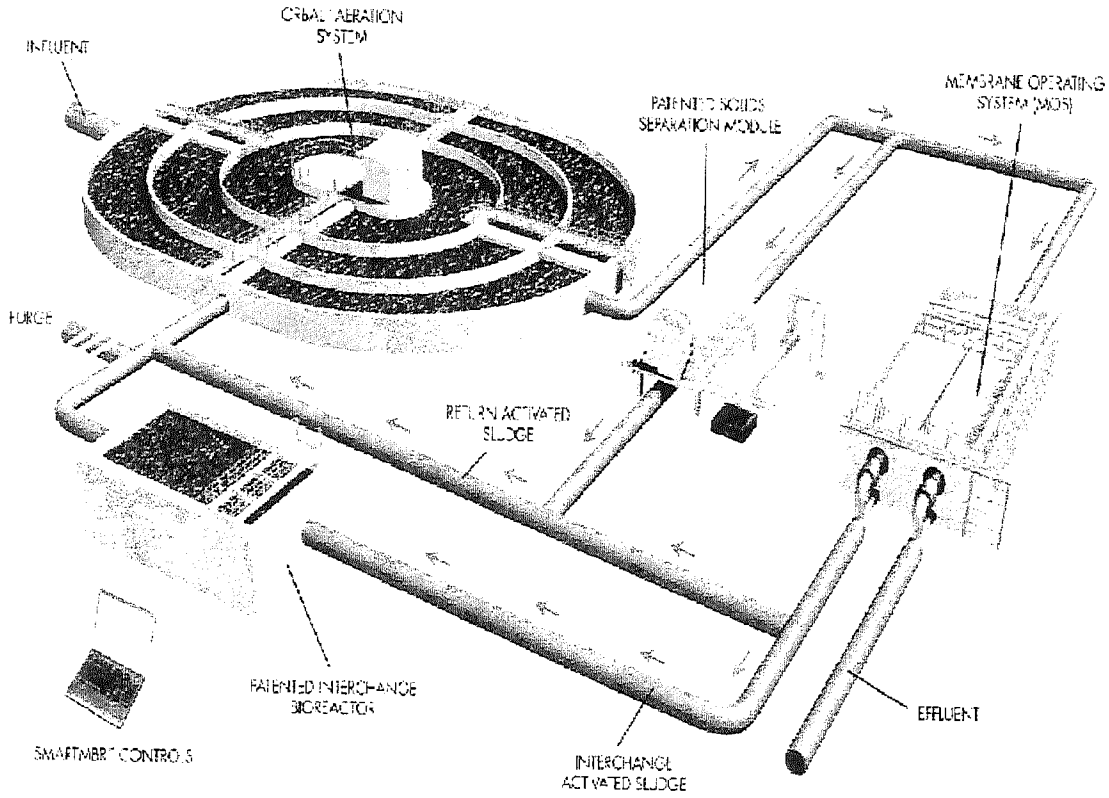
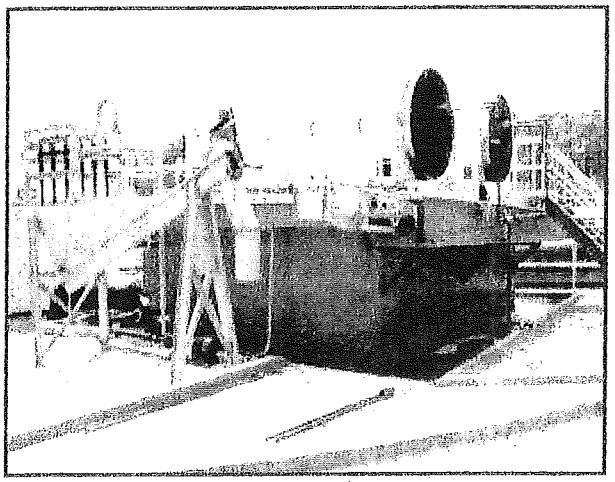
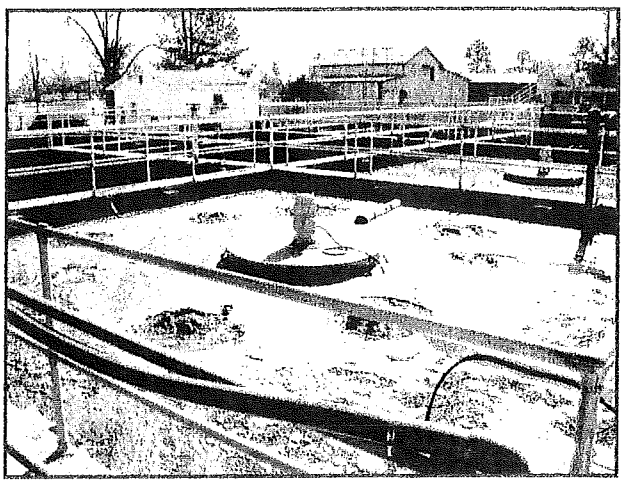


Figure 1 – Cannibal Process block flow diagram.

CANNIBAL PROCESS

CANNIBAL PROCESS





Reference drawings for the Cannibal Process can be found in Appendix A.

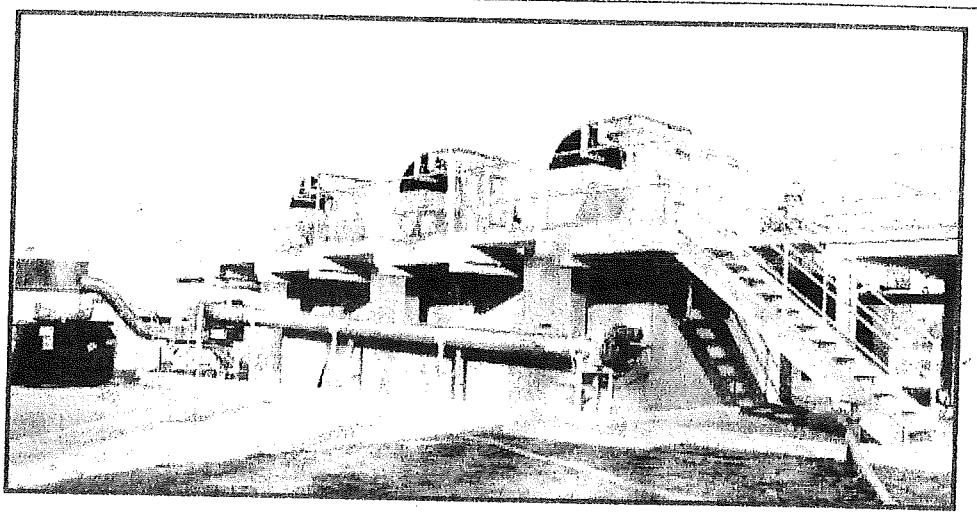
3 CANNIBAL PROCESS DESCRIPTION

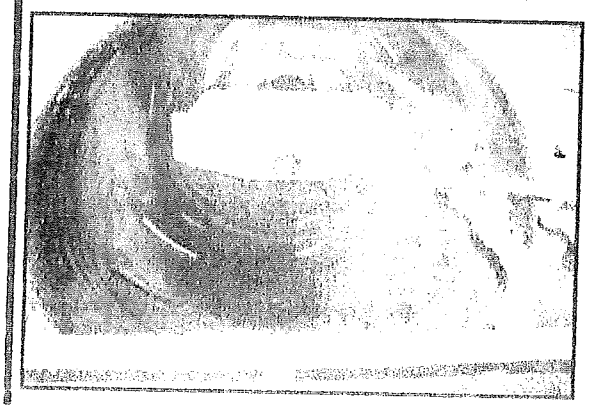
The Cannibal Process is comprised of three major components which can be adapted to specific treatment systems and requirements. These components include 1) the Solids Separation Module, 2) the Cannibal Interchange Bioreactor, and 3) the SmartCannibal™ Control System. These components are described in more detail in the following paragraphs.

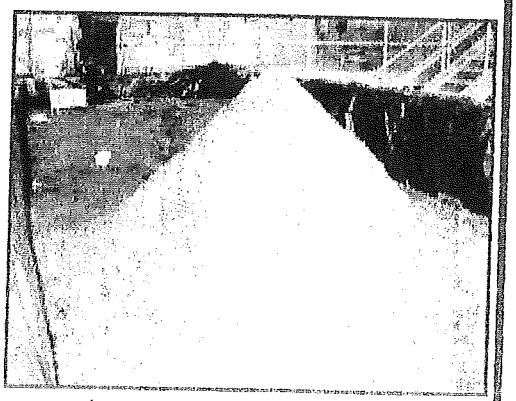
3.1 Solids Separation Module

In a conventional activated sludge plant, fine trash and inerts that are not removed in the headworks are eliminated through sludge wasting. In the Cannibal Process, traditional wasting is eliminated, and thus these solids must be removed through alternate means. This material commonly makes up 20 to 25% of the mixed liquor suspended solids (MLSS). In the Cannibal Process flowsheet, the activated sludge is sent through a patented solids separation module which contains ultra fine rotary drum screens for the removal of trash that would otherwise build up in the plant. The trash is washed and separated from the biological solids and is then compressed to 20% to 30% prior to disposal.

ULTRA FINE ROTARY DRUM SCREENS



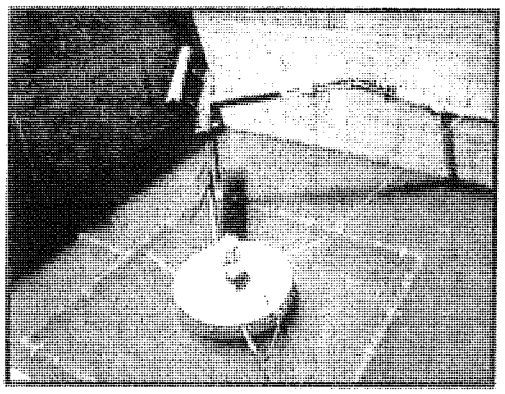


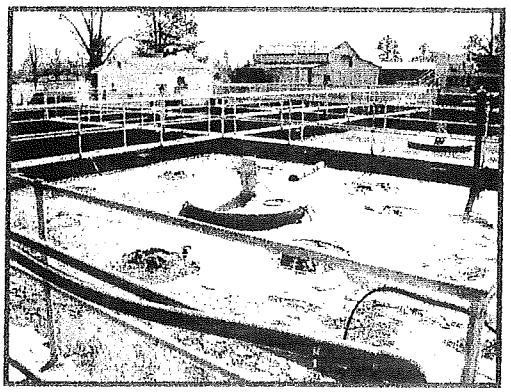


3.2 Cannibal Interchange Bioreactor

Solids that would normally be wasted from a conventional plant are instead sent to the side-stream interchange bioreactor where the unique conditioning environment of the Cannibal Process is created. Existing treatment facilities can frequently be retrofitted using existing digesters or other tankage as interchange bioreactors. Minimal aeration is required in the interchange tanks, and the oxidation reduction potential (ORP) is carefully monitored so that air is only supplied for short periods of time when the ORP becomes too low. In the low ORP environment, aerobic bacteria are conditioned for destruction and biodegradation, making their byproducts available for facultative bacteria that can survive in this environment. A portion of this side-stream tank is interchanged back into the main treatment process where biodegradation is completed and the facultative bacteria are out-competed by the new, fast growing aerobic bacteria. As the solids are interchanged and cycled between the aerobic and non-aerobic environments of the aeration basin and interchange tanks, solids are conditioned and destroyed, and the effective biological solids yield is significantly reduced.

CANNIBAL INTERCHANGE BIOREACTOR





3.3 SmartCannibal™ Control System

The SmartCannibal™ control system helps keep the Cannibal Process operating efficiently, regardless of varying load conditions. Designed by our biological treatment experts, the software of the SmartCannibal control system encodes their unique process knowledge to ensure system performance.

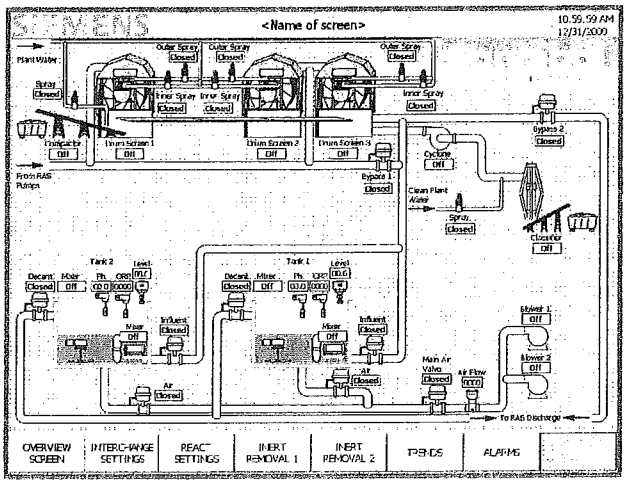
The Cannibal Process is controlled by:

- ORP and pH probes that monitor the environment and the interchange bioreactor, enabling the system to apply aeration and mixing at the optimum rate and time for solids destruction.

- Suspended solids and flow sensors that monitor the MLSS concentrations and the mass flow rate of the streams throughout the process.
- Level sensors and timers that monitor and regulate the operation of the solids separation module and side-stream bioreactor.

The SmartCannibal control system is derived from Siemens Water Technologies' SmartBNR™ technology. It provides the operator with easy-to-use tools for the most efficient plant control. The SmartCannibal control system features PLC based controls with a panel PC that utilizes a graphical interface. The system can interact with existing SCADA systems or be included in a comprehensive new SCADA system for the entire plant.

SMARTCANNIBAL CONTROL SYSTEM



4 CANNIBAL PROCESS DESIGN INFORMATION[3]

This section outlines the design basis for this Cannibal Process Proposal as well as the resulting design such as the basin size for the Cannibal interchange bioreactor and the equipment required for the solids separation module.

[3] More detailed process information for the Cannibal Process are available upon request and will be provided in any case as part of the Cannibal Process design package that will be prepared if the Cannibal Process is selected for this project.

4.1 System Design Parameters

Design Parameters		
Parameter	Value	Units
Organic Loading	37	lb BOD/cubic foot/day
Interchange Rate	5,336	dry lbs/day

4.2 Solids Separation Module

The solids separation module is intended to remove trash, grit, and inert materials from the activated sludge. It consists of a fine screening system. The activated sludge is pumped to the rotary drum screens. Screened activated sludge then flows by gravity or via a pump station back to the main process train. Screenings are conveyed to a screw press where they are dewatered to 20% to 30% solids without polymer addition. Dewatered screenings fall into a dumpster for final disposal in landfills without any further treatment. The rotary drum screen and the screw press run 24 hrs per day, 7 days per week. Wash water keeps the drum screen from plugging up and washes the activated sludge off the screenings.

Either MLSS or return activated sludge (RAS) can be sent to the rotary drum screens. As we move forward with this project, we will provide recommendations to help you evaluate which screening alternative is the most cost-effective option for this project.

The hydraulic capacity of the rotary drum screens is site specific. Therefore, please note that the pump station used to feed the screens must be designed with variable frequency devices (VFDs) and/or a bypass system to allow a great degree of flexibility. The activated sludge will be pumped to the rotary drum screens at a maximum rate equivalent to 150% of the influent design flow rate.

Solids Separation Module		
Parameter	Value	Units
Number of Rotary Drum Screens	1	-
Nameplate Power per Rotary Drum Screen	1.50	horsepower
Flow Rate per Rotary Drum Screen	200-2,000	gpm
Number of Screenings Compactors	1	-
Nameplate Power per Compactor	3	horsepower

4.3 Cannibal Interchange Bioreactor

The normal quantity of waste sludge from the activated sludge process is now sent to the interchange bioreactors for conditioning. Once a day, the interchange bioreactor is decanted to make room for untreated waste sludge. A control valve on

a floating decanter opens, allowing water and interchange sludge to be sent by gravity or via a decant pump station to the head of the plant. Once the proper space has been made in the interchange bioreactor, the decant control valve closes and then a fill control valve opens, allowing the tank to be filled back up.

The environment in the interchange bioreactor is monitored by the ORP and pH probes. An ORP set point and timers control when the blowers and mixers turn ON and OFF. The pH probe ensures that the nitrification process does not deplete the alkalinity, causing the pH to drop excessively. In addition to this control logic, the total MLSS inventory in the activated sludge process and the interchange rate are monitored with total suspended solids (TSS) probes in the aeration basins and in the RAS line, respectively.

The mixers are used during the decant cycle, the fill cycle, and when the aeration is ON. The interchange bioreactors are also equipped with a coarse bubble aeration system and a blower supply system[4]. The piping for the aeration system is provided with valved orifice diffusers. Dedicated blowers are not necessary since the interchange bioreactors do not call for air at the same time. The decanter is used for two purposes in the interchange bioreactors. First, it serves to decant water from the tank to maintain the appropriate TSS concentration in the tank. The second purpose of the decanter is to interchange sludge back to the main treatment process.

The required volume of the Cannibal interchange bioreactor for the Lytle Creek Ranch WWTP is 0.52 MG for the 2.2 MGD design flow. As a preliminary approach, we have assumed the use of two (2) new reactors as the Cannibal interchange bioreactors. Concrete tanks with the following dimensions are recommended: 44.00 feet x 44.00 feet x 18.00 feet side water depth (SWD). Siemens Water Technologies will supply the mixers, decanters, and the coarse-bubble diffusers for the interchange reactors.

Cannibal Interchange Bioreactor Information		
Parameter	Value	Units
Number of Interchange Bioreactors	2	-
Basin Length (inside dimension – each)	44.00	feet
Basin Width (inside dimension – each)	44.00	feet
Basin Side Water Depth	18.00	feet

[4] Blowers are not provided by Siemens as part of its budgetary pricing.

Cannibal Interchange Bioreactor Information		
Parameter	Value	Units
Basin Freeboard	2	feet
Number of Floating Mixers per Bioreactor	1	-
Nameplate Power per Mixer	15.00	horsepower
Number of Decanters per Bioreactor	1	-
In-basin Discharge Pipe of Floating Decanters	6	inch
Coarse Bubble Diffuser Air Flow per Basin[5]	1045.00	SCFM
Aeration Drop Pipe	10.00	inch
Aeration Distribution Header	8.00	inch
Number of Coarse Bubble Diffusers per Basin	72	-
Number of ORP Probes per Basin	1	-
Number of pH Probes per Basin	1	-
Number of Level Sensors per Basin	1	-
Number of TSS Probes	2	-

4.4 Configuration of the Activated Sludge Process

The performance of the Cannibal Process is highly dependent on the configuration of the activated sludge process. The daily interchange of solids between the secondary process train and the Cannibal interchange bioreactors and vice versa, changes the bacterial community of the entire plant. This new biology must not only be suitable to treat the incoming wastewater (considering that effluent quality is always the primary goal) but must also achieve sludge minimization. With the proper process configuration we can favor slow growers in the main process train and adequately condition or stress bacteria in the Cannibal bioreactors. The key for the Cannibal Process is to achieve a balance between bacterial growth and cell destruction.

The presence of multiple anoxic contact zones in series at the head of the plant and a significant turndown capability to deliver oxygen in the aeration basins are crucial for the Cannibal Process to properly work. The existing aeration volume will need to be added to in order to incorporate the Cannibal solids reduction process. The extra volume needed is estimated at 500,000 gallons.

As we move forward with this project we will need further discussions to determine how the most adequate activated sludge process configuration for the Cannibal Process can be incorporated into the plant flowsheet of The Lytle Creek Ranch WWTP.

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[5] Blowers are not provided by Siemens as part of its budgetary pricing.

5 CANNIBAL OPERATING CONDITIONS AND COST SAVINGS

Detailed within this section is an estimation of the operating conditions and cost savings of the Cannibal process offered to the Lytle Creek Ranch WWTP.

5.1 Estimated Amount of Screenings and Trash

At the design condition of 2.2 MGD we expect the amount of screenings and inerts material to be approximately 400 dry lbs/day at 20% to 30% solids. Solids from the rotary drum screen will be collected in a dumpster and disposed in landfills without any further treatment.

Screenings and Trash at Design Flow		
Parameter	Value	Units
Daily Screenings and Trash	400	dry lbs/day
Screenings Dryness	30%	%
Daily Volume	0.72	yd^3/day
Annual Screenings and Trash	250	wet tons/year

5.2 Biosolids Purge

The Cannibal process reduces the amount of biological solids wasting. However, there is a requirement for purging of biological solids at a rate equivalent to the reduced yield of the system. At the design flow rate the amount of biological sludge was estimated as 250 dry tons per year. This figure corresponds to a biological yield of 0.3 lbs TSS per lb BOD removed in the activated sludge process. Please note that the biosolids purged must be treated as conventional waste activated sludge. Further stabilization and dewatering may be required depending on your local sludge disposal regulations. Design of solids treatment, handling and disposal equipment needs to consider the estimated purge rate from the Cannibal process.

Biosolids Purge at Design Flow		
Parameter	Value	Units
Biological Yield	0.3	lbs TSS/lb BOD
Cake Dryness after Dewatering	18%	%
Biweekly Purged Amount	15	wet tons/ 2 weeks
Monthly Purged Amount	120	wet tons/month
Annual Purged Amount	1,400	wet tons/year

5.3 Operating Power

Power is required for the intermittent aeration and mixing in the side-stream Cannibal interchange bioreactor, as well as for the rotary drum screens and compactor in the solids separation module (SSM). We expect the total energy consumption to be approximately 94,718 kW-hr/year. Please note that this figure does not include any digestion and/or dewatering processes that may be applied to the purged biological solids. Also, it does not consider the pumping energy used to feed the rotary drum screens.

Estimated Energy Consumption for the Cannibal Process		
Parameter	Value	Units
Rotary Drum Screen	9,798	kW-hr/year
Screenings Compactor	9,798	kW-hr/year
Floating Mixers	16,330	kW-hr/year
Coarse Bubble Aeration	58,790	kW-hr/year
TOTAL	94,718	**kW-hr/year**

5.4 Cost Savings and Benefits

Regarding the benefits of the Cannibal Process, we expect that the generation of secondary sludge will decrease significantly. As a result of the sludge reduction process, the Lytle Creek Ranch WWTP will reduce the costs associated with handling, stabilization, dewatering, and disposal of secondary sludge. Additional investments in sludge thickening, digestion processes, and/or dewatering systems may also be reduced or eliminated completely.

We also estimate the sludge treatment will require less manpower. Labor costs are dependent on the specific site. As a guide, the operator would be required to do the following:

- Testing of the biological samples from the plant including but not limited to MLSS, nitrates, ammonia, SVI, TSS, and phosphates on a site specific frequency.
- Collection of samples from various locations in the plant including but not limited to the Cannibal interchange bioreactors, aeration basins, raw feed, etc.
- Monitoring the Cannibal Process.
- Oversight of the routine disposal of trash and inerts.
- Monitoring of the plant operation to control the throughput of the plant.

6 EQUIPMENT AND SERVICES PROVIDED BY SIEMENS WITH THE CANNIBAL PROCESS

This section provides an indication of the items included in budgetary pricing offered by Siemens. Items typically not included by Siemens can be found within the Budgetary Pricing section.

6.1 Items Provided by Siemens

When supplying the Cannibal Process, the items noted in this section are typically provided by Siemens and are included in the budgetary pricing found in this Proposal.

6.1.1 Solids Separation Module

Solids Separation Module
Rotary Drum Screen:
• Internally fed rotary wedge-wire screen.
• Base frame with structural members and legs.
• Surge tank collection pan.
• Internal and external spray wash headers with two solenoid valves.
Compactor:
• Shaftless screw.
• Inlet hopper.
• Spray wash solenoid valve.
• Gated compaction end.
• Solids discharge pipe.

6.1.2 Cannibal Interchange Bioreactor

Cannibal Interchange Bioreactor
Aeration system:
• Drop pipe.
• Diffuser header piping.
• Valved orifice diffusers.
• Supports with attachment hardware.
• Anchorage.

Cannibal Interchange Bioreactor
Floating Mixer:
• Floating mixer.
• Mooring cables with extension springs.
Decanter:
• decanter.
• Decanter support.
• In-basin discharge pipe.

6.1.3 SmartCANNIBAL Control System

The proposed SmartCANNIBAL Control System is based upon a Siemens programmable logic controller (PLC) with the necessary input/output (I/O) and software to provide complete automated control for the Cannibal Process. The following items include the basic elements that form the backbone of the control system:

SmartCANNIBAL Control System
The SmartCANNIBAL Control System includes:
• NEMA 4X control panel.
• PLC with: · Cannibal Process control logic, software, and graphics · I/O points for all instruments, starters, etc.
• Control panel with graphical operator interface (HMI).
• TSS probes.
• ORP probes.
• pH probes.
• Level transmitter.

6.1.4 Services

Cannibal Services
Mechanical Field Service:
• Mechanical field service to check the installation of the equipment, assist in the start-up, and provide training on the maintenance of the equipment will be provided. A total of three (3) days at site will be provided.
Instrumentation and Control Field Service:
• Instrumentation and control field service to check the installation of the instrumentation, assist in the PLC start-up, and provide training on the operation of the HMI screens will be provided. A total of four (4) days at site will be provided.
Process Field Service:
• Process training and support during the first year of operation will be provided. A total of fourteen (14) days at site will be provided.

BUDGETARY PRICING

In order to assist in the evaluation of this Siemens offering, budgetary pricing is provided below for the Cannibal Process.

Cannibal Budgetary Pricing	
Equipment Offering	Price
Cannibal Process as described in this Proposal	$1,170,000

In the absence of detailed project specifications and a specific purchase date, this pricing is intended to be conservative in nature, making the assumption that the equipment in question will be purchased approximately one year in the future. If circumstances dictate, firm pricing can readily be provided for a contemplated purchase within the next sixty (60) days.

7 ITEMS TYPICALLY NOT PROVIDED BY SIEMENS

When supplying the Cannibal Process, there are items associated with construction of a complete facility that are typically provided by the constructor rather than Siemens.

7.1 General Items Not Included

General Items not Included
• Compliance permitting and approval (Federal, State and/or local).
• Detail shop fabrication drawings.
• Electrical, hydraulic, or pneumatic controls unless specifically noted.
• Engineering and supervision of all equipment and labor for civil works.
• Laboratory, shop, or field testing other than supervision of start-up testing.
• Taxes, bonds, fees, permits, lien waivers, licenses, etc.
• Tools or spare parts.
• Unloading of equipment and protected storage of equipment at jobsite.
• Utilities connections.

7.2 Process Equipment Items Not Included

Process Equipment Items not Included
• Aeration blowers.

7.3 Civil Works and Mechanical Items Not Included

Civil Works and Mechanical Items not Included
• Adhesives, adhesive dispensers, grout, mastic & anti-seize compounds.
• Anchor bolts and/or expansion anchors unless otherwise noted.
• Base slabs, equipment mounting pads, or shims.
• Concrete work of any sort, grout, mastic, sealing compounds, shims.
• Demolition, removal, or transfer of anything that is existing.
• Engineering, permitting, and surveying.
• Equipment lifting hoists, cranes, or other lifting devices.
• Field surface preparation and/or painting.
• Floor grating, stairways, ladders, platforms, handrailing unless noted.
• Installation of equipment.
• Interconnecting materials external to enclosures such as cable, pressure taps, tubing, etc.
• Labor for field testing.
• Lubricants, grease piping, grease guns.
• Modifications to existing equipment or structures.
• Pipe supports and hangers for piping.
• Piping, pumps, valves, wall sleeves, gates, drains, weirs, baffles not mentioned.
• Plumbing associated with waste disposal, floor drains, and/or emergency and safety wash stations.
• PVC solvent weld materials.

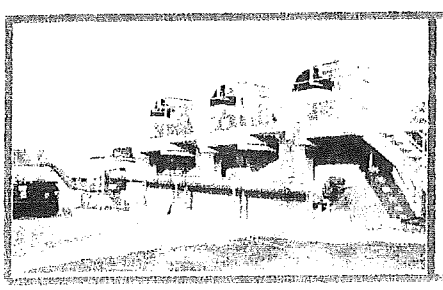
7.4 Electrical Items Not Included

Electrical Items not Included
• Conduit or wiring in the field.
• Cable trays, fittings, and supports.
• Influent instrumentation including, but not limited to flowmeters, pH analyzers, temperature transmitters and/or pressure transducers.
• Instrumentation required for post treatment monitoring.
• Power to Siemens supplied equipment.
• Motor control centers.
• Plant lighting.
• Supply and installation of building power, lighting, main service disconnects and control panels.
• Supply, installation and control of a remote telemetry system (SCADA) to monitor and control the operation of the system and overall plant operation other than SmartBNR.
• Underwriters Laboratory inspection of electrical controls.
• Variable frequency drives unless specifically noted.

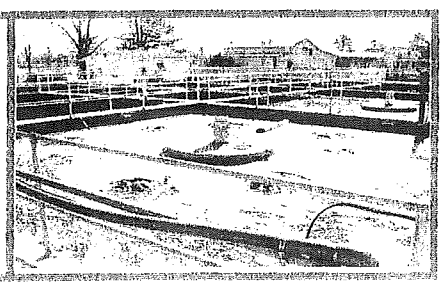
CONCLUSION

In the Cannibal Process, Siemens offers what we believe to be the best available combination of sludge reduction effectiveness, capital cost economy, and minimum operation and maintenance costs. The intent of this Proposal is to provide the basic information necessary to evaluate the capabilities of the Cannibal Process versus the needs of this project. In the event the Cannibal Process is deemed to be a desirable treatment option for this project, we assume that additional detail will be needed during the project design process. Siemens welcomes the opportunity to provide its Tier 2 Proposal which includes the level of detail we believe is needed to address the requirements of most designs we have encountered over the years.

Siemens appreciates your interest in our Products, and we are anxious to discuss your needs and our offering with you. We encourage you to meet with the Siemens contact identified in the cover letter accompanying this Proposal to further discuss the needs of this project and how the Cannibal Process can address those needs.



Taking care



Return

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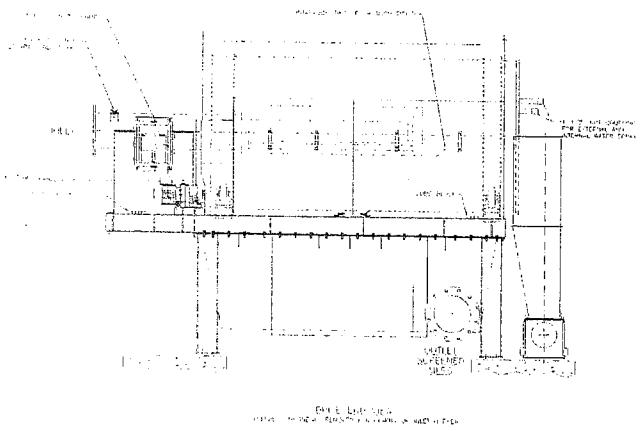
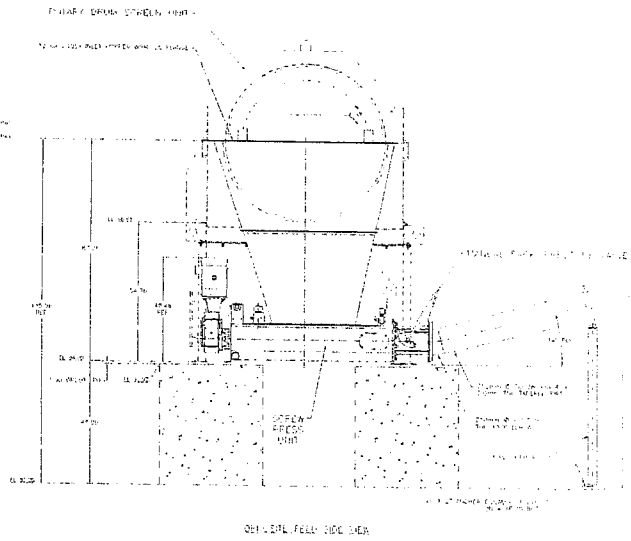
Water Technologies

APPENDIX A – CANNIBAL PROCESS REFERENCE DRAWINGS

Typical Solids Separation Module Equipment Layout
Typical Cannibal Interchange Bioreactor Plan View





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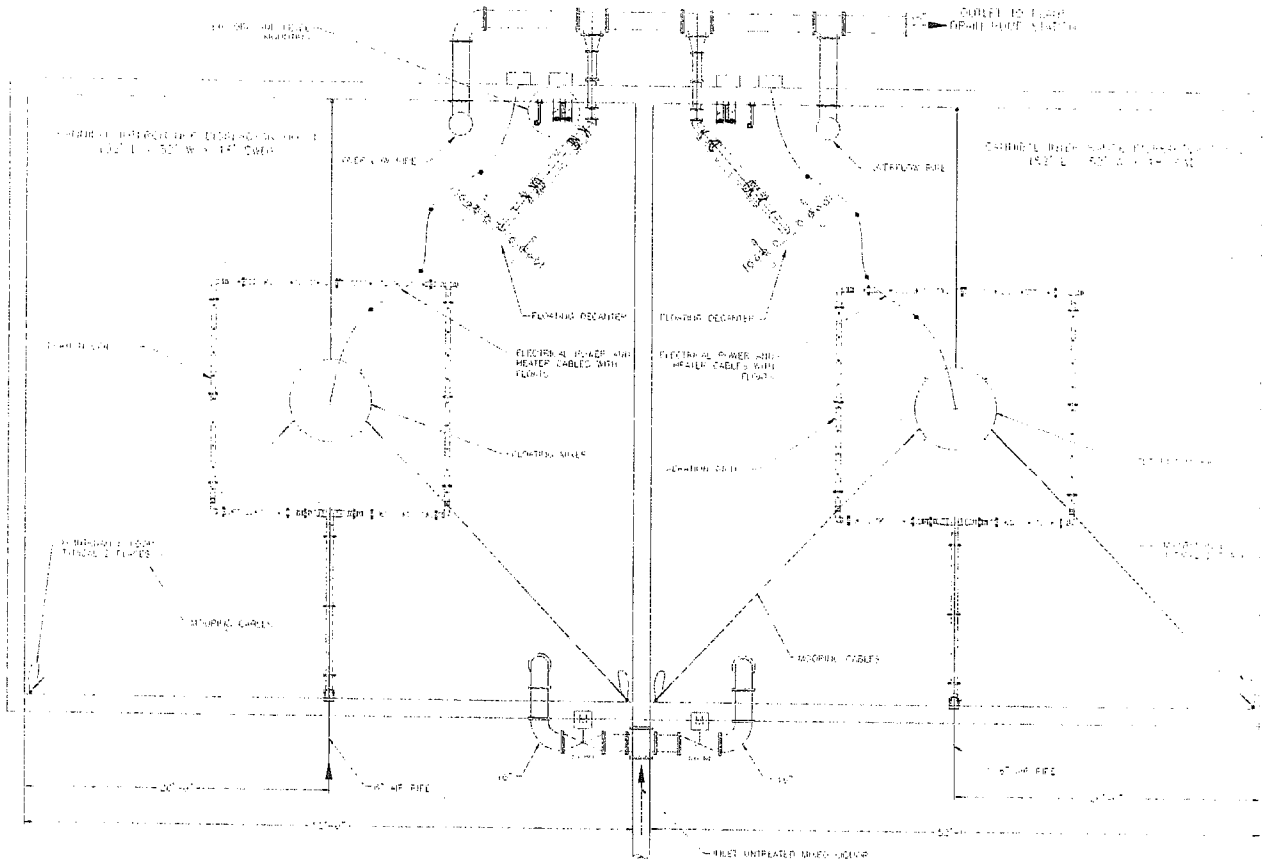

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DENITE[R] DESIGN CALCULATIONS
7/23/09

SEVERN TRENT SERVICES
Water Purification Solutions, Inc.

Project Name: Lytle Creek WWTP
STS #: 10105
STS Sales: Robert Kurtz
Client's Engr.: Mark Iverson, PE PBS&J Riverside CA
Plant Location: Devore, CA
STS Engineer: Gregory Ellard, PE
Comments: Title 22 Effluent Requirements
Four shorter concrete filters with extra freeboard

I. DESIGN BASIS

A. General Design Parameters

K value @ 20 deg. C	=			
Media depth	=	6.0	feet of	6 x 9
Media void volume factor	=	0.4		
Media specific surface area	=	200	ft^2/ft^3	
Reactor width	=	9.5	ft	
Reactor length	=	9.8	ft	
Reactor surface area	=	92.6	ft^2	
Biomass yield	=	0.5	lb/lb NO_X-N red.	
S.G. of dry biosolids	=	1.4		
Effective MLSS assumed	=	20,000	mg/L average	
Initial BW water rate	=	6	gpm/ft^2	
Initial BW water duration	=	15	minutes	
Final BW water rate	=	6	gpm/ft^2	
Final BW water duration	=	5	minutes	
BW air rate @ std. atm pressure	=	5	$icfm/ft^2$	
Barometric pressure at site	=	14.7	psig	
Max. spec. solids loading	=	1.00	lb/ft^2	
Max. spec. NO_X-N loading	=	0.05	lb/ft^2	
Methanol storage tank(s)	=	3,000	gallons total	
Est. power cost	=	$0.10	per KWH	
Methanol cost	=	$0.80	per gallon	
BW pump head	=	10	psig	
BW blower head	=	10	psig	
Mudwell pump head	=	10	psig	

B. Flow

		Summer	Winter	
Annual Avg.,	MGD =	2.00	2.00	
	gpm =	1,389	1,389	
Max-Mo.,	MGD =	2.00	2.00	PF = 1.00
	gpm =	1,389	1,389	
Pk-Hour,	MGD =	2.00	2.00	PF = 1.00
	gpm =	1,389	1,389	

C. Hydraulic Criteria

Filtr. Rate @ AA w/all IS	=	3.7	gpm/ft^2
Filtr. Rate @ AA w/1OOS	=	5.0	gpm/ft^2
Filtr. Rate @ Max-Mo w/all IS	=	5.0	gpm/ft^2
Filtr. Rate @ Max-Mo w/1 OOS	=	5.0	gpm/ft^2
Filtr. Rate @ Pk-hr w/1 OOS	=	5.0	gpm/ft^2

D. Influent Characteristics

Parameter		Summer	Winter	
Nitrate as N, mg/L avg @ AA	=	7.0	7.0	
Nitrate as N, mg/L max @ MM	=	7.0	7.0	
TSS, mg/L	=	20.0	20.0	
Phosphate as P, mg/L	=	1.0	1.0	assumed
pH, SU	=	7.0	7.0	assumed
DO, mg/L	=	2.0	2.0	assumed
Min. temperature, deg.C	=	27.0	12.0	53.6 deg. F

E. Desired Effluent Characterictics (Discharge Limits)

Parameter		Summer	Winter	
Nitrate as N, mg/L @ AA	=	1.5	1.5	79% removal
Nitrate as N, mg/L @ Max-Mo	=	1.5	1.5	79% removal
TSS, mg/L	=	5.0	5.0	
pH, SU	=	6-9	6-9	

II. DENITE[R] CALCULATION SUMMARY

A. Kinetic Design

		Summer	Winter
K value corrected for temperature	=		
Empty Bed D.T. required @ AA	=		
Empty Bed D.T. required @ Max-Mo	=		
Maximum filtration rate @ AA	=		
Maximum filtration rate @ Max-Mo	=		
Minimum reactor SA @ AA	=		
Minimum reactor SA @ Max-Mo	=		
Raw number of reactors @ AA	=		
Actual number of reactors @ AA	=		
Raw number of reactors @ Max-Mo	=		
Actual number of reactors @ Max-Mo	=		
Design based on kinetics	=	3.00 reactors	4.00 reactors
MESSAGE:		ok	ok

MESSAGE: AA condition controls kinetic design for winter

B. Hydraulic Design

		Summer	Winter
Raw size at AA w/all in-service	=	4.05 reactors	4.05 reactors
Actual size at AA w/all in-service	=	4.00 reactors	4.00 reactors
Raw size at AA w/1 out-of-service	=	4.00 reactors	4.00 reactors
Actual size at AA w/1 out-of-service	=	4.00 reactors	4.00 reactors
Raw size at Max-Mo w/all in-service	=	3.00 reactors	3.00 reactors
Actual size at Max-Mo w/all in-service	=	3.00 reactors	3.00 reactors
Raw size at Max-Mo w/1 out-of-service	=	4.00 reactors	4.00 reactors
Actual size at Max-Mo w/1 out-of-service	=	4.00 reactors	4.00 reactors
Raw size at Pk-hr w/1 out-of-service	=	4.00 reactors	4.00 reactors
Actual size at Pk-hr w/1 out-of-service	=	4.00 reactors	4.00 reactors
Design based on hydraulics	=	4.00 reactors	4.00 reactors

C. Recommended Design

		Summer (Hydraulics control)		Winter (Kinetics control)	
Number of reactors required	=	4	reactors	4	reactors
Total surface area	=	370	ft^2	370	ft^2
AA hydraulic loading	=	3.75	gpm/ft^2	3.75	gpm/ft^2
AA hyd. loading w/1 filter OOS	=	5.00	gpm/ft^2	5.00	gpm/ft^2
Max-Mo hydraulic loading	=	3.75	gpm/ft^2	3.75	gpm/ft^2
Max-Mo hydraulic loading w/1 filter OO	=	5.00	gpm/ft^2	5.00	gpm/ft^2
Pk hour hydraulic loading	=	3.75	gpm/ft^2	3.75	gpm/ft^2
Pk hour hydraulic loading w/1 OOS	=	5.00	gpm/ft^2	5.00	gpm/ft^2
75% Pk hour hydraulic loading w/1 OOS	=	3.75	gpm/ft^2	3.75	gpm/ft^2
Empty Bed D.T. @ AA	=	11.97	minutes	11.97	minutes
Empty Bed D.T. @ Max-Mo	=	11.97	minutes	11.97	minutes
Methanol equiv. BOD rem. @ AA	=	185	$lb/1000\ ft^3$	185	$lb/1000\ ft^3$
NO_X-N removal/volume @ AA	=	41	$lb/1000\ ft^3$	41	$lb/1000\ ft^3$
NO_X-N removal/media SA @ AA	=	0.21	$lb/1000\ ft^2$	0.21	$lb/1000\ ft^2$
Total NO_X-N removal @ AA	=	92	lb N/day	92	lb N/day
Spec. NO_X-N removal @ AA	=	0.08	lb N/lb bio	0.08	lb N/lb bio
MESSAGE:		Rate ok		Rate ok	
Alkalinity generation @ AA	=	17	mg/L $CaCO_3$	17	mg/L $CaCO_3$
Bio-Solids generation @ AA	=	46	lb/day	46	lb/day
TSS removal @ AA	=	250	lb/day	250	lb/day
BW air @ std. baro psi = 14.7	=	463	icfm	463	icfm
BW air @ act. baro psi = 14.7	=	463	icfm	463	icfm
BW air rate at corrected pressure	=	5.00	icfm/sf	5.00	icfm/sf
Est. BW blower motor, full load	=	25.95	hp@psig= 10	25.95	hp@psig= 10
Initial BW water flow	=	556	gpm	556	gpm
Final BW water flow	=	556	gpm	556	gpm
Est. BW pump motor, full load	=	5.59	hp@psig= 10	5.59	hp@psig= 10
BW water volume per BW	=	11,112	gallons	11,112	gallons
Mudwell/Clearwell size, DF=1.2(BW vol	=	13,334	gallons	13,334	gallons
Min. Clearwell size req'd @ AA	=	0	gallons	0	gallons
Mudwell pump, return @min(BI or 2 hrs)	=	93	gpm	93	gpm
Mudwell pump motor	=	0.93	hp@psig= 10	0.93	hp@psig= 10
Backwash frequency @ AA	=	1.25	days/reactor	1.25	days/reactor
	=	30.05	hrs/reactor	30.05	hrs/reactor
BW Sys. Interval, start to next start	=	7.51	hrs/syst. BW	7.51	hrs/syst. BW
		3.19	system BW/day	3.19	system BW/day
		7%	BW as % op. time	7%	BW as % op. tim
BW: % of forward flow @ AA	=	1.78	%	1.78	%
Bump frequency @ AA	=	4.85	hrs/reactor	4.85	hrs/reactor
	=	1.21	hrs/sys. bump	1.21	hrs/sys. bump
Number of bumps btw. reactor BW	=	6.20	bumps/ BW	6.20	bumps/ BW

Biosolids accumulation btw BWs	=	14	lbs	14	lbs
Non-bio TSS accum. btw BWs	=	78	lbs	78	lbs
Total solids accum. btw BWs	=	93	lbs	93	lbs
Average TSS in BW	=	1,001	mg/L	1,001	mg/L
Theoretical CH_3OH:N ratio @ AA	=	2.72		2.72	
Est. actual CH_3OH:N (1.1 factor)	=	2.99		2.99	
Methanol req'd @ AA conditions	=	1.73	gph max.	1.73	gph max.
Methanol req'd @ est. 10:1 turndown	=	0.17	gph min.	0.17	gph min.
MESSAGE: Methanol feed range ok for LMI-E7 series pump					
Methanol storage @ AA conditions	=	72.05	days	72.05	days
Theoretical CH_3OH:N ratio @ Max-mo	=	2.72		2.72	
Est. actual CH_3OH:N (1.1 factor)	=	2.99		2.99	
Methanol req'd @ Max-mo conditions	=	1.73	gph max.	1.73	gph max.
Methanol req'd @ est. 10:1 turndown	=	0.17	gph min.	0.17	gph min.
MESSAGE: Methanol feed range ok for LMI-E7 series pump					
Methanol storage @ Max-mo conditions	=	72.05	days	72.05	days
Theoretical P required as nutrient	=	0.92	lb/day	0.92	lb/day
Est. actual P required (1.1 factor)	=	1.01	lb/day	1.01	lb/day
P available in raw wastewater	=	16.67	lb/day	16.67	lb/day
Supplemental P required	=	none req'd	lb/day	none req'd	lb/day
Supplemental P as 75% H_3PO_4	=	0.00	gpd	0.00	gpd
55-gal drum of 75% H_3PO_4 will last	=	0.00	days	0.00	days

III. ESTIMATED OPERATING COSTS

A. Chemical @ AA			Summer		Winter	
Methanol cost/gal @	$0.80	=	$6,079	per 6 mos.	$6,079	per 6 mos.
H_3PO_4 cost /lb @	$0.50	=	$0	per 6 mos.	$0	per 6 mos.
	Subtotal	=	$6,079	per 6 mos.	$6,079	per 6 mos.

B. Power @ AA

$/KWH = $0.10

BW pump power	=	$80	per 6 mos.	$80	per 6 mos.
BW blower power	=	$282	per 6 mos.	$282	per 6 mos.
Bump pump power	=	$50	per 6 mos.	$50	per 6 mos.
Mudwell pump power		$81	per 6 mos.	$81	per 6 mos.
Subtotal	=	$493	per 6 mos.	$493	per 6 mos.

IV. EQUIPMENT LIST FOR ROM-TYPE ESTIMATE (based on winter conditions)

Final equip. selection to be made by Mechanical Dept. after design is finalized.
HP and psig values are estimated typical operating conditions.

Qty	Description					
4	Denite[R] hardware @	92.6	ft2			
1 lot	media @	111.1	tons of	6 x 9		
1 lot	gravel @	27.8	tons			
1	Mudwell basin @	13,334	gallons			
1	Clearwell basin @	13,334	gallons			
2	BW water pump @	556	gpm@psig=	10	6	hp
2	BW air blower @	463	icfm@psig=	10	26	hp
1	Methanol storage @	3,000	gallons			
2	Methanol pump @	1.73	gph max.,	0.17	gph min.	
0	Phos. acid pump @	0.00	gph =	0	ml/min	
2	Mudwell pump @	93	gpm@psig=	10	1	hp
1	Instrument air comp	10	scfm @ 100 psig			
1	Instrument air dryer	20	scfm @ 100 psig			
1	Control system					

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GLOSSARY

Terms Encountered in Wastewater Management

"A" Horizon. The layer of soil formed at or near the soil surface, having properties that reflect the influence of accumulating organic matter or eluviation.

Absorption. The process by which one substance is physically taken into and included with another substance.

Acidity. A measure of the acid character of waters; indicated by low pH's (below 7.0); associated with aggressive and corrosive waters.

Activated sludge. A process commonly used in conventional centralized sewerage systems for removing organic matter from sewage by saturating it with air and adding biologically activated sludge. The activated sludge is subsequently separated from the treated wastewater (mixed liquor) by sedimentation and wasted or returned to the process as needed.

Adsorption. The process by which pollutants are attracted to and held on the surfaces of soil molecules, thus immobilizing them.

Ad valorum tax. A method of determining user charge rates based on a percentage of assessed property values.

Advanced waste treatment. Physical or chemical treatment following secondary or biological treatment. Also called tertiary treatment.

Aeration. The exposure to the chemical action of air.

Aeration tank. Serves as a chamber for injecting air into raw or settled wastewater as it is mixed with return sludge. The same as aeration bay, aerator, or reactor.

Aerobic. Life or processes that occur in the presence of oxygen. In an aquatic environment such as wastewater, "aerobic" refers to the presence of free or dissolved oxygen.

Aerobic treatment. Process by which microbes consume complex organic compounds in the presence of oxygen and use the liberated energy for reproduction and growth. Types of aerobic processes include aerobic tanks, extended aeration, trickling filtration and rotating biological contactors.

Aggregate, soil. A group of soil particles cohering so as to behave mechanically as a unit.

Algae. Simple rootless plants that grow in still waters in relative proportion to the amounts of nutrients available. When they grow in large numbers in wastewater treatment ponds they can affect water quality adversely by lowering the dissolved oxygen in the water. But they can help treat wastewater in small natural treatment units.

Alkalinity. The capacity of water or wastewater to neutralize acids. High alkalinities (above 300 to 500 mg/l) are usually associated with hard waters. Alkalinity is not the same as pH because water does not have to be strongly basic (high pH) to have a high alkalinity. Alkalinity is a measure of how much acid can be added to a liquid without causing great change in pH.

Alternating and dosing system. An onsite disposal system that uses tanks, automatic siphons, pumps, or other mechanisms to control the package of waste effluent from the septic tank to the drainfield. The system allows for dose and rest cycles that improve waste assimilation in the drainfield.

Alternative wastewater system. A fully proven system that reclaims or reuses wastewater, productively recycles wastewater components, recovers energy, or eliminates the discharge of pollutants.

Anaerobic. A life or process that occurs in the absence of oxygen. In an aquatic environment such as wastewater, "anaerobic" refers to the absence of free or dissolved oxygen.

Angstrom (Å). One hundred millionth of a centimeter. Expressed as 10-8 cm.

Aquaculture. Developing plants and animals that grow in water or wastewater and cleanse wastewater by digesting pollutants. The harvest is used as fertilizer, food, and so on.

Aquifer. An underground geologic formation, or group of formations, containing usable amounts of groundwater that can supply wells and springs.

Amortization. The process of allocating an asset, a liability, or an amount over future accounting periods. It is the gradual reduction or liquidation of an account according to a specified schedule of times and amounts.

Assimilative capacity. The ability of a site to absorb and treat hydraulic and nutrient loading of wastewater effluent.

Attenuation. The process by which a compound is reduced in concentration over time through adsorption, degradation, dilution, and/or transformation.

"B" Horizon. The layer of soil beneath the "A" horizon characterized by a higher colloid (clay or humus) content, or by a darker or brighter color than the soil immediately above or below, the color usually being associated with the colloidal materials. The colloids may be of alluvial origin (left by rivers or floods), as clay or humus; they may have formed in place (clays); or they have been derived from texturally layered parent material.

Backwashing. The operation of cleaning a filter by reversing the flow of liquid through it, washing out matter captured in it, and returning to the wastewater treatment plant for additional treatment.

Bacteria. Microscopic, single-celled living organisms which can aid wastewater treatment systems by consuming or breaking down organic matter in sewage. Bacteria in soil, water or air can also cause human, animal, and plant health problems.

Batch process. A treatment process in which a tank or reactor is filled, the wastewater is treated, and the tank is emptied. The tank may then be filled and the process repeated.

Bedrock. The solid rock beneath the soil and subsoil.

Biochemical oxygen demand (BOD). The rate at which microorganisms use the oxygen in water and wastewater to aerobically decompose organic matter present. The BOD in effluent is used along with suspended solids as a measure of the effectiveness of the wastewater treatment processes. All BOD levels of treated effluent are 30 milligrams per liter or lower as set by state and county health regulations. "BOD5" refers to the biochemical oxygen demand over a five-day period.

Biodegrade. To decompose as a result of the actions of microorganisms.

Biomass. A mass or clump of living organisms feeding on the wastes in wastewater, dead organisms and other debris. This mass may be formed for, or function as, the protection against predators and storage of food supplies. Biomass also refers to trees and shrubs or anything of biological origin.

Biomat. Also known as clogging mat. An organic-rich slime layer that forms on sand filter surfaces or at soil trench interfaces that reduces permeability.

Biosolids. A term referring to sludge.

Blackwater. Any water that carries animal, human, or food wastes.

Bond. A written obligation to pay (debt) a specified sum of money (called principal) at future dates (called maturity dates) along with periodic payments at a specified percentage of the principal (interest rate). Bonds are typically used for long-term debt.

Bond, general obligation. When a government pledges its full faith and credit to the repayment of bonds which it issues through various means including taxes or other revenues.

Bound water. Water contained within the cell mass of sludges or strongly held on the surface of colloidal particles. It is one of the causes of bulking sludge in the activated-sludge process.

Bulk density, soil. The mass of dry soil per unit bulk volume. The bulk volume is determined before drying to constant weight at 105° C.

Bulking. Clouds of billowing sludge that occur throughout secondary clarifiers and sludge thickeners when the sludge becomes too light and will not settle properly. In the activated-sludge process bulking is usually caused by filamentous bacteria or bound water.

Bulking agent. A material which reduces bulk density and improves aeration in a compost facility.

"C" Horizon. The layer of soil that normally lies beneath the "B" horizon but may lie beneath the "A" horizon, where the only significant change caused by soil development is an increase in organic matter, which produces an "A" horizon.

CFS. Flow rate in cubic foot per second; 1 cfs equals 0.65 million gallons per day.

Capital costs. All costs of major rehabilitation, betterments, expansion, or upgrading (as opposed to operation) of a wastewater system project.

Capillary action. A liquid's movement over, or retention by, a soil surface, due to the interaction of adhesive and cohesive forces.

Chemical oxygen demand (COD). A measure of the oxygen-consuming capacity of materials in wastewater. COD is expressed as the amount of oxygen consumed from a chemical oxidant in milligrams per liter (mg/l) during a specific test. Results are not necessarily related to biochemical oxygen demand because the chemical oxidant may react with substances that bacteria do not stabilize.

Chlorinator. A device for adding chlorine gas to sewage to kill infectious germs.

Chlorine. A compound added to water and wastewater usually for the purpose of disinfection.

Chlorine residual. The total amount of chlorine (combined and free available chlorine) remaining in water, sewage, or industrial wastes at the end of a specified contact period following chlorination.

Clay. A soil separate that is less than 0.002 millimeters in diameter. Clay has a smooth, sticky and plastic feel when moist. Clay forms very hard clods when dry. Clay particles may remain suspended in water for extended periods of time.

Clarifiers. Settling tanks or sedimentation basins. The purpose of a clarifier is to remove settleable solids by gravity, or colloidal solids by coagulation following chemical flocculation; will also remove floating scum through skimming.

Clay. A soil separate consisting of particles smaller than 0.002 millimeters in equivalent diameter; a textural class of soil.

Clogging mat. Same as biomat.

Closed-loop recycling. Reclaiming or recycling wastewater for nonpotable purposes in an enclosed process.

Cluster system. A system of wastewater collection and treatment facilities in which wastes from numerous homes or their sources are conveyed to a central treatment and disposal facility. Systems generally consist of small collection pipes attached to individual homes that transfer the wastes to the central treatment facility.

Coagulation. The clumping together of solids to make them settle out of the sewage faster. Coagulation of solids is brought about with the use of certain chemicals such as lime, alum, or iron slats.

Coliform-group bacteria. A group of bacteria predominantly inhabiting the intestines of humans or animals, but also found in soil. Used as an indicator of contamination.

Colloids. The finely divided suspended matter which will not settle, and the apparently dissolved matter which may be transformed into suspended matter by contact with solid surfaces or precipitated by chemical treatment. Substances which are soluble as judged by ordinary physical tests, but will not pass through a parchment membrane.

Combined sewers. Sewers that carry both sewage and stormwater runoff. During rainless periods, most or all of the flow in a combined sewer is composed of sanitary sewage. During a storm, runoff increases the rate of flow and may overload the sewage treatment plant to which the sewage connects. At such times, it is common to divert some of the flow, without treatment, into the receiving water.

Commercial waste. Any waste that is generated and disposed by a commercial establishment such as a gas station, restaurant, or dry cleaner. These wastes may contain hazardous constituents which may require special treatment.

Composting. The natural biological decomposition of organic material in the presence of air to form a humus-like material.

Composting toilet. Any device that is designed to store and decompose human waste by aerobic digestion. These systems may require special venting, plumbing, electrical, and mechanical components, and periodic maintenance.

Compound. A pure substance composed of two or more elements whose composition is constant. For example, table salt (sodium chloride) is a compound.

Conventional wastewater system. One of a variety of standard systems which is commonly used to collect, treat, and dispose of wastewater: sewers, treatment plants and septic tanks with drainfields.

Cross connection. A connection between drinking (potable) water and an unsafe water supply. For example, if a pump moving non-potable water is hooked up to a drinking water system to supply water for the pump seal, a cross connection or mixing between the two water systems can occur. This mixing may lead to contamination of the drinking water.

Decomposition. The process of breaking down into smaller particles.

Debt service. Payment of interest and repayment of principal to holders of a debt instrument.

Denitrification. The biochemical reduction of nitrate or nitrite to gaseous molecular nitrogen or an oxide of nitrogen. This condition is often the cause of rising sludge observed in secondary clarifiers or gravity thickeners. Denitrification takes place during the proper balance of nitrate and carbonaceous material and only under anaerobic conditions.

Detention time. The time required to fill a tank at a given flow or the theoretical time required for a given flow of wastewater to pass through a tank.

Dewater. To remove or separate a portion of the water present in a sludge or slurry.

Digestion. The process of dissolving solids in wastewater. Digestion of sludge takes place when the materials decompose, resulting in partial gasification, liquefaction, and mineralization of pollutants.

Dilution. The process of diluting, thinning out, or making less concentrated, as in diluting wastewater by adding it to a river or stream.

Discharge. To release; when used with "wastewater" it usually refers to wastewater released into surface waters (streams and lakes).

Disinfection. The process designed to kill most microorganisms, including essentially all pathogenic (disease-causing) bacteria. Disinfection should not be confused with sterilization.

Dissolved oxygen. The oxygen freely available in water, wastewater, or other liquid. Dissolved oxygen is vital to fish and other aquatic life.

Domestic wastewater. Wastewater that is generated by a residence. These wastewaters generally consist of human wastes and wastewater from washing machines, toilets, showers, and dishwashers.

Drainfield. Also known as absorption field, disposal field, leach field, nitrification field, seepage field, tile field, septic field and others. A system of trenches or beds or combinations of these devices designed for subsurface treatment and disposal of pretreated waters.

Economies of scale. The process in which the cost per customer decreases as the number of users increases.

Effluent. The liquid that comes out of a septic or aerobic tank, drainfield, basin, or other treatment unit after completion of the treatment process.

Environmental Impact Assessment (EIA). Also known as environmental impact statement (EIS), a process mandated by federal law, with auxiliary requirements in executive orders, regulations, agency response, state legal requirements, and other legal mechanisms, for projects or actions which are either expected to have a significant effect on the quality of the human environment or are expected to be controversial on environmental grounds. Most centralized wastewater projects require an EIA.

Eutrophication. The normally slow aging process by which a lake evolves into a bog or marsh and ultimately assumes a completely terrestrial state and disappears. During eutrophication the lake becomes so rich in nutritive compounds, especially nitrogen and phosphorous, that algae and other microscopic plant life become super-abundant, thereby "choking" the lake, and causing it eventually to dry up. In addition to dense algae growth, eutrophic conditions are typified by surface water scums, foul-smelling water, periods of anaerobic conditions, and fish kills. Eutrophication of wastewater ponds can happen due to improper maintenance. Eutrophication can also occur in other surface waters such as rivers and streams due to the increased release of nutrients and other constituents of wastewater.

Evapotranspiration. The total water removed from an area by transpiration from plants and by evaporation from soil, snow, and water surfaces.

Evapotranspiration system. An onsite system in which wastewater flow from a septic tank or other device is disposed of through evaporation from the soil surface or transpiration from plants. This process is most useful in areas outside of North Carolina with year-round high evaporation rates which exceed rainfall rates.

Experimental wastewater system. See "innovative wastewater system."

Extended aeration. A modification of the activated sludge process which provides for aerobic sludge digestion within the aeration system.

Facultative. Facultative bacteria can use either molecular (dissolved) oxygen or oxygen obtained from food materials such as sulfate or nitrate ions. In other words, facultative bacteria can live under aerobic or anaerobic conditions.

Feasibility study. A comprehensive investigation of the factors related to developing a community wastewater system.

Filtration. The physical removal of suspended solids or particles from effluent by soil or sand particles of other filter media.

Fixed media. A wastewater treatment process where the organisms which feed on sewage are physically bound to a substrate medium and contact with wastewater is intermittent.

Flat rate. A sewerage billing rate that is not based on water usage, but is usually based on a fixed price.

Floc. Groups or clumps of bacteria and particles that have come together and formed a cluster. Floc is found in aeration tanks and

secondary clarifiers.

Flocculation. The grouping together of fine particles to form larger particles.

Flood plain. Flat or nearly flat land on the floor of a river valley that is covered by water during floods.

Flow rate. The quantity of water available and/or needed per minute, per hour, or per day to satisfy the requirements of people, livestock, and water fixtures.

GPD. Gallons per day. A measure of water or effluent flow rate.

Geology. The structure of the earth in a given region or area, including soil, rocks, and water.

Grants. Appropriations of funds from government or private sources for use in developing wastewater or other projects.

Gravity sewer. A system of conduits (open or closed) in which no wastewater pumping is required.

Greywater. Domestic wastewater composed of washwater from sinks, kitchen sinks, bathroom sinks, and tubs and laundry drains.

Grinder pump. A mechanical device that shreds solids and raises the fluid to a higher elevation through pressure sewers.

Grit. The heavy material present in wastewater such as sand, eggshells, gravel, and cinders.

Groundwater. Water found in cracks, fissures, and pore spaces in the subsurface of the earth below the water table.

Groundwater recharge. Water which flows from the surface, thorough soil, and into the subsurface saturated zone to replenish groundwater sources.

Heavy metals. Mineral elements found in soils that are essential to plant growth but in high concentrations can be toxic to plant and animal life. Typically, the quantity of heavy metals found in sludge from wastewater treatment plants is very low when compared to the quantity of naturally occurring metals in the soil. Some heavy metals such as mercury are toxic in low concentrations to plant and animal life.

Holding tank. An enclosed tank, usually fiberglass or concrete, for the storage of wastewater prior to removal or disposal at another location. Rarely approved in North Carolina.

Hydraulic conductivity. The ability of soil to transmit liquids through pore spaces in a specified direction, such as horizontally or vertically.

Hydraulic loading. The flows to a wastewater treatment plant or treatment process. Detention times, surface loadings, and weir overflow rates are directly influenced by flows.

Hydraulic potential. Also called hydraulic capacity, long-term acceptance rate, or loading rate. The ability of a soil to accept and dispose of a volume of waste effluent over time. It is used as a measure of the proper size for a soil absorption field.

Hydrogeologic characteristics. Characteristics that describe the hydrology (the distribution of water on the surface and below the ground) and the geology (the structure and content of the earth) at a site. Hydrogeologic characteristics include soil type, depth to groundwater, soil permeability, and groundwater recharge rate. These properties control the entrance of water to the subsurface and the capacity to hold, transmit, and deliver water.

Hydrology. Surface and ground water conditions at a site.

Imhoff tank. A two-story tank used for onsite and cluster wastewater systems. Sedimentation is accomplished in the upper compartment and digestion of settled solids is accomplished in the lower compartment. Not permitted for use in North Carolina.

Impact assessment fees. Charges to a property owner for a share of the cost of offsite improvements sometimes imposed on a new development or intended to cover the cost of water and wastewater facilities.

Impervious. Resistant to penetration by fluids or by roots.

Industrial wastes. Any waste that results from manufacturing or other industrial processes. These wastes often contain hazardous chemicals which require special treatment processes.

Inert. Without active chemical or biological properties, as in inert particles in wastewater.

Infiltration. The penetration of water through the ground surface into the subsurface soil or the penetration of water from the soil into a pipe through such means as defective pipes, connections and manholes.

Infiltration/Inflow. The total quantity of water entering a sewer system. Infiltration means entry through such sources as defective pipes, pipe joints, connections, or manhole walls. Inflow signifies discharge into the sewer system through service connections from such sources as area or foundation drainage, springs, and swamps, storm waters, street wash waters, or sewers.

Influent. Water, wastewater, or other liquid flowing into a septic tank, treatment plant, basin, or other treatment unit.

Innovative wastewater systems. Systems that use technologies that are developed but not yet fully proven. Also known as experimental wastewater systems.

Irradiation. See ultraviolet light.

Irrigation. A land-application technique wherein wastewater is applied to land to supply the water and nutrient needs of plants.

Lagoon. In terms of wastewater treatment, a human-made pond or body of water in which sunlight, algal and bacterial action and oxygen interact to restore the wastewater to a reasonable state of purity.

Land application. Also known as land treatment, it is method of treatment of wastewater in which soil, air, vegetation, bacteria, and fungi are employed to remove pollutants from wastewater. Some of the applied wastewater evaporates and the remainder may be allowed to percolate to the water table, discharged through the drain tiles, or reclaimed by wells.

Lateral sewer. A sewer designed and installed to collect sewage from a limited number of individual properties and conduct it to a trunk sewer. Also known as a street sewer or collecting sewer.

Leachate. The solution formed when water percolates through solid wastes, soil, or other materials, and extract soluble or suspended substances from the materials.

Leaching. The process by which soluble constituents (tiny particles) are dissolved and carried down through the soil by a percolating fluid.

Licensed professional engineer. An engineer who has been certified or approved by a state authority.

Lineament analysis. An analytical technique that uses aerial photographs to detect linear features in the landscape that are indicative of solution zones in karst terrain.

Manifold. A pipe fitting with several openings and numerous branches used in wastewater drainfields to convey wastewater between a large pipe and several smaller pipes, or to permit choice of diverting flow from one of several sources or to one of several discharging points.

Mapping unit. A soil or combination of soils delineated on a map where possible. Mapping units on maps principally depict soil types, phases, associations, or complexes.

Mastic. A scaler used to seal septic tank joints.

Media. The material that serves as a physical foundation for fixed biological processes.

MGD. Flow rate in million gallons per day; 1 mgd equals 1.5 cubic feet per second.

Microorganisms. Also know as microbes. Minute plant and animal life, some of which exist in sewage and can cause disease.

Milligrams per liter (mg/l). The weight of a substance, in milligrams, found in a liter of water. One mg/l equals 1 oz. per 7,5000 gallons. It is also equivalent to one part per million (ppm).

Mixed liquor. When the activated sludge in the aeration tank is mixed with primary effluent or the raw wastewater and return sludge, the mixture is then referred to as mixed liquor as long as it is in the aeration tank. Mixed liquor may also refer to the contents of mixed aerobic or anaerobic digesters.

Monitoring well. A well used to collect groundwater samples for the purpose of physical, chemical, or biological analysis. They are generally installed where groundwater contamination exists or has a potential to exist.

Mottles. Spots or blotches of different color or shades of color interspersed with the dominant color. Mottles indicate the depth of the seasonal high water table.

Mound system. An alternative system design in which fill material, generally sand, is laid on top of plowed soils that alone are unsuitable for wastewater treatment. Mound systems are generally used where there is an inadequate thickness of acceptable soil to support a conventional soil absorption system.

Municipal wastewater. Water containing pollution resulting from domestic wastes, typically feces and laundry wastes.

Nitrate (NO3). The most oxidized form of inorganic nitrogen and a contaminant commonly associated with septic systems. High concentrations of nitrate and nitrite (NO2) in drinking water are known to cause methemoglobinemia (a poisoning similar to that caused by cyanide) in young babies. The EPA sets a limit of 10 mg/l for nitrates.

Nitrification. The biochemical oxidation of ammonium to nitrate.

Non-functional water use. Excessive water use that is a result of malfunctioning or poorly maintained plumbing, high water pressure, or wasteful water-use habits.

Non-point source. A general source of pollution, such as surfacing effluent from a failing septic system.

NPDES. National Pollutant Discharge Elimination System, the federal government's system of controlling all discharges of pollutants from point sources into U.S. waterways. NPDES permits discharges into navigable waters from all point sources of pollution, including industries, municipal treatment plants, large agricultural feed lots, and return irrigation flows.

Nutrients. Fertilizers; any substance absorbed by living things that promotes growth. The term is generally applied to nitrogen and phosphorous in wastewater which contributes to eutrophication of water supplies.

Onsite system. A wastewater treatment and disposal facility located at or near the source of the wastewater.

Operation and Maintenance (O&M). Functions that result in expenditures during the useful life of the treatment works for materials, labor, utilities, and other items necessary for managing and maintaining the facility.

Organic. Referring to or derived from living organisms containing carbon and hydrogen.

Organic waste. Waste materials which come mainly from animal or plant sources. Organic waste generally can be consumed by bacteria and other small organisms. Inorganic wastes are chemical substances of mineral origin.

Overland flow. The land-application technique that cleanses wastewater by allowing it to flow over a sloped surface. As the water flows over the surface, the contaminants are removed and the water is collected at the bottom of the slope for reuse.

Oxidation pond. A human-made lake or body of water in which wastes are consumed by bacteria. It is used most frequently with other wastewater treatment processes.

Package sewage treatment plant. A relatively small, prefabricated self-contained primary or secondary wastewater treatment system. One might be used in a subdivision where septic systems will not meet requirements for wastewater discharge.

Parasites. An animal or plant that lives on or in another organism from which it draws its nourishment.

Pathogens. Microorganisms potentially harmful to humans and animals, including parasites, bacteria, and viruses and other disease-causing microorganisms.

Ped. A unit of soil such as an aggregate, crumb, prism, block, or granule formed by natural processes (in contrast with a clod, which is formed artificially).

Perched water table. A discontinuous, saturated area of soil which exists in the unsaturated zone (above the normal water table) as a result of a low permeability layer. Often occurs after heavy rain.

Percolation. The movement of water downward and radially through pores between the particles of soil, filtering wastewater through subsurface soil layers, usually continuing downward to the groundwater.

Percolation test. A test used to estimate the percolation rates of water through soils. Unlike most states, onsite systems in North Carolina are approved based on a comprehensive soil morphology rather than the traditional percolation test.

Perforated. Having holes, as in perforated pipe.

Performance standard. A standard that is

used to judge whether predetermined requirements have been met, such as the necessary level of treatment for a waste stream, after the completion or initiation of operation. Performance standards generally are in the form of a pre-determined level of concentration of a particular compound or constituent that is allowed in a waste effluent.

Permeability. The rate at which liquids pass through soil in a specified direction. Permeability is expressed in inches per hour. Generally, fine textured soils have slower permeabilities than coarse-textured soils. Information on soil permability can be found in the Soil Conservation Service interpretation sheets or county soil surveys.

pH. A term used to describe the hydrogen-ion activity of a system; a measure of the acidity or alkalinity or water, wastewater, or other solution.

Physical and chemical treatment. Processes generally used in large-scale wastewater treatment facilities. Physical processes may involve air-stripping, comminutors, clarifiers (sedimentation and flotation) and filtration using racks or screens. Chemical treatment includes coagulation, chlorination, or ozone addition.

Phosphorous. An element that while essential to life, contributes to the eutrophication of lakes and other bodies of water.

Point source. A stationary source of a large individual emission. Wastewater treatment plants are ordinarily considered point sources of pollution.

Pollution, water. Results when something animal, vegetable, or mineral makes it more difficult or dangerous to use for drinking, recreation, agriculture, industry or wildlife.

Ponding. The accumulation of septic tank discharge in soil absorption drainfields. (Same as surfacing).

Porous. Having or full of pores that admit the passage of gas or liquid.

PPM. Parts per million, 1 ppm equals 1 part of the substance concentrated in one million parts of water (by weight).

Precipitation. A chemical reaction formed when chemicals are added to alter physical states of dissolved or suspended solids to aid in their removal during wastewater treatment. Examples of precipitation include water softening, phosphorous removal and heavy metal removal.

Pressure. The force needed to move water.

Pressure distribution. A system that uses a pump and special piping to evenly distribute waste flow from a septic tank over a drainfield. The system can improve upon gravity flow by distributing the effluent over a wider area and by permitting resting cycles.

Pressure sewer. A wastewater collection system in which household wastes are collected in a building drain and conveyed therein to the pretreatment and/or pressurization facility at a higher elevation by applying a pumping force behind it. The system consists of two major elements: the onsite or pressurization facility and the primary conductor pressurized sewer main.

Pretreatment Facility. An industrial wastewater treatment plant consisting of one or more treatment devices designed to remove sufficient pollutants from wastewaters to allow an industry to comply with federal, state, and local effluent pretreatment regulations.

Primary treatment. A first and basic stage in the treatment of sewage that removes by screening or sedimentation nearly all solid material that floats or will settle. Septic tanks provide primary treatment onsite and in conventional centralized sewerage systems screens remove floating solids and settling tanks remove heavy material.

Protozoa. A group of microscopic animals that sometimes cluster into colonies and often consume bacteria as an energy source.

Public-Private Partnership. A contractual relationship between a public and private partner that commits both to providing an environmental service. The private sector can be involved in a variety of ways, from the initial design of a facility to its daily operation and maintenance.

Pump. A mechanical device for causing flow, for raising or lifting water or other fluid, or for applying pressure to fluids.

PVC. Polyvinyl chloride. A type of plastic commonly used in the pipes of water and wastewater systems.

Receiving waters. Rivers, lakes, oceans, or other water courses that receive treated or untreated wastewaters.

Recharge. To replenish or refill, as in groundwater recharge.

Renovation. To renew or repair. Renovation of wastewater refers to the treatment processes that cleanse wastewater before it is reintroduced into the water supply.

Rejuvenate. To renew or restore to a previous condition, as in rejuvenating septic systems to make them usable again.

Residuals. A term referring to sludge.

Restrictive horizon. A soil layer that limits or restrains movement of water through the soil.

Rotating biological contactor. A device used in an aerobic process which encourages the growth of organisms that aerobically decompose wastes. The organisms are grown on surfaces of the contactors, often constructed as large discs, which are rotated to come into contact with the waste flow and with air. The process seeks to optimize organism growth by exposing them to an ideal combination of wastes and oxygen.

Sand. A soil separate whose particle sizes range from 2 to 0.05 millimeters in diameter. Sand is gritty when soil is rubbed between the thumb and forefingers.

Sand filters. Biological and physical wastewater treatment units utilizing filter tanks that remove some suspended solids from sewage. Air and bacteria decompose additional wastes filtering through the sand. Cleaner water drains from the bed. Liquid passing through the filter may be discharged to a soil absorption system or to surface water after chlorination. The sludge accumulating at the surface must be removed from the bed periodically.

Sandy loam. Soil composed on approximately equal parts of sand, silt and clay.

Sanitary district. A local public authority with a local mandate to manage and operate water and/or wastewater systems.

Sanitary sewers. Pipes in a separate system that carry only domestic wastewater. The stormwater runoff is taken care of by a separate system of pipes.

Saprolite. Geologic material breaking down in place which will ultimately form soil.

Saturation zone. The area below the water table where the soil pores are fully saturated with water.

Scum. A layer of light solids (such as hair, grease, and soap) which accumulates at the surface of the wastewater in a septic tank.

Secondary treatment. The second stage in most conventional centralized wastewater treatment systems in which bacteria consume and decompose the organic parts of the wastes. It is accompanied by bringing together wastewater, bacteria, and oxygen in trickling filters or the activated-sludge process. Effective secondary treatment processes remove nearly all solids as well as 90 percent of BOD and suspended solids. Disinfection of the effluent by chlorination is usually the last step in this process.

Sedimentation tanks. Tanks that help remove solids from sewage. The wastewater is pumped to the tanks where the solids settle to the bottom or float on the top as scum. The scum is skimmed off the top, and solids on the bottom are pumped to digestors, filtration, or other means of final disposal.

Seepage. The slow movement of water through small cracks or pores of a material, through the soil, or into or out of a body of surface or ground water.

Septage. An anaerobic slurry of solid wastes, including scum, sludge, and liquid contents of a septic tank at the time of pumping. The septage must be periodically pumped from the septic tank. Also called scavenger wastes, septic tank pumpings, residuals.

Septic system. An onsite wastewater management system. Septic systems are constructed using conventional, alternative, or experimental system designs.

Septic tank. A treatment receptacle that receives wastewater and is designed and constructed to separate the liquid and solids in the wastewater. Organisms in the tank anaerobically treat and digest organic matter prior to discharge, generally to a subsurface disposal system. Sludge settles on the bottom of the tank.

Service charge. A charge levied on a user of the treatment works which includes a user charge, a charge for capital reserve, and debt service.

Settleable solids. That matter in wastewater which will not stay in suspension during a preselected settling period, such as one hour, but either settles to the bottom or floats to the top.

Sewer. A system of pipes that collects and delivers wastewater to treatment plants or receiving streams.

Shallow water table. The underground supply of fresh water located near the surface of the ground.

Short circuit. In a water or wastewater system, a flow of liquid that follows a path of lesser resistance, flowing by a shorter route than the normal one.

Silt. A soil separate consisting of particles between 0.05 and 0.002 millimeters in diameter. Silt has a smooth, baby powder feel when rubbed between the thumb and fingers and is not plastic or sticky when moist.

Slope. Deviation of a plane surface from the horizontal.

Sludge. A semi-solid residue of raw wastes from wastewater and water treatment processes. Sludge needs to be pumped and removed from facilities such as septic tanks periodically. Also known as residuals and biosolids.

Slug load. A higher than usual load of influent in a wastewater treatment process.

Soil. A complex, heterogeneous, porous mixture of particulate mineral solids and organic matter between which are spaces that are filled with air and water. It provides a three-phase treatment system: the solid phase consists of soil particles; the liquid phase consists of water containing dissolved substances; and, the gaseous phase consists primarily of soil air and other gases.

Soil absorption field. The area of ground to which wastewater is released from a septic tank through a series of perforated pipes.

Soil absorption system. A system consisting of trenches or beds, together with piping or gravel, installed in appropriate solids for the purpose of receiving wastewater flow from a septic tank or other treatment device and transmitting it into soil for final treatment and disposal.

Soil borings. Soil samples taken where the septic tank or soil absorption system is to be located. Samples may be tested for various soil characteristics.

Soil characteristics. Relevant properties of soil, including its clay content, texture, particle size, classification, structure, permeability, and other relevant properties.

Soil horizon. A layer of soil or soil material approximately parallel to the land surface and differing from adjacent genetically related layers in physical, chemical, and biological properties or characteristics such as color, structure, texture, consistence, pH, and so on.

Soil map. A map showing the distribution of soil types or other soil mapping units in relation to the prominent features of the earth's surface.

Soil morphology. The physical constitution, particularly the structural properties, of a soil profile as exhibited by the kinds, thickness, and arrangement of the horizons in the profile, and by the texture, structure, consistence, and porosity of each horizon.

Soil profile. The natural appearance and layering of soil.

Soil separates. Groups of mineral particles separated on the basis of a range in size. The principal separates are sand, silt, and clay.

Soil series. The basic unit of soil classification, and consisting of soils which are essentially alike in all major profile characteristics, although the texture of the "A" horizon may vary somewhat. See soil type.

Soil structure. The combination or arrangement of individual soil particles into definable aggregates, or peds, which are characterized and classified on the basis of size, shape, and degree of distinctness.

Soil texture. A relative proportion of various soil components, including sands, silts, and clays, that make up the soil layers at a site. Soil textural analysis can be used to determine a soil's ability to treat and dispose of septic tank effluent and in sizing the soil absorption system.

Soil type. In mapping soils, a subdivision of a soil series based on differences in the texture of the "A" horizon.

Sole-source aquifer. A groundwater aquifer which is the sole or principal drinking water

source for an area and which, if contaminated, would create a significant hazard to public health.

Sorption. A process by which suspended solids and colloidal particles in waste effluent become attached to soil particles. In general, soils high in clay or organic content have high sorptive capacities.

Sterilization. The removal or destruction of all living microorganisms, including pathogenic (disease-causing) bacteria and saprophytic (living on or decaying organic matter) bacteria, vegetative forms, and spores. Sterilization should not be confused with disinfection.

Storm sewer. A separate system of pipes that carry only runoff from buildings and land during a storm.

Stormwater runoff. The water that flows over buildings and land during storms.

Subsoil. In general concept, that part of the soil below the depth of plowing.

Subsurface. Below ground.

Sump pump. A mechanism used for removing water or wastewater from a sump or wet well. It may be energized by air, water, steam, or electric motors.

Supernatant. Liquid removed from settled sludge. Supernatant commonly refers to the liquid between the sludge on the bottom and the scum of the surface of an anaerobic digester. This liquid is usually returned to the influent wet well or to the primary clarifier of a wastewater treatment facility.

Surfacing. Excess ponding resulting in introduction of partially treated effluent to the soil surface above a soil absorption system. There is a potential for disease transmission through contact with the surface effluent.

Suspended media. Opposite of fixed media.

Suspended solids. The small particles of solid pollutants which are present in sewage and which resist separation from the water by conventional means. The amount of suspended solids in effluent is used along with BOD as a measure of the effectiveness of the treatment process.

Tertiary treatment. See advanced waste treatment.

Tight soil. A compact, relatively impervious and tenacious soil or subsoil.

Topography. The general shape of the ground surface at a site (such as hilly, rolling, level).

Topsoil. (1) the layer of soil moved in cultivation, (2) the "A" horizon, (3) presumably fertile soil material used to top dress road banks, gardens, and lawns.

Transpiration. The process by which water vapor is lost to the atmosphere for living plants. The term can be applied to the quantity of water thus dissipated.

Triassic basin. A geologic basin formed during the Triassic period, composed primarily of sand stone, mud stone and silt strate.

Trickling filter. A device used in many conventional centralized sewage treatment plants that is the support media for bacterial growth, usually a bed of rocks or stones. The sewage is trickled over the bed so the bacteria can break down organic wastes. As the wastewater trickles through the filter, the bacterial slime that coats the bed material biodegrades the organic material in the wastewater.

Turbidity. The turbidity of water is attributed to suspended or colloidal matter, the effect of which is to reduce clarity and light penetration.

Ultraviolet light. A disinfection technique that utilizes a wavelength that is slightly shorter than that of visible light rays.

Unincorporated community. A community or neighborhood without an immediate local government but under the jurisdiction of the county in which it is located.

Unsaturated zone. The area above the water table where the soil pores are not fully saturated, although some water may be present. Also called the "vadose zone."

User charge. A charge levied on users of a treatment works for the costs of operation, maintenance or replacement.

Vector. An organism that carries pathogens from one host to another.

Virus. The smallest form of microorganism capable of causing disease.

Volatile. Capable of being evaporated or changed to a vapor at relatively low temperatures.

Wastewater. A combination of liquid and water-carried wastes from residences, commercial buildings, industrial plants, and institutions, together with any groundwater, surface water, and storm water that may be present.

Wastewater reuse. The use of treated wastewater for a beneficial use such as agricultural irrigation or industrial cooling.

Wastewater treatment plant. A series of tanks, screen, filters or other processes by which pollutants are removed from water.

Water table. The dividing line between the soil's saturated and unsaturated zones.

Waterless toilets. Any one of a number of types of toilets that do not use water, including composting toilets.

Watershed. The land area drained by a stream or by an entire river system.

Weir. A wall or plate placed in an open channel and used to measure the flow.

Wetlands. Areas or ground that are swampy or marshy for at least part of a year that are usually protected by federal regulations to safeguard sensitive wildlife and vegetation.

Zero Discharge. A theoretical no-discharge system.

Appendix III-L

PHASE I ENVIRONMENTAL SITE ASSESSMENT

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SUMMARY REPORT
SITE RECONNAISSANCE AND
DATABASE REVIEW
RELATED TO HAZARDOUS MATERIALS
PROPOSED LYTLE CREEK RANCH PROJECT
2,450± ACRES
LYTLE CREEK AREA
SAN BERNARDINO COUNTY, CALIFORNIA
PREPARED FOR
LYTLE DEVELOPMENT COMPANY
JOB NO. 08165-9

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C.H.J. Incorporated
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April 11, 2008

Lytle Development Company
3281 East Guasti Road, Suite 330
Ontario, California 91761
Attention: Mr. Kevin Lynch

Job No. 08165-9

Dear Mr. Lynch:

Attached is the Summary Report of the Site Reconnaissance and Database Review Related to Hazardous Materials prepared for the proposed ±2,500-acre Lytle Creek Ranch Project, located in San Bernardino County, California.

We appreciate the opportunity to provide environmental services for this project. If you should have questions or comments concerning this report, please contact this firm at your convenience.

Respectfully submitted,
C.H.J., INCORPORATED

Ann Laudermilk

Ann Laudermilk, Environmental Project Manager

AL/RJJ:ndt

Distribution: Lytle Development Company (4)

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SUMMARY REPORT
SITE RECONNAISSANCE AND DATABASE REVIEW
RELATED TO HAZARDOUS MATERIALS
PROPOSED LYTLE CREEK RANCH PROJECT
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LYTLE CREEK AREA
SAN BERNARDINO COUNTY, CALIFORNIA
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1.0 INTRODUCTION AND SCOPE OF WORK

The Lytle Creek Ranch Specific Plan proposes to develop a 2,447.3 acre master planned mixed-use community located in the City of Rialto and unincorporated San Bernardino County. This study was prepared to assess potential hazards and hazardous materials that may have occurred in the past and that may also occur as a result of the proposed project.

The proposed project would include 8,407 residential units, 849,420 square feet of retail space, an elementary school and middle school, as well as both a golf course and a park spanning over a total of 2,437.3 acres. The proposed development is expected to be fully operational by 2030, while some individual phases would become operational prior to that date.

During March and April of 2008, C.H.J., Incorporated (CHJ) conducted a site visit and a current database search for the subject site. The scope of work included a site reconnaissance and a current search of federal, state, and local databases by Environmental Data Resources, Incorporated (EDR), as well as preparation of a summary report. In addition to the updated site reconnaissance and database search, this report is intended to be a general compilation of information found in four previous Preliminary Environmental Site Assessment (Phase I) reports completed by CHJ for sections of the subject site since 2001. The four CHJ job numbers and report dates are 01905-9, dated October 16, 2001; 04827-9, dated January 12, 2005; 06189-9, dated March 31, 2006; and 06518-9, dated July 19, 2006.

The four previous reports represent Phase I reports prepared in general conformance with the scope and limitations of the requirements of the ASTM Standard Practice for Environmental Site Assessments in

effect at the time of each report, either ASTM 1527-94 or ASTM 1527-00. This compilation report was not prepared in general conformance with the scope and limitations of the requirements of the ASTM Standard Practice for Environmental Site Assessments: Phase I Environmental Site Assessment Process, Designation E 1527-05, and is not intended to be a Phase I Update.

The site reconnaissance was extended to incorporate the Monier Lifetile facility, located at 3511 North Riverside Avenue. The roofing tile manufacturing facility was not included as part of the previously investigated subject sites.

2.0 SITE DESCRIPTION

2.1 Location

The subject site is an approximately 2,500-acre irregularly shaped parcel of land, located primarily within the Lytle Creek wash in the Lytle Creek area of San Bernardino County, California. It is mapped at an approximate elevation of 2,200 feet above mean sea level in the northwestern portion and 1,360 feet above mean sea level in the southeastern portion. An Index Map and Site Map are provided as Enclosures "A-1" and "A-2", respectively.

2.2 Site Reconnaissance

The site reconnaissance of the majority of the subject site was conducted on March 13, 2008. The Monier Lifetile facility was visited on March 24, 2008. The description of the current subject site conditions is divided into a discussion of the vacant land, east and west of Interstate 15, including the Sycamore Canyon and Sycamore Flat areas and the Lytle Creek Wash areas; the El Rancho Verde Country Club area; and the Monier Lifetile facility.

2.2.1 Vacant Land

West of Interstate 15

The northern portion of the subject site west of Interstate 15 consisted primarily of vacant land with natural vegetation in the mouth of Sycamore Canyon, bounded by the rugged terrain of the San

Bernardino National Forest. Previously noted concrete and household debris was no longer evident in the Sycamore Canyon area. The central portion of the site west of Interstate 15 was vacant with natural vegetation. A berm and retention basin with a spillway were noted near the north end of this triangular portion of the site. The southern portion of the site west of Interstate 15 consisted of a vacant wash area. Placards indicating a Southern California Edison pipeline were apparent along Lytle Creek Road at the southwest boundary of the site. Two water wells, an offsite water reservoir facility, and high voltage power lines were located in this wash area.

Reconstruction of Glen Helen Parkway had been recently completed through this portion of the site and extended from Interstate 15 across the mouth of Sycamore Canyon, south of the hills, and across the wash areas of the site to Lytle Creek Road. Previous pipeline construction was completed, and a rip rap channel was noted adjacent to Glen Helen Road at the base of the hills.

East of Interstate 15

The majority of the subject site east of Interstate 15 consisted of vacant land. Previous grading and roadway construction were completed, resulting in Clearwater Parkway. The area east of Clearwater Parkway consisted of rugged terrain with natural vegetation. A borrow area was located in the southeast portion of this area. The area west of Clearwater Parkway was generally a low-lying area with natural vegetation. A high pressure natural gas line was marked in a northeast to southwest alignment through the low-lying area.

Lytle Creek Wash

At the time of our site reconnaissance, a major portion of the subject site consisted primarily of vacant, undeveloped land located within the wash area of Lytle Creek. Two main wash areas were divided by the Cemex open-pit mining facility. The area west of Cemex consisted of generally vacant and undeveloped land. Numerous dirt access roads crossed this portion of the site. Three earthen flood control levees with associated access roads were traveled to view this area. Minor quantities of household trash and debris were noted along several of the dirt roads.

The area east of the Cemex cement plant (north of the El Rancho Verde Country Club) also consisted of generally vacant and undeveloped land within the wash. An earthen water reservoir and several municipal water wells were located within this area. Placards paralleled the west boundary of the site, indicating an offsite underground petroleum pipeline adjacent to Cemex. Numerous dirt access roads crossed this portion of the site, some of which led to water wells. Minor quantities of household debris were noted along some of the dirt roads.

No evidence of USTs or other undocumented subsurface structures was observed on the three main vacant and undeveloped portions of the subject site at the time of our site visit. No significant soil staining or distressed vegetation were noted. There was no evidence during our site reconnaissance that significant quantities of hazardous materials have been handled or disposed of in the vacant and undeveloped areas of the site.

2.2.2 El Rancho Verde Country Club

At the time of our site reconnaissance on March 13, 2008, the eastern portion of the subject site was occupied by the golf course and associated structures, as well as a vacant and undeveloped area. The golf course area consisted of a clubhouse, parking area, cart barn, driving range building, two tennis courts, and an auxiliary office building, as well as the current and former maintenance facilities located to the northwest of the other structures near the northern golf course boundary. Detailed descriptions of each area within the golf club portion of the subject site are included below.

No evidence of current USTs or other undocumented subsurface structures was observed on the golf club portion of the subject site at the time of our site visit. No significant soil staining or distressed vegetation were noted. There was no evidence during our site reconnaissance that significant quantities of hazardous materials have been mishandled or disposed of in the area.

Golf Course

The golf course area consisted of rolling terrain interwoven with landscaped fairways and greens, as well as man-made sand bunkers. Mature trees lined the fairways. A golf course lake and one water supply

reservoir/lake were located in the northwestern portion of the course. A driving range was located north of the clubhouse and related structures in the north-central portion of the country club.

Clubhouse Area

The clubhouse consisted of the original wood-frame structure and housed typical facilities for a golf course, including a pro shop, restaurant/banquet facility, and restrooms.

The cart barn structure was an enclosed structure located north of the clubhouse. Numerous overhead electrical hook-ups were attached to the ceiling of the cart barn for recharging the golf carts. Boxes and miscellaneous items were stored in the southern portion of the cart barn and in a small storage room in the western portion of the structure. No petroleum products were noted to be stored within the cart barn. A floor drain was located within the concrete outside of the door on the southeastern corner of the structure. The floor drain was reportedly connected to the on-site septic system.

A structure associated with the driving range was located adjacent to the west of the cart barn. Two tennis courts were located further to the west, and an auxiliary office/storage building was located south of the tennis courts. Asphalt concrete (AC) pavement extended toward the maintenance facilities to the northwest.

Maintenance Facilities

The grounds maintenance building was a U-shaped structure of corrugated metal construction located within a fenced area in the north-central portion of the site. Based on aerial photograph evidence, the structure was installed between 1990 and 1995. The western portion of the building was occupied by office space. The mechanic shop/garage area was located in the central portion of the building. The western portion of the building was used for storage of chemical pesticides and herbicides. The pesticides/herbicides utilized for the golf course consisted of typical regulated products used in the industry. Several bags, 5-gallon buckets, and 1- to 5-gallon bottles of products were stored on wooden pallets and shelves. No spills or leaking containers were noted within the storage room.

The walls of the garage area were generally lined with shelves and racks for tools, table-top quantities of automotive fluids, and other equipment. Several 55-gallon poly drums of fertilizer were stored in the eastern portion of the garage. Lawn maintenance equipment and miscellaneous irrigation parts and equipment were stored within the garage.

A hot aqueous parts cleaning station was noted in the northwest portion of the maintenance garage. The parts cleaning station consisted of a rectangular metal tub with a drain situated on top of an open 30-gallon drum used to collect the used detergent solution.

Two 55-gallon drums used to store waste oil were located on top of a plastic pallet and berm along the southern wall in the western portion of the garage. Two drums of new motor oil were located on a wooden pallet adjacent to the waste oil drums. Moderate oil stains were noted on the concrete surrounding the drum storage area. The concrete floor of the garage area appeared to be in fair to good condition with no apparent significant pathways to underlying soils such as major cracks or floor drains.

A floor drain in the center of a concrete pad was located adjacent to the south of the eastern portion of the garage structure. Four sewer access points were located along the west portion of the concrete pad.

The ground surface within the fenced maintenance area and adjacent to the east consisted primarily of AC pavement in fair condition with no evidence of significant pathways to underlying soils. Several grounds maintenance vehicles and equipment were stored along the fence lines. Minor to moderate oil stains generally typical of automotive leakage were noted on the AC pavement.

An aboveground storage tank (AST) was located on a concrete pad within a cinder block structure and 6-inch concrete berm along the southwestern fence line of the maintenance area. The AST was a single tank divided into two approximately 500-gallon compartments for unleaded gasoline and diesel fuel. Based on aerial photograph evidence, the tank was installed between 1990 and 1995. The tanks appeared to be in excellent condition with no indications of leakage.

The maintenance and storage facility for grounds equipment used prior to the construction of the existing building was located outside of the fenced area adjacent to the northwest of the current structure. It consisted of a corrugated metal structure on a concrete foundation. The structure was generally vacant with storage of miscellaneous items. A concrete wash area with a drain was located adjacent to the northwest corner of the structure. This was the general area of the UST which was removed in 1993; however, there did not appear to be physical evidence of the removal remaining.

Vacant Land

Two vacant residential parcels on the north side of Sycamore Avenue are part of the subject site. Both parcels were vacant and undeveloped.

A portion of the site area east of the golf course was vacant and undeveloped with natural vegetation. A wedge-shaped piece of vacant land extended between two sets of fairways in the eastern portion of the golf course. Placards indicating several utility lines were noted within the vacant area.

A dirt road beginning at the northern end of North Oakdale Avenue extended northwesterly onto the subject site. The road forked off toward the northeast to two WVWD well sites. The well sites were fenced areas along the eastern and northeastern site boundaries, and are not considered to be part of the subject site. The dirt road continued northwesterly toward the site of a former residence shown on historical topographic maps, not a part of the subject site. Several piles of debris were noted among the trees along the dirt road. Debris included trash, household items, wood, metal, and furniture. No significant soil staining due to the debris was noted. The area between the dirt road and the southwest site boundary also showed evidence of being used as a paintball playing field.

2.2.3 Monier Lifetile Facility

The plant manager and other personnel provided guidance throughout the Monier Lifetile facility and answered questions regarding the site operations, processes, and materials storage. The site was developed by Burlingame Industries as a roofing tile manufacturing facility in 1984. Monier Lifetile has been in operation on site since 1997. The site generally consisted of AC or concrete paved product

storage areas, the production building, and several associated buildings for storage, materials testing, and color mixing.

The site was connected to city utilities. An SCE owned and maintained triple pole-mounted transformer was located adjacent to the production building in the northwest portion of the site. The transformers appeared to be in excellent condition with no signs of leakage.

The company complies with State Water Resources Control Board requirements for storm water pollution prevention and the Air Quality Management District for emissions control and is not required to have County HMD permits related to hazardous materials. Monier Lifetile did not appear on the regulatory databases reviewed by EDR for this investigation.

The production building was located in the northwest portion of the site. Three tile production lines were aligned within the central portion of the structure. Supply silos for the sand and cement products, as well as ASTs for the sealer and mold releasing agent, methyl ester, were located on the northwest side of the production building.

A water filtration and recycling area was located adjacent to the northeast corner of the production building. There were no drains in the filtration area. The water is reportedly pumped, the coloring agents filtered out into holding tanks for disposal, and the water is reused in the production line.

No vehicle maintenance is conducted on the facility. One 500-gallon diesel AST with a secondary containment structure was located in the north portion of the site. The diesel fuel was reported to be for the loader utilized on site.

No evidence of underground storage tanks (USTs) or other undocumented underground structures was observed on the facility at the time of our site visit. No significant surface staining, soil staining, or distressed vegetation was noted. There was no evidence during our site reconnaissance that significant quantities of hazardous materials have been disposed of on the facility.

2.3 Adjacent Property Land Use

Undeveloped land of the San Bernardino National Forest generally bounded the subject site area west of Interstate 15 to the west and north. The northwestern portion of the site was bounded to the south by Lytle Creek Road. A large, aboveground water reservoir was located on the north side of Lytle Creek Road immediately adjacent to the subject site. Numerous service stations and restaurant facilities were located southwest of the intersection of Interstate 15 and Lytle Creek Road. Ranch-style residential properties were located to the south of the remainder of the western portion of the site beyond Lytle Creek Road.

The Sycamore Flat area was bounded to the north and east by an undeveloped portion of Glen Helen Regional Park. Grading and other preparation for development was in progress on adjacent parcels south and southeast of this site area.

The central area of the subject site was bounded to the north by grading and residential development, to the east by the Cemex cement plant, and to the south by Riverside Avenue. Land use beyond Riverside Avenue included residential and commercial properties, municipal utility facilities including water distribution and treatment reservoirs, and vacant parcels.

The eastern portion of the subject site was bounded to the west by the Cemex cement plant, to the north and east by undeveloped land within the Lytle Creek Wash. The golf course portion of the subject site was bounded to the southwest by residential development.

2.4 General Geologic and Hydrologic Setting

The USGS Geologic map of the Devore 7.5-minute quadrangle (Morton and Matti, 2001) was reviewed for the subject site area. The subject site is mapped as being underlain by several geologic units. Several concealed fault traces of the northwest- to southeast-trending San Jacinto fault zone are mapped through the subject site.

The Sycamore Flat area is mapped as early Tertiary age granodiorite, Cretaceous age mylonitic leucogranite, Holocene age alluvial fan deposits, late Holocene age wash deposits, and early Pleistocene age alluvial fan deposits. Geologic mapping of the central wash area of the site shows young alluvial fan deposits of Holocene age, Holocene alluvial valley deposits, and modern (late Holocene) wash deposits. Geologic mapping of the golf course and southeast portion of the subject site indicates young alluvial fan deposits and modern wash deposits of late Holocene age, as well as outcrops of young alluvial valley deposits of Holocene age.

The subject site is located within several distinct hydrologic subareas. These include the Colton, Rialto, and Lower Lytle Hydrologic Subareas of the Colton-Rialto Hydrologic Area, and the Sycamore Hydrologic Subarea of the Upper Santa Ana Hydrologic Area. Depth to groundwater reported in previous reports was in the range of 57 to 327 feet below ground surface on the subject site.

The general groundwater flow direction in the vicinity of the subject site is anticipated to be to the southeast following the Lytle Creek Wash.

3.0 RECORDS REVIEW

3.1 Standard Environmental Records Sources

County, State, and Federal listings were compiled and searched for this update by a nationwide regulatory agency database company, EDR, and reviewed by CHJ. All listings/databases were searched for sites located within 1 mile of the general subject site boundary. The database results required to be reported in accordance with ASTM 1527-05 are summarized in this section. The full EDR Area Study report is included as Enclosure "B" of this report. Additional explanations of the federal and state listings/databases are provided in the portion of the EDR report entitled "Description of Databases Searched". Due to the nature of an area study, many "unmapped" locations are listed within the EDR report. Based on the site and area reconnaissance and the available information, several of these facilities were identified. Any relevant discussions concerning "unmapped" sites within the search area are presented within the respective sections.

Summary of Significant Results

Results of the EDR search indicated that the El Rancho Verde Country Club in the southeast portion of the subject site was identified with County permits for hazardous materials handling and generating. These are related to the waste oil collection and the diesel AST in the maintenance area.

Information regarding known perchlorate groundwater contamination southwest of the subject site was reviewed. The plume is confined south of the San Jacinto Fault and is mapped off-site; therefore, it is considered unlikely to have the potential to impact groundwater beneath the subject site.

Leaking Underground Storage Tank (LUST) facilities were identified. Several soil and groundwater gasoline contamination cases were noted. Due to case type and status, as well as groundwater flow patterns and groundwater barriers, the identified contamination cases are considered unlikely to have the potential to impact the soils or groundwater of the subject site.

3.1.1 Local Agencies

EDR conducted a search of the County of San Bernardino Fire Department's HMD permitted facilities, dated December 2007. This listing includes USTs, medical waste handlers/generators, hazardous materials handlers, hazardous waste generators, and waste oil handlers/generators. The El Rancho Verde Golf Club, located at 355 East Country Club Drive in the southeast portion of the subject site, was identified on the unmapped list with active hazardous materials handler and special generator permits. Fifteen additional permitted facilities, including three identified on the unmapped list, were identified within 1 mile of the site. These included Glen Helen Regional Park, the Glen Helen Rehabilitation Center, three West Valley Water District Well sites, Owl Rock Products/Cemex, and four gas stations adjacent to the northwest portion of the site on Sierra Avenue. The permitted facilities are further described in the attached EDR report and the site reports for the Glen Helen Rehab Center, West Valley Water District Well No. 2, and Auto Craft.

3.1.2 State of California

3.1.2.1 The Department of Toxic Substances Control's (DTSC) Site Mitigation and Brownsfields Reuse Program's EnviroStor database (ENVIROSTOR), dated November 2007, includes sites with known contamination or where further investigation may be required. The list includes Federal Superfund (NPL) sites, State Response (Military Facilities and State Superfund), Voluntary Cleanup, and School Sites. The ENVIROSTOR database replaces the CAL-SITES database, previously updated with similar information by the DTSC. A private residence located near the southeast portion of the subject site was listed as an ENVIROSTOR site. The address is listed as a historical site, with no further action reported in 1995. The ENVIROSTOR facility is further described in the attached EDR report.

3.1.2.2 The California Identified Hazardous Waste and Substance Sites (CORTESE) database (dated April 2001) lists hazardous waste and substance sites compiled according to Assembly Bill 3750 (CORTESE, Chapter 1048, Statutes of 1986). The information included in this list comes from the State Department of Health Services (public drinking water wells and detectable levels of contamination, hazardous substances sites selected for remedial action, and sites with known toxic materials identified through the Abandoned Sites Assessment Program), the State Water Resources Control Board (sites with USTs having a reportable release), and the California Waste Management Board (all solid waste disposal facilities from which there is known migration). Three CORTESE facilities were identified due to their inclusion on LUST databases (see section 3.1.2.4). The CORTESE facilities are further described in the attached EDR report.

3.1.2.3 The California UST Registrations database, dated January 2008, the Indian UST Region 9 Database, dated November 2007, the Facility Inventory Database (CA FID, dated October 1994), the Statewide Environmental Evaluation and Planning System (SWEEPS, dated June 1994), and the Hazardous Substance Storage Container Database (HIST, dated October 1990), list registered USTs and historically registered USTs in the State of California. Two gas stations adjacent to the north portion of the site and Cemex USA were listed on the currently registered UST database. Seven additional facilities within 1 mile of the subject site, including the Glen Helen Rehabilitation Center identified on the unmapped list, were listed on one or more of the historical UST databases.

3.1.2.4 The EDR report includes research of three LUST databases: the Leaking Underground Fuel Tank Report (LUST) published by the State Water Resources Control Board (dated January 2008); the Region 8 - Santa Ana Regional Underground Tank Database List (LUST REG 8) published by the Santa Ana Regional Water Quality Control Board (RWQCB) (dated February 2005); and the Indian LUST Region 9 Database, published by the EPA (dated November 2007). Glen Helen Regional Park was identified and reported as a case of gasoline contamination of the ground water aquifer and soil in 1999. The current status of the case was not listed. Based on the relative hydraulic position and topographic location of the identified LUST case, the identified groundwater contamination to the northeast of the subject site is not expected to impact the groundwater at subject site. Soil contamination by diesel fuel was reported at the Owl Rock facility in 1993. Remediation by excavation and disposal was conducted, and the site was reported as closed. Two soil contamination LUST cases (both closed) and one groundwater contamination LUST case were identified near the southeast end of the subject site. The groundwater contamination was reportedly undergoing vapor extraction and monitoring as recently as 2002. The groundwater contamination is considered unlikely to affect the groundwater beneath the subject site due to groundwater flow patterns and relative position related to groundwater barriers (faults) in the site vicinity. The LUST facilities are further described in the attached EDR report.

3.1.2.5 The Solid Waste Information System (SWIS) database maintained by the California Integrated Waste Management Board, dated December 2007, and the Waste Management Unit Data System (WMUDS) provided by the State Water Resources Control Board, dated April 2000, were searched by EDR for landfills and/or transfer stations. One WMUDS facility was identified on Glen Helen Road north of the northeast portion of the subject site. The facility was identified as a treatment site for contaminated soil. The facility is further described in the attached EDR report.

3.1.2.6 The Voluntary Cleanup Program Properties (VCP) database, provided by the Department of Toxic Substances Control, dated November 2007, was reviewed by EDR. The VCP database identifies low threat level properties with either confirmed or unconfirmed releases, and the project proponents have requested that DTSC oversee the investigation or cleanup activities. No VCP sites were identified within 1 mile of the site.

3.1.2.7 The California Hazardous Materials Incident Report System (CHMIRS) database, provided by the Office of Emergency Services (dated December 2005) contains information on reported hazardous material incidents (accidental releases or spills). One CHMIRS incident in 1989 was identified by EDR as I-5 S/Devore Road, in an unincorporated area. The location was mapped within the subject site boundary in the northeast portion of the site; however, it is likely that the incident occurred along the highway and not south of Glen Helen Parkway on the subject site.

3.1.3 Federal Government

3.1.3.1 The United States Environmental Protection Agency (USEPA) National Priorities List (NPL) or Superfund Listing and the Delisted NPL database, dated October 2007, list all sites receiving, or potentially eligible to receive, Superfund investigation and/or remediation assistance in California, or sites removed from this list in accordance with the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) criteria. No NPL or Delisted NPL sites were identified within 1 mile of the subject site.

3.1.3.2 The Comprehensive Environmental Response, Compensation and Liability Information Source (CERCLIS) database, dated January 2008, lists sites either on or proposed to be included on the NPL and sites in the screening and assessment phase for possible inclusion on the NPL. The CERCLIS No Further Remedial Action Planned (NFRAP) database, dated December 2007, lists archived sites which have been removed from the CERCLIS list based on the completion of a site assessment and the determination that the site is not a potential NPL site. One CERCLIS facility was identified approximately 1/2 mile south of the subject site at 3196 North Locust Avenue. The facility is the Astro Pyrotechnics site. EDR information indicates that the site is not on the NPL and that preliminary assessment and site inspection for lead and perchlorate contamination occurred between 2003 and 2006. The site is located on the Formerly Used Defense Site (FUDS) known as the Rialto Ammunition Storage Point (RASP). Further research regarding the Rialto-Colton Plume indicated that the pyrotechnics site is located within the "160-acre parcel" in the northeastern portion of the former RASP known to be one of two main sources of perchlorate groundwater contamination. The other source is the "Bunker Area" adjacent to the southwest. The WWII era military activities (DOD), as well as more recent occupants, including pyrotechnics companies, the Mid-Valley Landfill, BF Goodrich, and Denova Environmental,

Inc. (all identified on the EDR unmapped list) have been identified as potentially responsible parties. The Rialto-Colton Plume has been mapped as a southeast-trending plume flowing generally parallel to Riverside Avenue approximately 1,500 to 3,000 feet south of Riverside Avenue in the area of the subject site (Stephens & Associates, Inc., 2006). Based on this information, the groundwater beneath the subject site is not expected to be impacted by perchlorate contamination in the site vicinity.

3.1.3.3 EDR conducted a review of the USEPA Resource Conservation and Recovery Act (RCRA) Corrective Action Sites (CORRACTS) database, dated December 2007. CORRACTS facilities are those that are undergoing corrective action as a result of a release of hazardous waste or constituents into the environment from a RCRA facility. No CORRACTS facilities were identified.

3.1.3.4 The USEPA RCRA is a comprehensive information system that includes selective information on sites which generate, transport, treat, and/or dispose of hazardous waste as defined by the RCRA of 1976. This database (dated September 2007) was searched by EDR for treatment, storage, or disposal (TSD) facilities. The subject site was not identified on this database, and no RCRIS TSD facilities were identified within 1 mile of the subject site.

The RCRA listings were also searched by EDR for small quantity generators (SQG) and large quantity generators (LQG) of hazardous waste. No LQG facilities were identified. One gas station adjacent to the northwest portion of the subject site was listed as a SQG facility with no violations. Two additional addresses on the unmappable list, Rialto Concrete Products at 2250 West Lowell Street and the Glen Helen Rehabilitation Center were listed as SQG facilities, with no violations reported. The SmGen facilities are further described in the attached EDR report and the site reports for Rialto Concrete Products and the Glen Helen Rehabilitation Center.

3.1.3.5 The United States Engineering Controls Sites List and the United States Institutional Controls Sites List (dated July 2007) are compiled by the EPA and were reviewed by EDR. US ENG CONTROLS is a listing of sites with engineering controls in place, including various physical measures to create pathway elimination of regulated substances. US INST CONTROLS is a listing of sites with institutional controls in place, including administrative measures and post remediation care requirements

intended to prevent exposure to contaminants remaining on site. No facilities within 1 mile were identified on these lists.

3.1.3.6 The USEPA Emergency Response Notification System (ERNS) database (dated December 2006) contains information regarding spills and reported releases of oil and hazardous substances. No ERNS facilities were identified.

3.1.3.7 EDR identified 72 facilities on regulatory databases that were considered to be unmappable. Based on the information provided in the EDR report and the site reconnaissance, 61 of these unmapped facilities were considered to be located outside of the specified search distance for the identified databases.

3.2 Additional Environmental Records Sources

3.2.1 County of San Bernardino Fire Department Hazardous Materials Division

Requests for records specific to each subject site were submitted to the County of San Bernardino Fire Department's HMD at the time of each previous Phase I investigation. A records review generally includes any information regarding USTs, hazardous waste generators, hazardous materials handlers, and emergency response records specific to the subject site. The presence of underground tanks, hazardous waste generators, and hazardous materials handlers does not indicate the existence of contamination. However, this information may indicate if there are potential contamination sources in the site vicinity.

The HMD responses for the El Rancho Verde Golf Club report and for the 307-acre Sycamore Flat Area report are included in Enclosure "C".

El Rancho Verde Golf Club HMD Records Review

Records indicated that a previously undocumented underground storage tank was removed from the site on January 20, 1993. The tank was permitted as part of the removal process. Soil samples were collected at the direction of the County inspector, and a report of analytical results, dated February 17, 1993, was prepared by SEACOR. Analytical results indicated the detection of xylenes, one of the

constituents of gasoline at a concentration of 153,000 parts per billion (153 parts per million). The remaining analyses indicated non-detectable results.

A County Department of Environmental Health Services closure letter was issued on February 24, 1993. After review of the SEACOR report, it was determined that the analytical results indicated that the contamination remaining in the excavation was below that which is generally considered a problem and further investigation was not warranted. A copy of the County closure letter are included in Enclosure "C".

Sycamore Flat Area Records Review

Six Haz Mat Incident Response listings and one incident follow-up between 1998 and 2002 were reported as a result of the 2006 records search request for the Sycamore Flat area. These included abandoned drug lab waste and abandoned waste (asbestos containing material) responses with various descriptions near the northeast portion of the subject site. The records were reviewed at the HMD offices in 2006. The descriptions did not contain sufficient detail that would place the waste within the subject site boundaries.

3.3 Historical Use Information

3.3.1 Aerial Photograph Review

Aerial photographs taken in 1930, 1938, 1953, 1955, 1967, 1968, 1971, 1977, 1978, 1983, 1986, 1989, 1995, 1996, 2002, and 2003 were obtained from U.S. Department of Agriculture and San Bernardino County Flood Control District collections, as well as from EDR and online sources for review during the previous Phase I assessments.

Sycamore Flat and Sycamore Canyon Areas

A review of the aerial photographs indicated that portions of the Sycamore Flat and Sycamore Canyon areas have historically been used for agricultural purposes, including groves and vineyards. All agricultural use appeared to cease by the mid-1980s. Residential structures historically existed on site until the mid-1980s.

Northwest and Central Site Areas

A review of available aerial photographs indicated that these portions of the subject site primarily consisted of vacant, active wash areas and vacant undeveloped land with natural vegetation during the time period reviewed.

Eastern Site Area and Golf Course

A review of available aerial photographs indicated that the north and west portions of this subject site area primarily consisted of vacant, active wash areas during the time period reviewed. A review of the aerial photographs indicated that the golf course was developed in the 1960s. The remaining site area east of the golf course was generally vacant and undeveloped.

3.3.2 Topographic Map Review

Historical maps published by the *U.S. Department of Interior U.S. Geological Survey* for the subject site and vicinity were reviewed. The 7.5-minute Devore Quadrangle Map, dated 1966 and photo-revised in 1980, was reviewed for information pertaining to the subject site.

The review indicated that the central and eastern portions of the subject site were mapped as primarily vacant and undeveloped in 1966. Several unimproved dirt roads and several groundwater wells were mapped. The El Rancho Verde Country Club was mapped in the southeastern portion of the site. Riverside Avenue was mapped in its current alignment along the southwestern site boundary. Many residences were located to the southwest of the subject site. Verdemont Ranch and the Glen Helen Rehabilitation Facility were located approximately 0.5 to 1.0 mile to the northeast of the subject site.

The 1980 photo-revisions showed Interstate 15 mapped in its current alignment across the northwestern portion of the subject site. Two large structures were mapped on the Monier Lifetile site. There were no other significant changes to the subject site. The open-pit gravel mines were mapped between the central and eastern portions of the subject site. Several additional residences were mapped to the southwest and south of the subject site. Other adjacent properties remained generally unchanged.

Two residential-type structures were noted in the Sycamore Flat area, and Glen Helen Parkway was developed in 1966. One pond/reservoir was mapped along the southern portion of Sycamore Flat. A four-lane highway was partially developed in the current alignment of Interstate 15. The Sycamore Canyon wash area in the northwestern portion of the subject site was mapped with natural vegetation (scrub) and vineyards in 1966. One residential structure and a dirt road were mapped west of Interstate 15, and a water tank was mapped in the northwest portion of the site. Adjacent properties in the northeast site area were mapped primarily as vacant and undeveloped in 1966.

The 1980 revisions indicated no significant changes to the northwestern portion of the site. Interstate 15 was developed in its current alignment through the subject site. Two additional residential-type structures were mapped in the Sycamore Flat area, and the dirt road was extended through the site toward the south. Two additional ponds/reservoirs were also mapped in the Sycamore Flat area. No significant changes were noted for adjacent properties. Glen Helen Regional Park was developed northeast of the subject site.

3.3.3 City Directory Review

A search of available city directories was conducted by Environmental Data Resources (EDR) for the period from 1970 through 2005 during the 2006 assessment of the El Rancho Verde Country Club. Street directories provide information of historical occupancy and usage of the subject property and properties in the immediate vicinity. A 1/8-mile radius was searched from the site address of 19494 Country Club Drive. Country Club Drive was not listed in the research source (Haines Criss-Cross Directories) until 1990. The subject site address was not listed. Residential addresses on Country Club Drive and Sycamore Avenue were listed from 1990 through 2005.

Directory searches were not conducted for the remaining portions of the site due to the lack of subject site addresses.

4.0 CONCLUSIONS

Site Conditions

At the time of this investigation, the ±2,500-acre subject site consisted primarily of vacant and undeveloped land within the Lytle Creek Wash. Other vacant and undeveloped areas were the Sycamore Canyon and Sycamore Flat areas in the northeast portion of the site. Two developed facilities were located on the subject site. These were the El Rancho Verde Country Club and the Monier Lifetile facility. Both of these facilities have ASTs for gasoline and/or diesel fuel. The tile manufacturer did not utilize or handle other hazardous materials. Handling and storage of hazardous materials (primarily waste oil) was contained within the maintenance area of the golf course. No evidence of mishandling or on-site disposal was noted.

No evidence of USTs or other undocumented subsurface structures was observed on the subject site at the time of our site visit. No significant soil staining or distressed vegetation were noted. There was no evidence during our site reconnaissance that significant quantities of hazardous materials have been mishandled or disposed of on the site.

Database Review

Results of the EDR search indicated on-site results for the El Rancho Verde Golf Club in the southeast portion of the subject site. The golf course was identified with County permits for hazardous materials handling and generating. These are related to the waste oil collection and the diesel AST in the maintenance area. No violations were noted. County HMD records review results indicated the removal of an undocumented UST from a location adjacent to the former maintenance facility in 1993. The case was given County closure following soil sampling and analysis.

Offsite groundwater contamination was indicated in the EDR report. EDR and other sources regarding known perchlorate groundwater contamination southwest of the subject site were reviewed. The plume is reported to be confined south of the San Jacinto Fault and is mapped off-site; therefore, it is considered unlikely to have the potential to impact groundwater beneath the subject site.

Offsite Leaking Underground Storage Tank (LUST) facilities were identified. Several soil and groundwater gasoline contamination cases were noted. Due to case type and status, as well as groundwater flow patterns and groundwater barriers, the identified contamination cases are considered unlikely to have the potential to impact the soils or groundwater of the subject site.

Significance of Hazardous Materials Within Proposed Project

The proposed master planned community will include residential, retail, school, and recreational land uses. Based on the proposed Lytle Creek Ranch Land Use Plan, the potential for hazards to the public or environment due to transport, use, disposal, or release of hazardous materials appears to be non-significant. Hazardous materials that are typically utilized within households and by the types of proposed retail/commercial businesses planned for the subject site include cleaning materials, fertilizers, paint, solvents, and automotive fluids, which are generally expected to be in small quantities. Various city and county agencies typically provide disposal opportunities for residential hazardous materials and wastes. In addition, the existing and proposed land uses in the vicinities of the planned school sites do not indicate a significant potential threat of the release of hazardous materials.

5.0 LIMITATIONS

C.H.J., Incorporated has performed our services within the limits prescribed by our client with no vested interest in the site or in the subject matter contained in the report and with the usual thoroughness and competence of the engineering profession. C.H.J., Incorporated makes no other warranty or representation, either express or implied.

The conclusions presented in this report are based upon the research and site reconnaissance described in this report. Should conditions be encountered in the field that appear different from those described in this report, we should be contacted immediately in order that we might evaluate their effect. Site conditions are subject to change with time, and should be evaluated within this context. C.H.J., Incorporated shall not be responsible for conditions or consequences arising from relevant facts that were concealed, withheld, or not fully disclosed at the time the assessment was performed.

If this report or portions thereof are provided to others, it should be understood by all parties that it is provided for information only, and should be used as such.

This report and its contents resulting from this investigation are not intended or represented to be suitable for reuse on extensions or modifications of the project or for use on any other projects.

6.0 CLOSURE

We appreciate this opportunity to provide environmental services for this project. If you should have questions or comments regarding this report, please contact this firm at your convenience.

Respectfully submitted,
C.H.J., INCORPORATED

Ann M. Laudermilk, Environmental Project Manager

REGISTERED ENVIRONMENTAL ASSESSOR
ROBERT J. JOHNSON
No. 00859
Exp. 6/30/2009
STATE OF CALIFORNIA

4/11/08

Robert J. Johnson, R.E.A. 859
President

AML/RJJ:ndt

ENCLOSURE "A"

MAPS

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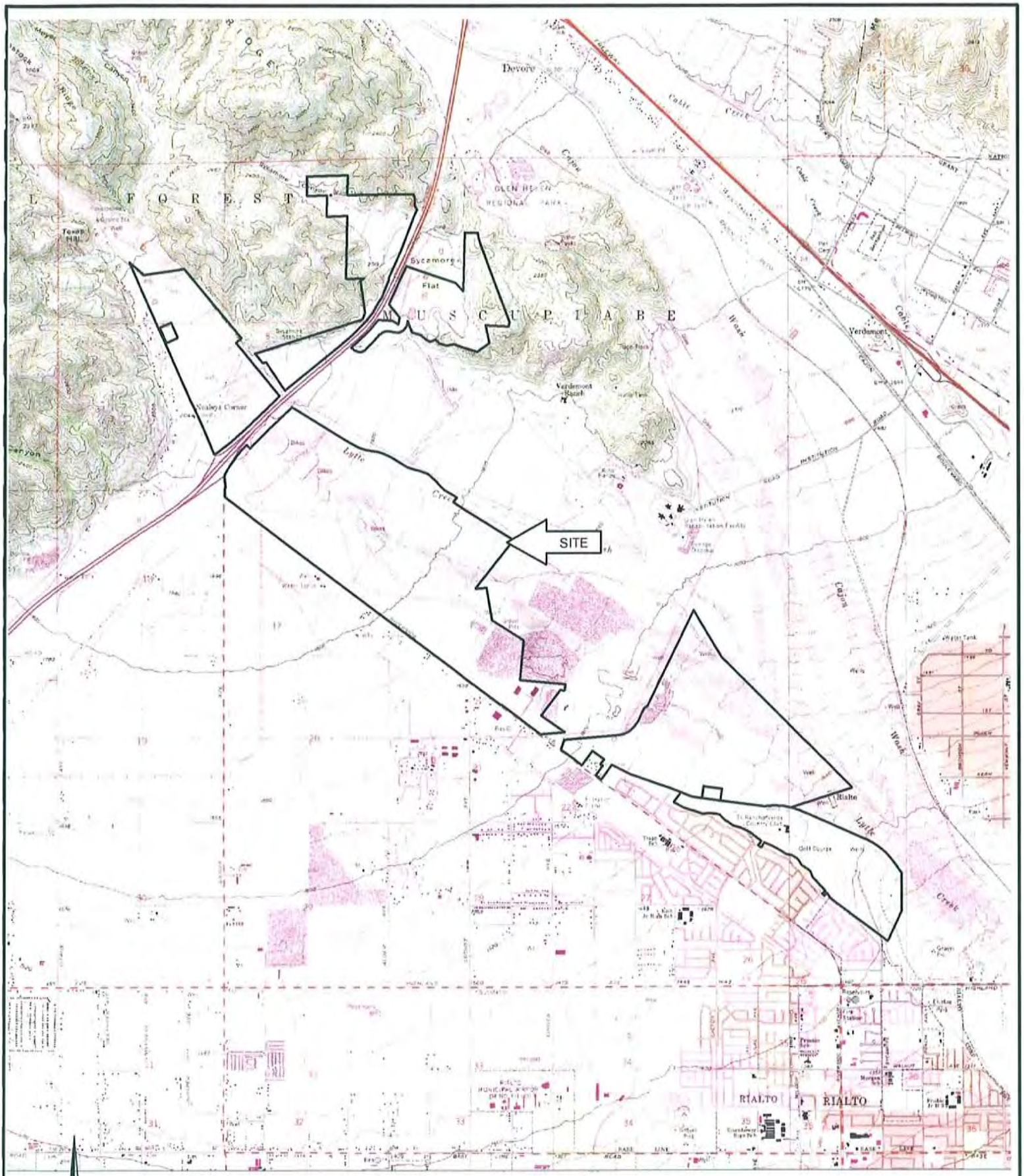

INDEX MAP

FOR: LYTLE DEVELOPMENT COMPANY	SITE RECONNAISSANCE AND DATABASE REVIEW PROPOSED LYTLE CREEK RANCH PROJECT 2,450± ACRES, LYTLE CREEK AREA SAN BERNARDINO COUNTY [illegible]FORNIA	ENCLOSURE "A-1"
DATE: APRIL 2008		JOB NUMBER 08165-9

-N-

SCALE: 1" = 4000'

C.H.J. Incorporated

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ENCLOSURE "B"

ENVIRONMENTAL DATABASE SEARCH REPORT

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EDR DataMap®
Area Study

Lytle Development Area
Rialto, CA 92377

March 17, 2008

Inquiry number 2167310.1s

EDR® Environmental
Data Resources Inc

The Standard in Environmental Risk Information

440 Wheelers Farms Road
Milford, Connecticut 06461

Nationwide Customer Service

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Internet: www.edrnet.com

Thank you for your business.
Please contact EDR at 1-800-352-0050
with any questions or comments.

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EXECUTIVE SUMMARY

TARGET PROPERTY INFORMATION

ADDRESS

RIALTO, CA 92377
RIALTO, CA 92377

DATABASES WITH NO MAPPED SITES

No mapped sites were found in EDR's search of available ("reasonably ascertainable ") government records within the requested search area for the following databases:

FEDERAL RECORDS

NPL	National Priority List
Proposed NPL	Proposed National Priority List Sites
Delisted NPL	National Priority List Deletions
NPL LIENS	Federal Superfund Liens
CERC-NFRAP	CERCLIS No Further Remedial Action Planned
LIENS 2	CERCLA Lien Information
CORRACTS	Corrective Action Report
RCRA-TSDF	RCRA - Transporters, Storage and Disposal
RCRA-LQG	RCRA - Large Quantity Generators
RCRA-CESQG	RCRA - Conditionally Exempt Small Quantity Generator
RCRA-NonGen	RCRA - Non Generators
US ENG CONTROLS	Engineering Controls Sites List
US INST CONTROL	Sites with Institutional Controls
ERNS	Emergency Response Notification System
HMIRS	Hazardous Materials Information Reporting System
DOT OPS	Incident and Accident Data
US CDL	Clandestine Drug Labs
US BROWNFIELDS	A Listing of Brownfields Sites
DOD	Department of Defense Sites
LUCIS	Land Use Control Information System
CONSENT	Superfund (CERCLA) Consent Decrees
ROD	Records Of Decision
UMTRA	Uranium Mill Tailings Sites
ODI	Open Dump Inventory
DEBRIS REGION 9	Torres Martinez Reservation Illegal Dump Site Locations
MINES	Mines Master Index File
TRIS	Toxic Chemical Release Inventory System
TSCA	Toxic Substances Control Act
FTTS	FIFRA/ TSCA Tracking System - FIFRA (Federal Insecticide, Fungicide, & Rodenticide Act)/TSCA (Toxic Substances Control Act)
HIST FTTS	FIFRA/TSCA Tracking System Administrative Case Listing
SSTS	Section 7 Tracking Systems
ICIS	Integrated Compliance Information System
PADS	PCB Activity Database System
MLTS	Material Licensing Tracking System

EXECUTIVE SUMMARY

RADINFO..... Radiation Information Database
RAATS..... RCRA Administrative Action Tracking System

STATE AND LOCAL RECORDS

HIST Cal-Sites..... Historical Calsites Database
CA BOND EXP. PLAN..... Bond Expenditure Plan
SCH..... School Property Evaluation Program
Toxic Pits..... Toxic Pits Cleanup Act Sites
SWF/LF..... Solid Waste Information System
CA WDS..... Waste Discharge System
SWRCY..... Recycler Database
LIENS..... Environmental Liens Listing
Notify 65..... Proposition 65 Records
DEED..... Deed Restriction Listing
VCP..... Voluntary Cleanup Program Properties
DRYCLEANERS..... Cleaner Facilities
WIP..... Well Investigation Program Case List
CDL..... Clandestine Drug Labs
RESPONSE..... State Response Sites
HAULERS..... Registered Waste Tire Haulers Listing

TRIBAL RECORDS

INDIAN RESERV..... Indian Reservations
INDIAN ODI..... Report on the Status of Open Dumps on Indian Lands
INDIAN LUST..... Leaking Underground Storage Tanks on Indian Land
INDIAN UST..... Underground Storage Tanks on Indian Land

EDR PROPRIETARY RECORDS

Manufactured Gas Plants... EDR Proprietary Manufactured Gas Plants

SURROUNDING SITES: SEARCH RESULTS

Surrounding sites were identified.

Page numbers and map identification numbers refer to the EDR Radius Map report where detailed data on individual sites can be reviewed.

Sites listed in ***bold italics*** are in multiple databases.

Unmappable (orphan) sites are not considered in the foregoing analysis.

FEDERAL RECORDS

CERCLIS: The Comprehensive Environmental Response, Compensation and Liability Information System contains data on potentially hazardous waste sites that have been reported to the USEPA by states, municipalities, private companies and private persons, pursuant to Section 103 of the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA). CERCLIS contains sites which are either proposed to or on the National Priorities List (NPL) and sites which are in the screening and assessment phase for possible inclusion on the NPL.

A review of the CERCLIS list, as provided by EDR, and dated 01/09/2008 has revealed that there are 3

EXECUTIVE SUMMARY

CERCLIS sites within the searched area.

Site	Address	Map ID	Page
GWK	3196 NORTH LOCUST AVENU	8	31
PYRO SPECTACULARS	3196 NORTH LOCUST AVENU	8	33
AMERICAN PROMOTIONAL EVENTS	3196 NORTH LOCUST AVENU	8	34

RCRA-SQG: RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Small quantity generators (SQGs) generate between 100 kg and 1,000 kg of hazardous waste per month.

A review of the RCRA-SQG list, as provided by EDR, and dated 09/11/2007 has revealed that there is 1 RCRA-SQG site within the searched area.

Site	Address	Map ID	Page
SHELL SERVICE STATION	***3864 SIERRA AVE***	***5***	***17***

FUDS: The Listing includes locations of Formerly Used Defense Sites Properties where the US Army Corps Of Engineers is actively working or will take necessary cleanup actions.

A review of the FUDS list, as provided by EDR, and dated 12/31/2006 has revealed that there is 1 FUDS site within the searched area.

Site	Address	Map ID	Page
RIALTO AMMUNITION STORAGE POIT		10	35

FINDS: The Facility Index System contains both facility information and "pointers" to other sources of information that contain more detail. These include: RCRIS; Permit Compliance System (PCS); Aerometric Information Retrieval System (AIRS); FATES (FIFRA [Federal Insecticide Fungicide Rodenticide Act] and TSCA Enforcement System, FTTS [FIFRA/TSCA Tracking System]; CERCLIS; DOCKET (Enforcement Docket used to manage and track information on civil judicial enforcement cases for all environmental statutes); Federal Underground Injection Control (FURS); Federal Reporting Data System (FRDS); Surface Impoundments (SIA); TSCA Chemicals in Commerce Information System (CICS); PADS; RCRA-J (medical waste transporters/disposers); TRIS; and TSCA. The source of this database is the U.S. EPA/NTIS.

A review of the FINDS list, as provided by EDR, and dated 01/04/2008 has revealed that there is 1 FINDS site within the searched area.

Site	Address	Map ID	Page
SHELL SERVICE STATION	***3864 SIERRA AVE***	***5***	***17***

EXECUTIVE SUMMARY

STATE AND LOCAL RECORDS

WMUDS/SWAT: The Waste Management Unit Database System is used for program tracking and inventory of waste management units. The source is the State Water Resources Control Board.

A review of the WMUDS/SWAT list, as provided by EDR, and dated 04/01/2000 has revealed that there is 1 WMUDS/SWAT site within the searched area.

Site	Address	Map ID	Page
SOIL TREATMENT, DEVORE	2590 GLEN HELEN ROAD	1	3

Cortese: The sites for the list are designated by the State Water Resource Control Board (LUST), the Integrated Waste Board (SWF/LS), and the Department of Toxic Substances Control (Cal-Sites). This listing is no longer updated by the state agency.

A review of the Cortese list, as provided by EDR, and dated 04/01/2001 has revealed that there are 3 Cortese sites within the searched area.

Site	Address	Map ID	Page
GLEN HELEN REGIONAL PARK	***2555 GLEN HELEN PKWY***	***2***	***6***
OWL ROCK PRODUCTS	***3221 RIVERSIDE AVE***	***7***	***24***
PENHALL COMPANY	***2190 RIVERSIDE AVE***	***15***	***41***

LUST: The Leaking Underground Storage Tank Incident Reports contain an inventory of reported leaking underground storage tank incidents. The data come from the State Water Resources Control Board Leaking Underground Storage Tank Information System.

A review of the LUST list, as provided by EDR, and dated 01/07/2008 has revealed that there are 5 LUST sites within the searched area.

Site	Address	Map ID	Page
GLEN HELEN REGIONAL PARK Facility Status: Preliminary site assessment workplan submitted	***2555 GLEN HELEN PKWY***	***2***	***6***
OWL ROCK PRODUCTS Facility Status: Case Closed	***3221 RIVERSIDE AVE***	***7***	***24***
ARCO COLTON TERMINAL Facility Status: Pollution Characterization	***2395 RIVERSIDE AVE***	***14***	***38***
PENHALL COMPANY Facility Status: Case Closed	***2190 RIVERSIDE AVE***	***15***	***41***
ARCO - RIVERSIDE SERVICE Facility Status: Case Closed	1877 RIVERSIDE AVE	16	43

EXECUTIVE SUMMARY

CA FID UST: The Facility Inventory Database contains active and inactive underground storage tank locations. The source is the State Water Resource Control Board.

A review of the CA FID UST list, as provided by EDR, and dated 10/31/1994 has revealed that there are 4 CA FID UST sites within the searched area.

Site	Address	Map ID	Page
GLEN HELEN REGIONAL PARK	***2555 DEVORE RD***	***2***	***4***
DOVE OIL/SIERRA SHELL	***3740 SIERRA AVE***	***4***	***11***
ARROWHEAD SEPTIC	***3344 LOCUST AVE***	***6***	***20***
OWL ROCK PROD/LYTLE CREEK	***3221 N RIVERSIDE AVE***	***7***	***29***

SLIC: SLIC Region comes from the California Regional Water Quality Control Board.

A review of the SLIC list, as provided by EDR, and dated 01/07/2008 has revealed that there are 3 SLIC sites within the searched area.

Site	Address	Map ID	Page
CEMEX	3221 N RIVERSIDE AVE	7	23
AMERICAN PROMOTIONAL EVENTS, I	3196 NORTH LOCUST	8	32
ASTRO PYROTECHNICS	3796 N LOCUST	8	35

UST: The Underground Storage Tank database contains registered USTs. USTs are regulated under Subtitle I of the Resource Conservation and Recovery Act (RCRA). The data come from the State Water Resources Control Board's Hazardous Substance Storage Container Database.

A review of the UST list, as provided by EDR, and dated 01/07/2008 has revealed that there are 3 UST sites within the searched area.

Site	Address	Map ID	Page
SIERRA SHELL	3740 SIERRA AVE	4	13
SIERRA FONTANA INVESTMENT	***3892 SIERRA AVE***	***5***	***15***
CEMEX USA CONST MATERIALS	***3221 N RIVERSIDE AVE***	***7***	***27***

HIST UST: Historical UST Registered Database.

A review of the HIST UST list, as provided by EDR, and dated 10/15/1990 has revealed that there are 3 HIST UST sites within the searched area.

Site	Address	Map ID	Page
GLEN HELEN REGIONAL PARK	***2555 GLEN HELEN PKWY***	***2***	***6***
ENGINEERED FIBERGLASS INC.	3122 RIVERSIDE AVE	7	21
LYTLE CREEK	3221 N RIVERSIDE AVE	7	24

EXECUTIVE SUMMARY

AST: The Aboveground Storage Tank database contains registered ASTs. The data come from the State Water Resources Control Board's Hazardous Substance Storage Container Database.

A review of the AST list, as provided by EDR, and dated 11/01/2007 has revealed that there is 1 AST site within the searched area.

Site	Address	Map ID	Page
LYTLE CREEK PLANT	3221 N RIVERSIDE AVE	7	23

SWEEPS UST: Statewide Environmental Evaluation and Planning System. This underground storage tank listing was updated and maintained by a company contacted by the SWRCB in the early 1990's. The listing is no longer updated or maintained. The local agency is the contact for more information on a site on the SWEEPS list.

A review of the SWEEPS UST list, as provided by EDR, and dated 06/01/1994 has revealed that there are 5 SWEEPS UST sites within the searched area.

Site	Address	Map ID	Page
GLEN HELEN REGIONAL PARK	***2555 DEVORE RD***	***2***	***4***
DOVE OIL/SIERRA SHELL	***3740 SIERRA AVE***	***4***	***11***
ARROWHEAD SEPTIC	***3344 LOCUST AVE***	***6***	***20***
S.C.E.	3165 N RIVERSIDE AVE	7	23
OWL ROCK PROD/LYTLE CREEK	***3221 N RIVERSIDE AVE***	***7***	***29***

CHMIRS: The California Hazardous Material Incident Report System contains information on reported hazardous material incidents, i.e., accidental releases or spills. The source is the California Office of Emergency Services.

A review of the CHMIRS list, as provided by EDR, and dated 12/31/2005 has revealed that there is 1 CHMIRS site within the searched area.

Site	Address	Map ID	Page
Not reported Date Completed: 16-APR-89	I-5 S/DEVORE RD	3	9

San Bern. Co. Permit: San Bernardino County Fire Department Hazardous Materials Division.

A review of the San Bern. Co. Permit list, as provided by EDR, and dated 12/28/2007 has revealed that there are 14 San Bern. Co. Permit sites within the searched area.

Site	Address	Map ID	Page
GLEN HELEN REGIONAL PARK	2555 GLEN HELEN	2	5
GLEN HELEN REGIONAL PARK	***2555 GLEN HELEN PKWY***	***2***	***6***
RENAISSANCE PLEASURE FAIRE	2555 GLEN HELEN PKY	2	9
SAM'S GAS	3740 SIERRA AVE	4	13
SIERRA FONTANA INVESTMENT	***3892 SIERRA AVE***	***5***	***15***
MC DONALDS/CHEVRON	3870 SIERRA AVE	5	16
SIERRA SHELL #68534	3864 SIERRA AVE	5	17
FONTANA POWERHOUSE	3165 N RIVERSIDE AVE	7	22

EXECUTIVE SUMMARY

Site	Address	Map ID	Page
OWL ROCK PRODUCTS	***3221 RIVERSIDE AVE***	***7***	***24***
CEMEX USA CONST MATERIALS	***3221 N RIVERSIDE AVE***	***7***	***27***
WEST VLLY WATER DIST TRT PLNT	3010 N CEDAR AVE	9	35
WEST VALLEY WATER DIST WELL#5	5914 N SYCAMORE AVE	11	36
WEST VALLEY WATER DIST WELL #3	19653 COUNTRY CLUB DR	12	37
NEW CINGULAR WIRELESS - 15 FWY	2602 N RIVERSIDE AVE	13	37

HAZNET: The data is extracted from the copies of hazardous waste manifests received each year by the DTSC. The annual volume of manifests is typically 700,000-1,000,000 annually, representing approximately 350,000-500,000 shipments. Data from non-California manifests & continuation sheets are not included at the present time. Data are from the manifests submitted without correction, and therefore many contain some invalid values for data elements such as generator ID, TSD ID, waste category, & disposal method. The source is the Department of Toxic Substance Control is the agency

A review of the HAZNET list, as provided by EDR, and dated 12/31/2006 has revealed that there are 5 HAZNET sites within the searched area.

Site	Address	Map ID	Page
DOVE OIL/SIERRA SHELL	***3740 SIERRA AVE***	***4***	***11***
SIERRA MOBILE	3740 SIERRA AVE	4	13
SIERRA FONTANA INVESTMENTS LLC	3892 SIERRA AVE	5	14
MIDLAND OIL CO (ARCO)	3892 SIERRA AVE	5	16
SHELL SERVICE STATION	***3864 SIERRA AVE***	***5***	***17***

AIRS: Toxics and criteria pollutant emissions data collected by the ARB and local air pollution agencies

A review of the AIRS list, as provided by EDR, and dated 12/31/2005 has revealed that there is 1 AIRS site within the searched area.

Site	Address	Map ID	Page
ARCO COLTON TERMINAL	***2395 RIVERSIDE AVE***	***14***	***38***

ENVIROSTOR: The Department of Toxic Substances Control's (DTSC's) Site Mitigation and Brownfields Reuse Program's (SMBRP's) EnviroStor database identifes sites that have known contamination or sites for which there may be reasons to investigate further. The database includes the following site types: Federal Superfund sites (National Priorities List (NPL)); State Response, including Military Facilities and State Superfund; Voluntary Cleanup; and School sites. EnviroStor provides similar information to the information that was available in CalSites, and provides additional site information, including, but not limited to, identification of formerly-contaminated properties that have been released for reuse, properties where environmental deed restrictions have been recorded to prevent inappropriate land uses, and risk characterization information that is used to assess potential impacts to public health and the environment at contaminated sites.

A review of the ENVIROSTOR list, as provided by EDR, and dated 11/27/2007 has revealed that there is

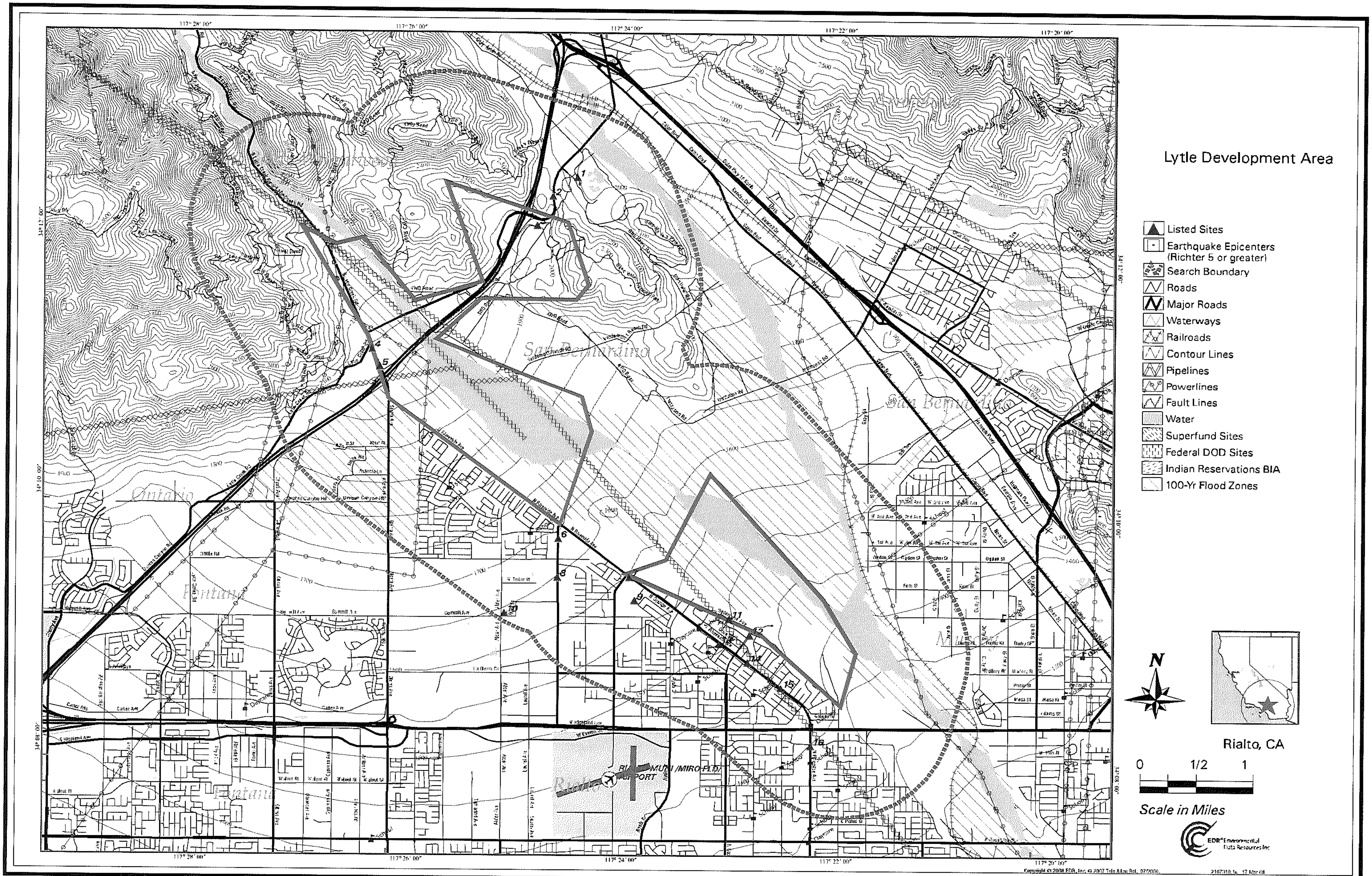
EXECUTIVE SUMMARY

1 ENVIROSTOR site within the searched area.

Site	Address	Map ID	Page
LARRY ZELKE RESIDENCE (2) Facility Status: Refer: Other Agency	6061 RIVERSIDE AVENUE	14	37

EXECUTIVE SUMMARY

Please refer to the end of the findings report for unmapped orphan sites due to poor or inadequate address information.



Lytle Development Area
Listed Sites
Earthquake Epicenters (Richter 5 or greater)
Search Boundary
Roads
Major Roads
Waterways
Railroads
Contour Lines
Pipelines
Powerlines
Fault Lines
Water
Superfund Sites
Federal DOD Sites
Indian Reservations BIA
100-Yr Flood Zones
N
Rialto, CA
0
1/2
1
Scale in Miles
EDR® Environmental Data Resources Inc
San Bernardino
Ontario
Fontana
117° 28' 00"
117° 26' 00"
117° 24' 00"
117° 22' 00"
117° 20' 00"
34° 12' 00"
34° 10' 00"
34° 08' 00"

MAP FINDINGS SUMMARY

Database	Total Plotted
FEDERAL RECORDS	
NPL	0
Proposed NPL	0
Delisted NPL	0
NPL LIENS	0
CERCLIS	3
CERC-NFRAP	0
LIENS 2	0
CORRACTS	0
RCRA-TSDF	0
RCRA-LQG	0
RCRA-SQG	1
RCRA-CESQG	0
RCRA-NonGen	0
US ENG CONTROLS	0
US INST CONTROL	0
ERNS	0
HMIRS	0
DOT OPS	0
US CDL	0
US BROWNFIELDS	0
DOD	0
FUDS	1
LUCIS	0
CONSENT	0
ROD	0
UMTRA	0
ODI	0
DEBRIS REGION 9	0
MINES	0
TRIS	0
TSCA	0
FTTS	0
HIST FTTS	0
SSTS	0
ICIS	0
PADS	0
MLTS	0
RADINFO	0
FINDS	1
RAATS	0
STATE AND LOCAL RECORDS	
HIST Cal-Sites	0
CA BOND EXP. PLAN	0
SCH	0
Toxic Pits	0
SWF/LF	0

MAP FINDINGS SUMMARY

Database	Total Plotted
CA WDS	0
WMUDS/SWAT	1
Cortese	3
SWRCY	0
LUST	5
CA FID UST	4
SLIC	3
UST	3
HIST UST	3
AST	1
LIENS	0
SWEEPS UST	5
CHMIRS	1
Notify 65	0
DEED	0
VCP	0
DRYCLEANERS	0
WIP	0
CDL	0
RESPONSE	0
San Bern. Co. Permit	14
HAZNET	5
AIRS	1
HAULERS	0
ENVIROSTOR	1
TRIBAL RECORDS	
INDIAN RESERV	0
INDIAN ODI	0
INDIAN LUST	0
INDIAN UST	0
EDR PROPRIETARY RECORDS	
Manufactured Gas Plants	0

NOTES:

Sites may be listed in more than one database

1 **SOIL TREATMENT, DEVORE**
2590 GLEN HELEN ROAD
DEVORE CA, CA 92407

WMUDS/SWAT **S104156559**
N/A

WMUDS/SWAT:

Edit Date:	Not reported
Complexity:	Category B - Any facility having a physical, chemical, or biological waste treatment system (except for septic systems with subsurface disposal), or any Class II or III disposal site, or facilities without treatment systems that are complex, such as marinas with petroleum products, solid wastes, and sewage pump out facilities.
Primary Waste:	Contaminated Soil
Primary Waste Type:	Hazardous/Influent or Solid Wastes that contain toxic, corrosive, ignitable or reactive substances and must be managed according to applicable DOHS standards.
Secondary Waste:	Not reported
Secondary Waste Type:	Not reported
Base Meridian:	Not reported
NPID:	Not reported
Tonnage:	0
Regional Board ID:	Not reported
Municipal Solid Waste:	False
Superorder:	False
Open To Public:	False
Waste List:	False
Agency Type:	Private
Agency Name:	CDE RESOURCES, INC
Agency Department:	Not reported
Agency Address:	2590 GLEN HELEN ROAD
Agency City,St,Zip:	DEVORE CA 92407
Agency Contact:	DONALD MATTHEWS
Agency Telephone:	9094741076
Land Owner Name:	Not reported
Land Owner Address:	Not reported
Land Owner City,St,Zip:	Not reported
Land Owner Contact:	Not reported
Land Owner Phone:	Not reported
Region:	8
Facility Type:	Solid Waste Site-Class II - A solid waste facility at which designated wastes may be treated or stored.
Facility Description:	Not reported
Facility Telephone:	Not reported
SWAT Facility Name:	Not reported
Primary SIC:	4959
Secondary SIC:	Not reported
Comments:	Not reported
Last Facility Editors:	Not reported
Waste Discharge System:	True
Solid Waste Assessment Test Program:	False
Toxic Pits Cleanup Act Program:	False
Resource Conservation Recovery Act:	False
Department of Defence:	False
Solid Waste Assessment Test Program:	Not reported
Threat to Water Quality:	Moderate Threat to Water Quality. A violation could have a major adverse impact on receiving biota, can cause aesthetic impairment to a significant human population, or render unusable a potential domestic or municipal water supply. Awsthetic impairment would include nuisance from a waste treatment facility.
Sub Chapter 15:	True

SOIL TREATMENT, DEVORE (Continued) **S104156559**

Regional Board Project Officer:	RA
Number of WMUDS at Facility:	1
Section Range:	Not reported
RCRA Facility:	No
Waste Discharge Requirements:	Active - Any facility with a continuous or seasonal discharge that is under Waste Discharge Requirements.
Self-Monitoring Rept. Frequency:	Monthly Submittal
Waste Discharge System ID:	8 362387001
Solid Waste Information ID:	Not reported

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2 **GLEN HELEN REGIONAL PARK**
2555 DEVORE RD
SAN BERNARDINO, CA 92407

CA FID UST **S101619499**
SWEEPS UST **N/A**

CA FID UST:

Facility ID:	36002492
Regulated By:	UTNKA
Regulated ID:	00023395
Cortese Code:	Not reported
SIC Code:	Not reported
Facility Phone:	Not reported
Mail To:	Not reported
Mailing Address:	2555 DEVORE RD
Mailing Address 2:	Not reported
Mailing City,St,Zip:	SAN BERNARDINO 92407
Contact:	Not reported
Contact Phone:	Not reported
DUNs Number:	Not reported
NPDES Number:	Not reported
EPA ID:	Not reported
Comments:	Not reported
Status:	Active

SWEEPS UST:

Status:	A
Comp Number:	23395
Number:	4
Board Of Equalization:	44-020787
Ref Date:	09-11-91
Act Date:	09-11-91
Created Date:	02-29-88
Tank Status:	A
Owner Tank Id:	1
Swrcb Tank Id:	36-000-023395-000001
Actv Date:	08-25-88
Capacity:	500
Tank Use:	M.V. FUEL
Stg:	P
Content:	DIESEL
Number Of Tanks:	2

Status:	A
Comp Number:	23395
Number:	4
Board Of Equalization:	44-020787
Ref Date:	09-11-91
Act Date:	09-11-91

GLEN HELEN REGIONAL PARK (Continued) **S101619499**

Created Date:	02-29-88
Tank Status:	A
Owner Tank Id:	2
Swrcb Tank Id:	36-000-023395-000002
Actv Date:	08-25-88
Capacity:	500
Tank Use:	M.V. FUEL
Stg:	P
Content:	REG UNLEADED
Number Of Tanks:	Not reported

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2 **GLEN HELEN REGIONAL PARK**
2555 GLEN HELEN
SAN BERNARDINO, CA 92407

San Bern. Co. Permit **S104765338**
N/A

San Bern. Co. Permit:

Region:	SAN BERNARDINO
Facility ID:	FA0007635
Owner:	SN BERNARDINO CO. REGIONAL PAK
Permit Number:	PT0013336
Permit Category:	SPECIAL GENERATOR(B)
Facility Status:	ACTIVE
Expiration Date:	2/28/2008 12:00:00AM

Region:	SAN BERNARDINO
Facility ID:	FA0007635
Owner:	SN BERNARDINO CO. REGIONAL PAK
Permit Number:	PT0013124
Permit Category:	HAZMAT HANDLER 0-10 EMPLOYEES
Facility Status:	ACTIVE
Expiration Date:	2/28/2008 12:00:00AM

Region:	SAN BERNARDINO
Facility ID:	FA0007635
Owner:	SN BERNARDINO CO. REGIONAL PAK
Permit Number:	PT0013123
Permit Category:	EPCRA FACILITY (RIGHT TO KNOW PLAN)
Facility Status:	INACTIVE
Expiration Date:	2/28/2003 12:00:00AM

Region:	SAN BERNARDINO
Facility ID:	FA0007635
Owner:	SN BERNARDINO CO. REGIONAL PAK
Permit Number:	PT0013121
Permit Category:	CALARP FACILITY PERMIT
Facility Status:	INACTIVE
Expiration Date:	2/28/2003 12:00:00AM

2 **GLEN HELEN REGIONAL PARK**
2555 GLEN HELEN PKWY
SAN BERNARDINO, CA 92407

LUST **U001576021**
Cortese **N/A**
HIST UST
San Bern. Co. Permit

LUST:

Region:	STATE
Case Type:	Drinking Water Aquifer affected
Cross Street:	Not reported
Enf Type:	Not reported
Funding:	Not reported
How Discovered:	Tank Closure
How Stopped:	Not reported
Leak Cause:	UNK
Leak Source:	UNK
Global Id:	T0607100575
Stop Date:	Not reported
Confirm Leak:	1999-01-06 00:00:00
Workplan:	1999-04-01 00:00:00
Prelim Assess:	Not reported
Pollution Char:	Not reported
Remed Plan:	Not reported
Remed Action:	Not reported
Monitoring:	Not reported
Close Date:	Not reported
Discover Date:	1999-01-06 00:00:00
Enforcement Dt:	Not reported
Release Date:	1999-03-21 00:00:00
Review Date:	1999-05-12 00:00:00
Enter Date:	1999-05-12 00:00:00
MTBE Date:	2000-05-11 00:00:00
GW Qualifier:	=
Soil Qualifier:	=
Max MTBE GW ppb:	7.75
Max MTBE Soil ppb:	792
County:	36
Org Name:	Not reported
Reg Board:	Santa Ana Region
Status:	Preliminary site assessment workplan submitted
Chemical:	Gasoline
Contact Person:	Not reported
Responsible Party:	THOMAS POTTER
RP Address:	777 E. RIALTO AVENUE
Interim:	Not reported
Oversight Prgm:	LUST
MTBE Class:	C
MTBE Conc:	2
MTBE Fuel:	1
MTBE Tested:	MTBE Detected. Site tested for MTBE and MTBE detected
Staff:	CAB
Staff Initials:	JC3
Lead Agency:	Local Agency
Local Agency:	36000L
Hydr Basin #:	UNNAMED BASIN
Beneficial:	Not reported
Priority:	Not reported
Cleanup Fund Id:	Not reported
Work Suspended:	Not reported
Local Case #:	99066

GLEN HELEN REGIONAL PARK (Continued) **U001576021**

Case Number: 083603456T
Qty Leaked: Not reported
Abate Method: Not reported
Operator: Not reported
Water System Name: Not reported
Well Name: Not reported
Distance To Lust: 0
Waste Discharge Global ID: Not reported
Waste Disch Assigned Name: Not reported
Summary: Not reported

LUST:

Region:	8
Case Type:	Soil only
Cross Street:	Not reported
Enf Type:	Not reported
Funding:	Not reported
How Discovered:	Tank Closure
How Stopped:	Not reported
Leak Cause:	UNK
Leak Source:	UNK
Global ID:	T0607100575
How Stopped Date:	Not reported
Review Date:	1/6/1999
Workplan:	3/26/1999
Prelim Assess:	Not reported
Pollution Char:	Not reported
Remed Plan:	Not reported
Remed Action:	Not reported
Monitoring:	Not reported
Close Date:	Not reported
Discover Date:	1/6/1999
Enforcement Date:	Not reported
Review Date:	5/12/1999
Enter Date:	5/12/1999
MTBE Date:	5/11/2000
GW Qualifies:	=
Soil Qualifies:	=
Max MTBE GW:	7.75
Max MTBE Soil:	792
County:	San Bernardino
Operator:	Not reported
Regional Board:	08
Facility Status:	Preliminary site assessment workplan submitted
Substance:	8006619
Facility Contact:	Not reported
Interim:	Not reported
Oversite Program:	LUST
Latitude:	34.2054698
Longitude:	-117.4108182
MTBE Concentration:	2
MTBE Fuel:	1
MTBE Tested:	YES
Staff:	CAB
Staff Initials:	CB5
Lead Agency:	Local Agency
Local Agency:	36000L

GLEN HELEN REGIONAL PARK (Continued) **U001576021**

Hydr Basin #: UNNAMED BASIN
Beneficial: Not reported
Priority: Not reported
Cleanup Fund Id: Not reported
Work Suspended: Not reported
Local Case Num: 99066
Case Number: 083603456T
Qty Leaked: Not reported
Abate Method: Not reported
MTBE Class: C
Summary: Not reported

Cortese:
Region: CORTESE
Facility Addr2: 2555 GLEN HELEN PKWY

HIST UST:
Region: STATE
Facility ID: 00000023395
Facility Type: Other
Other Type: REGIONAL PARKS DEPT.
Total Tanks: 0002
Contact Name: JOHN TROVILLION
Telephone: 7148873994
Owner Name: COUNTY OF SAN BERNARDINO
Owner Address: 825 E. 3RD STREET
Owner City,St,Zip: SAN BERNARDINO, CA 92415

Tank Num: 001
Container Num: 1
Year Installed: Not reported
Tank Capacity: 00000500
Tank Used for: PRODUCT
Type of Fuel: DIESEL
Tank Construction: Not reported
Leak Detection: Visual, Stock Inventor

Tank Num: 002
Container Num: 2
Year Installed: Not reported
Tank Capacity: 00000500
Tank Used for: PRODUCT
Type of Fuel: UNLEADED
Tank Construction: Not reported
Leak Detection: Visual, Stock Inventor

San Bern. Co. Permit:
Region: SAN BERNARDINO
Facility ID: FA0002293
Owner: SB COUNTY FLEET MANAGEMENT
Permit Number: PT0003424
Permit Category: HAZMAT HANDLER 0-10 EMPLOYEES
Facility Status: ACTIVE
Expiration Date: 7/31/2008 12:00:00AM

Region: SAN BERNARDINO

GLEN HELEN REGIONAL PARK (Continued) **U001576021**

Facility ID: FA0002293
Owner: SB COUNTY FLEET MANAGEMENT
Permit Number: PT0003423
Permit Category: ABOVEGROUND PETROLEUM STORAGE (AST) (SPCC)
Facility Status: ACTIVE
Expiration Date: 7/31/2008 12:00:00AM

Region: SAN BERNARDINO
Facility ID: FA0002293
Owner: SB COUNTY FLEET MANAGEMENT
Permit Number: PT0012760
Permit Category: CALARP FACILITY PERMIT
Facility Status: INACTIVE
Expiration Date: 7/31/2002 12:00:00AM

Region: SAN BERNARDINO
Facility ID: FA0002293
Owner: SB COUNTY FLEET MANAGEMENT
Permit Number: PT0012762
Permit Category: EPCRA FACILITY (RIGHT TO KNOW PLAN)
Facility Status: INACTIVE
Expiration Date: 7/31/2002 12:00:00AM

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2 **RENAISSANCE PLEASURE FAIRE** **San Bern. Co. Permit** **S106544699**
2555 GLEN HELEN PKY **N/A**
SAN BERNARDINO, CA 92407

San Bern. Co. Permit:
Region: SAN BERNARDINO
Facility ID: FA0008937
Owner: RENSAISSANCE ENTERTAINMENT COR
Permit Number: PT0015000
Permit Category: HAZMAT HANDLER 0-10 EMPLOYEES
Facility Status: INACTIVE
Expiration Date: 8/31/2005 12:00:00AM

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3 **CHMIRS** **S100218432**
I-5 S/DEVORE RD **N/A**
UNINC, CA

CHMIRS:
OES Incident Number: 8910306
OES notification: Not reported
OES Date: Not reported
OES Time: Not reported
Incident Date: 16-APR-89
Date Completed: 16-APR-89
Property Use: 961
Agency Id Number: 66860
Agency Incident Number: 115
Time Notified: 300
Time Completed: 630
Surrounding Area: Not reported
Estimated Temperature: Not reported
Property Management: S
Special Studies 1: Not reported

(Continued) **S100218432**

Special Studies 2:	Not reported
Special Studies 3:	Not reported
Special Studies 4:	Not reported
Special Studies 5:	Not reported
Special Studies 6:	Not reported
More Than Two Substances Involved?:	N
Resp Agncy Personel # Of Decontaminated:	0
Responding Agency Personel # Of Injuries:	0
Responding Agency Personel # Of Fatalities:	0
Others Number Of Decontaminated:	0
Others Number Of Injuries:	0
Others Number Of Fatalities:	0
Vehicle Make/year:	Not reported
Vehicle License Number:	Not reported
Vehicle State:	Not reported
Vehicle Id Number:	Not reported
CA/DOT/PUC/ICC Number:	114273
Company Name:	CST INC
Reporting Officer Name/ID:	L. ACEVEDO #8721
Report Date:	16-MAY-89
Comments:	Not reported
Facility Telephone:	916 327-3310
Waterway Involved:	Not reported
Waterway:	Not reported
Spill Site:	Not reported
Cleanup By:	Not reported
Containment:	Not reported
What Happened:	Not reported
Type:	Not reported
Measure:	Not reported
Other:	Not reported
Date/Time:	Not reported
Year:	88-92
Agency:	Not reported
Incident Date:	Not reported
Admin Agency:	Not reported
Amount:	Not reported
Contained:	Not reported
Site Type:	Not reported
E Date:	09-MAY-90
Substance:	Not reported
Quantity Released:	Not reported
BBLS:	Not reported
Cups:	Not reported
CUFT:	Not reported
Gallons:	Not reported
Grams:	Not reported
Pounds:	Not reported
Liters:	Not reported
Ounces:	Not reported
Pints:	Not reported
Quarts:	Not reported
Sheen:	Not reported
Tons:	Not reported
Unknown:	Not reported
Description:	Not reported
Evacuations:	Not reported

(Continued) **S100218432**

Number of Injuries: Not reported
Number of Fatalities: Not reported
Description: Not reported

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4 **DOVE OIL/SIERRA SHELL**
3740 SIERRA AVE
FONTANA, CA 92335

HAZNET **S101591712**
CA FID UST **N/A**
SWEEPS UST

HAZNET:

Gepaid:	CAC002562402
Contact:	AHMAD (NICK) NIJAKHTAR
Telephone:	8183120212
Facility Addr2:	Not reported
Mailing Name:	Not reported
Mailing Address:	3740 SIERRA AVE
Mailing City,St,Zip:	FONTANA, CA 92336
Gen County:	San Bernardino
TSD EPA ID:	CAT080013352
TSD County:	San Bernardino
Waste Category:	Unspecified oil-containing waste
Disposal Method:	Recycler
Tons:	0.22
Facility County:	San Bernardino

CA FID UST:

Facility ID:	36008713
Regulated By:	UTNKA
Regulated ID:	Not reported
Cortese Code:	Not reported
SIC Code:	Not reported
Facility Phone:	Not reported
Mail To:	Not reported
Mailing Address:	PO BOX 441
Mailing Address 2:	Not reported
Mailing City,St,Zip:	FONTANA 92336
Contact:	Not reported
Contact Phone:	Not reported
DUNs Number:	Not reported
NPDES Number:	Not reported
EPA ID:	Not reported
Comments:	Not reported
Status:	Active

SWEEPS UST:

Status:	A
Comp Number:	15434
Number:	1
Board Of Equalization:	44-035847
Ref Date:	06-28-94
Act Date:	06-28-94
Created Date:	06-28-94
Tank Status:	A
Owner Tank Id:	1
Swrcb Tank Id:	36-000-015434-000001
Actv Date:	06-28-94
Capacity:	10000
Tank Use:	M.V. FUEL

DOVE OIL/SIERRA SHELL (Continued) **S101591712**

Stg:	P
Content:	REG UNLEADED
Number Of Tanks:	3

Status:	A
Comp Number:	15434
Number:	1
Board Of Equalization:	44-035847
Ref Date:	06-28-94
Act Date:	06-28-94
Created Date:	06-28-94
Tank Status:	A
Owner Tank Id:	2
Swrcb Tank Id:	36-000-015434-000002
Actv Date:	06-28-94
Capacity:	10000
Tank Use:	M.V. FUEL
Stg:	P
Content:	PRM UNLEADED
Number Of Tanks:	Not reported

Status:	A
Comp Number:	15434
Number:	1
Board Of Equalization:	44-035847
Ref Date:	06-28-94
Act Date:	06-28-94
Created Date:	06-28-94
Tank Status:	A
Owner Tank Id:	3
Swrcb Tank Id:	36-000-015434-000003
Actv Date:	06-28-94
Capacity:	1000
Tank Use:	M.V. FUEL
Stg:	P
Content:	PRM UNLEADED
Number Of Tanks:	Not reported

Status:	A
Comp Number:	15435
Number:	2
Board Of Equalization:	44-020611
Ref Date:	07-28-92
Act Date:	07-28-92
Created Date:	09-21-88
Tank Status:	A
Owner Tank Id:	Not reported
Swrcb Tank Id:	36-000-015435-000001
Actv Date:	09-21-88
Capacity:	1
Tank Use:	UNKNOWN
Stg:	P
Content:	UNKNOWN
Number Of Tanks:	1

4 **SIERRA SHELL**
3740 SIERRA AVE
FONTANA, CA 92336

UST **U004050767**
N/A

UST:
Local Agency: 36000
Facility ID: 88015434

---

4 **SIERRA MOBILE**
3740 SIERRA AVE
FONTANA, CA 92335

HAZNET **S102039398**
N/A

HAZNET:
Gepaid: CAC002207201
Contact: TONY PARSA
Telephone: 0000000000
Facility Addr2: Not reported
Mailing Name: Not reported
Mailing Address: 3740 SIERRA AVE
Mailing City,St,Zip: FONTANA, CA 923350000
Gen County: San Bernardino
TSD EPA ID: CAT080033681
TSD County: Los Angeles
Waste Category: Other inorganic solid waste
Disposal Method: Disposal, Land Fill
Tons: .3500
Facility County: San Bernardino

Gepaid: CAC002207201
Contact: TONY PARSA
Telephone: 0000000000
Facility Addr2: Not reported
Mailing Name: Not reported
Mailing Address: 3740 SIERRA AVE
Mailing City,St,Zip: FONTANA, CA 923350000
Gen County: San Bernardino
TSD EPA ID: CAD099452708
TSD County: Los Angeles
Waste Category: Waste oil and mixed oil
Disposal Method: Recycler
Tons: .2085
Facility County: San Bernardino

---

4 **SAM'S GAS**
3740 SIERRA AVE
FONTANA, CA 92336

San Bern. Co. Permit **S105697540**
N/A

San Bern. Co. Permit:
Region: SAN BERNARDINO
Facility ID: FA0006181
Owner: BASEM R. GATAS
Permit Number: PT0011025
Permit Category: UST OWNERSHIP/OPERATING PERMIT (PER UST)
Facility Status: ACTIVE
Expiration Date: 7/31/2008 12:00:00AM

SAM'S GAS (Continued) **S105697540**

Region: SAN BERNARDINO
Facility ID: FA0006181
Owner: BASEM R. GATAS
Permit Number: PT0003705
Permit Category: SPECIAL HANDLER
Facility Status: ACTIVE
Expiration Date: 7/31/2008 12:00:00AM

Region: SAN BERNARDINO
Facility ID: FA0006181
Owner: BASEM R. GATAS
Permit Number: PT0011024
Permit Category: UST OWNERSHIP/OPERATING PERMIT (PER UST)
Facility Status: ACTIVE
Expiration Date: 7/31/2008 12:00:00AM

Region: SAN BERNARDINO
Facility ID: FA0006181
Owner: BASEM R. GATAS
Permit Number: PT0011023
Permit Category: UST OWNERSHIP/OPERATING PERMIT (PER UST)
Facility Status: ACTIVE
Expiration Date: 7/31/2008 12:00:00AM

---

5 **SIERRA FONTANA INVESTMENTS LLC** **HAZNET** **S104572904**
3892 SIERRA AVE **N/A**
FONTANA, CA 92335

HAZNET:
Gepaid: CAC002228689
Contact: ARCO CO
Telephone: 5626631600
Facility Addr2: Not reported
Mailing Name: Not reported
Mailing Address: 4 CENTER POINT DR
Mailing City,St,Zip: LA PALMA, CA 906230000
Gen County: San Bernardino
TSD EPA ID: CAT080013352
TSD County: Los Angeles
Waste Category: Tank bottom waste
Disposal Method: Recycler
Tons: 0.6255
Facility County: San Bernardino

Gepaid: CAL000207571
Contact: SIERRA SERVICES STATION INC
Telephone: 0000000000
Facility Addr2: Not reported
Mailing Name: Not reported
Mailing Address: 800 SERFAS CLUB DR
Mailing City,St,Zip: CORONA, CA 928820000
Gen County: San Bernardino
TSD EPA ID: CAT080013352
TSD County: Los Angeles
Waste Category: Aqueous solution with less than 10% total organic residues
Disposal Method: Recycler
Tons: 3.3360
Facility County: San Bernardino

SIERRA FONTANA INVESTMENTS LLC (Continued) **S104572904**

Gepaid:	CAL000272153
Contact:	ELIZABETH RODRIGUEZ/BKKP/EX: 5
Telephone:	9092803833
Facility Addr2:	Not reported
Mailing Name:	Not reported
Mailing Address:	PO BOX 1958
Mailing City,St,Zip:	CORONA, CA 92878
Gen County:	San Bernardino
TSD EPA ID:	CAT080013352
TSD County:	San Bernardino
Waste Category:	Unspecified aqueous solution
Disposal Method:	Recycler
Tons:	1.37
Facility County:	San Bernardino

---

5 **SIERRA FONTANA INVESTMENT** **UST** **U003785470**
3892 SIERRA AVE **San Bern. Co. Permit** **N/A**
FONTANA, CA 92336

UST:

Local Agency:	36000
Facility ID:	98046265

San Bern. Co. Permit:

Region:	SAN BERNARDINO
Facility ID:	FA0006174
Owner:	DHALIUSAL, JATINDERPAL S.
Permit Number:	PT0010673
Permit Category:	UST OWNERSHIP/OPERATING PERMIT (PER UST)
Facility Status:	ACTIVE
Expiration Date:	3/31/2008 12:00:00AM

Region:	SAN BERNARDINO
Facility ID:	FA0006174
Owner:	DHALIUSAL, JATINDERPAL S.
Permit Number:	PT0010675
Permit Category:	UST OWNERSHIP/OPERATING PERMIT (PER UST)
Facility Status:	ACTIVE
Expiration Date:	3/31/2008 12:00:00AM

Region:	SAN BERNARDINO
Facility ID:	FA0006174
Owner:	DHALIUSAL, JATINDERPAL S.
Permit Number:	PT0010674
Permit Category:	UST OWNERSHIP/OPERATING PERMIT (PER UST)
Facility Status:	ACTIVE
Expiration Date:	3/31/2008 12:00:00AM

Region:	SAN BERNARDINO
Facility ID:	FA0006174
Owner:	DHALIUSAL, JATINDERPAL S.
Permit Number:	PT0010672
Permit Category:	UST OWNERSHIP/OPERATING PERMIT (PER UST)
Facility Status:	ACTIVE
Expiration Date:	3/31/2008 12:00:00AM

Region: SAN BERNARDINO

SIERRA FONTANA INVESTMENT (Continued) **U003785470**

Facility ID: FA0006174
Owner: DHALIUSAL, JATINDERPAL S.
Permit Number: PT0009354
Permit Category: HAZMAT HANDLER - UST ONLY
Facility Status: ACTIVE
Expiration Date: 3/31/2008 12:00:00AM

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5 **MIDLAND OIL CO (ARCO)** **HAZNET** **S108213928**
3892 SIERRA AVE **N/A**
FONTANA, CA 92336

HAZNET:
Gepaid: CAL000290268
Contact: PAUL DHALIWAL
Telephone: 9094297886
Facility Addr2: Not reported
Mailing Name: Not reported
Mailing Address: 3892 SIERRA AVE
Mailing City,St,Zip: FONTANA, CA 923361157
Gen County: San Bernardino
TSD EPA ID: CAT080013352
TSD County: Los Angeles
Waste Category: Unspecified aqueous solution
Disposal Method: Not reported
Tons: 0.41
Facility County: Not reported

---

5 **MC DONALDS/CHEVRON** **San Bern. Co. Permit** **S106803260**
3870 SIERRA AVE **N/A**
FONTANA, CA 92335

San Bern. Co. Permit:
Region: SAN BERNARDINO
Facility ID: FA0007791
Owner: USPETRO, INC
Permit Number: PT0016262
Permit Category: UST OWNERSHIP/OPERATING PERMIT (PER UST)
Facility Status: ACTIVE
Expiration Date: 3/31/2007 12:00:00AM

Region: SAN BERNARDINO
Facility ID: FA0007791
Owner: USPETRO, INC
Permit Number: PT0016261
Permit Category: UST OWNERSHIP/OPERATING PERMIT (PER UST)
Facility Status: ACTIVE
Expiration Date: 3/31/2007 12:00:00AM

Region: SAN BERNARDINO
Facility ID: FA0007791
Owner: USPETRO, INC
Permit Number: PT0016259
Permit Category: HAZMAT HANDLER - UST ONLY
Facility Status: ACTIVE
Expiration Date: 3/31/2008 12:00:00AM

MC DONALDS/CHEVRON (Continued) **S106803260**

Region: SAN BERNARDINO
Facility ID: FA0007791
Owner: USPETRO, INC
Permit Number: PT0016260
Permit Category: UST OWNERSHIP/OPERATING PERMIT (PER UST)
Facility Status: ACTIVE
Expiration Date: 3/31/2007 12:00:00AM

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5 **SIERRA SHELL #68534**
3864 SIERRA AVE
FONTANA, CA 92336

San Bern. Co. Permit **S105047979**
N/A

San Bern. Co. Permit:
Region: SAN BERNARDINO
Facility ID: FA0006645
Owner: TESORO SOUTH COAST COMPANY, LL
Permit Number: PT0012589
Permit Category: UST OWNERSHIP/OPERATING PERMIT (PER UST)
Facility Status: ACTIVE
Expiration Date: 8/31/2007 12:00:00AM

Region: SAN BERNARDINO
Facility ID: FA0006645
Owner: TESORO SOUTH COAST COMPANY, LL
Permit Number: PT0012588
Permit Category: UST OWNERSHIP/OPERATING PERMIT (PER UST)
Facility Status: ACTIVE
Expiration Date: 8/31/2007 12:00:00AM

Region: SAN BERNARDINO
Facility ID: FA0006645
Owner: TESORO SOUTH COAST COMPANY, LL
Permit Number: PT0012590
Permit Category: UST OWNERSHIP/OPERATING PERMIT (PER UST)
Facility Status: ACTIVE
Expiration Date: 8/31/2007 12:00:00AM

Region: SAN BERNARDINO
Facility ID: FA0006645
Owner: TESORO SOUTH COAST COMPANY, LL
Permit Number: PT0000958
Permit Category: HAZMAT HANDLER - UST ONLY
Facility Status: ACTIVE
Expiration Date: 8/31/2007 12:00:00AM

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5 **SHELL SERVICE STATION**
3864 SIERRA AVE
FONTANA, CA 92336

RCRA-SQG **1006805124**
FINDS **CAR000123745**
HAZNET

RCRA-SQG:
Date form received by agency: 08/16/2002
Facility name: SHELL SERVICE STATION
Facility address: 3864 SIERRA AVE
S A P NO 121318
FONTANA, CA 923361157
EPA ID: CAR000123745

SHELL SERVICE STATION (Continued) **1006805124**

Mailing address:	P O BOX 2648 HOUSTON, TX 772522648
Contact:	SONDRA BIENVENU
Contact address:	P O BOX 2648 HOUSTON, TX 772522648
Contact country:	US
Contact telephone:	(713) 241-5036
Contact email:	Not reported
EPA Region:	09
Classification:	Small Small Quantity Generator
Description:	Handler: generates more than 100 and less than 1000 kg of hazardous waste during any calendar month and accumulates less than 6000 kg of hazardous waste at any time; or generates 100 kg or less of hazardous waste during any calendar month, and accumulates more than 1000 kg of hazardous waste at any time

Owner/Operator Summary:

Owner/operator name:	EQUILON ENT LLC DBA SHELL
Owner/operator address:	P O BOX 2648 HOUSTON, TX 77252
Owner/operator country:	Not reported
Owner/operator telephone:	(713) 241-5036
Legal status:	Private
Owner/Operator Type:	Owner
Owner/Op start date:	Not reported
Owner/Op end date:	Not reported

Handler Activities Summary:

U.S. importer of hazardous waste:	Unknown
Mixed waste (haz. and radioactive):	Unknown
Recycler of hazardous waste:	No
Transporter of hazardous waste:	No
Treater, storer or disposer of HW:	No
Underground injection activity:	No
On-site burner exemption:	Unknown
Furnace exemption:	Unknown
Used oil fuel burner:	No
Used oil processor:	No
User oil refiner:	No
Used oil fuel marketer to burner:	No
Used oil Specification marketer:	No
Used oil transfer facility:	No
Used oil transporter:	No
Off-site waste receiver:	Commercial status unknown

Hazardous Waste Summary:

Waste code:	D001
Waste name:	IGNITABLE HAZARDOUS WASTES ARE THOSE WASTES WHICH HAVE A FLASHPOINT OF LESS THAN 140 DEGREES FAHRENHEIT AS DETERMINED BY A PENSKY-MARTENS CLOSED CUP FLASH POINT TESTER. ANOTHER METHOD OF DETERMINING THE FLASH POINT OF A WASTE IS TO REVIEW THE MATERIAL SAFETY DATA SHEET, WHICH CAN BE OBTAINED FROM THE MANUFACTURER OR DISTRIBUTOR OF THE MATERIAL. LACQUER THINNER IS AN EXAMPLE OF A COMMONLY USED SOLVENT WHICH WOULD BE CONSIDERED AS IGNITABLE HAZARDOUS WASTE.
Waste code:	D018

SHELL SERVICE STATION (Continued) **1006805124**

Waste name: BENZENE

Violation Status: No violations found

FINDS:

Other Pertinent Environmental Activity Identified at Site

California - Hazardous Waste Tracking System - Datamart

RCRAInfo is a national information system that supports the Resource Conservation and Recovery Act (RCRA) program through the tracking of events and activities related to facilities that generate, transport, and treat, store, or dispose of hazardous waste. RCRAInfo allows RCRA program staff to track the notification, permit, compliance, and corrective action activities required under RCRA.

HAZNET:

Gepaid:	CAR000123745
Contact:	N CORTEZ/ENVT'L DATA ANALYST
Telephone:	2818742224
Facility Addr2:	Not reported
Mailing Name:	Not reported
Mailing Address:	12700 NORTHBOROUGH DRIVE MFT 240-G
Mailing City,St,Zip:	Houston, TX 770672508
Gen County:	San Bernardino
TSD EPA ID:	CAD008364432
TSD County:	Los Angeles
Waste Category:	Other organic solids
Disposal Method:	Recycler
Tons:	0.01
Facility County:	Not reported

Gepaid:	CAR000123745
Contact:	R HULL/ENV. REPORTING ANALYST
Telephone:	2818742224
Facility Addr2:	Not reported
Mailing Name:	Not reported
Mailing Address:	12700 NORTHBOROUGH DR 300G03
Mailing City,St,Zip:	Houston, TX 770670000
Gen County:	San Bernardino
TSD EPA ID:	CAD028409019
TSD County:	Los Angeles
Waste Category:	Other organic solids
Disposal Method:	Transfer Station
Tons:	0.13
Facility County:	San Bernardino

Gepaid:	CAR000123745
Contact:	Sondra Bienvenu
Telephone:	7132415036
Facility Addr2:	Not reported
Mailing Name:	Not reported
Mailing Address:	PO BOX 2648
Mailing City,St,Zip:	Houston, TX 772522648
Gen County:	San Bernardino
TSD EPA ID:	Not reported

SHELL SERVICE STATION (Continued) **1006805124**

TSD County:	Los Angeles
Waste Category:	Tank bottom waste
Disposal Method:	Treatment, Tank
Tons:	0.44
Facility County:	Not reported

Gepaid:	CAR000123745
Contact:	N CORTEZ/ENVT'L DATA ANALYST
Telephone:	2818742224
Facility Addr2:	Not reported
Mailing Name:	Not reported
Mailing Address:	12700 NORTHBOROUGH DRIVE MFT 240-G
Mailing City,St,Zip:	Houston, TX 770672508
Gen County:	San Bernardino
TSD EPA ID:	CAD008364432
TSD County:	Los Angeles
Waste Category:	Other organic solids
Disposal Method:	Recycler
Tons:	0.01
Facility County:	Not reported

Click this hyperlink while viewing on your computer to access
-1 additional CA_HAZNET: record(s) in the EDR Site Report.

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6 **ARROWHEAD SEPTIC**
3344 LOCUST AVE
RIALTO, CA 92376

CA FID UST **S101591633**
SWEEPS UST **N/A**

CA FID UST:

Facility ID:	36008544
Regulated By:	UTNKA
Regulated ID:	Not reported
Cortese Code:	Not reported
SIC Code:	Not reported
Facility Phone:	Not reported
Mail To:	Not reported
Mailing Address:	3344 LOCUST AVE
Mailing Address 2:	Not reported
Mailing City,St,Zip:	RIALTO 92376
Contact:	Not reported
Contact Phone:	Not reported
DUNs Number:	Not reported
NPDES Number:	Not reported
EPA ID:	Not reported
Comments:	Not reported
Status:	Active

SWEEPS UST:

Status:	A
Comp Number:	11169
Number:	1
Board Of Equalization:	Not reported
Ref Date:	03-24-92
Act Date:	03-24-92
Created Date:	09-13-88
Tank Status:	A
Owner Tank Id:	Not reported

ARROWHEAD SEPTIC (Continued) **S101591633**

Swrcb Tank Id:	36-000-011169-000001
Actv Date:	09-13-88
Capacity:	1
Tank Use:	UNKNOWN
Stg:	P
Content:	UNKNOWN
Number Of Tanks:	1

---

7 **ENGINEERED FIBERGLASS INC.**
3122 RIVERSIDE AVE
RIALTO, CA 92376

HIST UST **U001575535**
N/A

HIST UST:

Region:	STATE
Facility ID:	00000001816
Facility Type:	Other
Other Type:	FIBERGLASS COMPONENT
Total Tanks:	0008
Contact Name:	PAUL HAGEDORN
Telephone:	7148776761
Owner Name:	ENGINEERED FIBERGLASS INC.
Owner Address:	3122 S. RIVERSIDE AVE.
Owner City,St,Zip:	RIALTO, CA 92376
Tank Num:	001
Container Num:	ULD935692
Year Installed:	1981
Tank Capacity:	00002000
Tank Used for:	PRODUCT
Type of Fuel:	DIESEL
Tank Construction:	3 gauge
Leak Detection:	Stock Inventor
Tank Num:	002
Container Num:	ULC123709
Year Installed:	1981
Tank Capacity:	00005000
Tank Used for:	PRODUCT
Type of Fuel:	REGULAR
Tank Construction:	3 gauge
Leak Detection:	Stock Inventor
Tank Num:	003
Container Num:	ULF859991
Year Installed:	1981
Tank Capacity:	00005000
Tank Used for:	PRODUCT
Type of Fuel:	REGULAR
Tank Construction:	3 gauge
Leak Detection:	Stock Inventor
Tank Num:	004
Container Num:	ULE196409
Year Installed:	1981
Tank Capacity:	00005000
Tank Used for:	PRODUCT
Type of Fuel:	Not reported
Tank Construction:	3 gauge

ENGINEERED FIBERGLASS INC. (Continued) **U001575535**

Leak Detection: Stock Inventor

Tank Num: 005
Container Num: ULF859978
Year Installed: 1981
Tank Capacity: 00005000
Tank Used for: PRODUCT
Type of Fuel: Not reported
Tank Construction: 3 gauge
Leak Detection: Stock Inventor

Tank Num: 006
Container Num: G105485
Year Installed: 1981
Tank Capacity: 00006000
Tank Used for: PRODUCT
Type of Fuel: Not reported
Tank Construction: 3 gauge
Leak Detection: Stock Inventor

Tank Num: 007
Container Num: ULC750779
Year Installed: 1981
Tank Capacity: 00006000
Tank Used for: PRODUCT
Type of Fuel: Not reported
Tank Construction: 3 gauge
Leak Detection: Stock Inventor

Tank Num: 008
Container Num: ULC500093
Year Installed: 1981
Tank Capacity: 00006000
Tank Used for: PRODUCT
Type of Fuel: Not reported
Tank Construction: 3 gauge
Leak Detection: Stock Inventor

---

7 **FONTANA POWERHOUSE**
3165 N RIVERSIDE AVE
RIALTO, CA 92377

San Bern. Co. Permit **S108087272**
N/A

San Bern. Co. Permit:
Region: SAN BERNARDINO
Facility ID: FA0006045
Owner: SOUTHERN CALIFORNIA EDISON
Permit Number: PT0018014
Permit Category: HAZMAT HANDLER 0-10 EMPLOYEES
Facility Status: ACTIVE
Expiration Date: 9/30/2008 12:00:00AM

7 **S.C.E.**
3165 N RIVERSIDE AVE
RIALTO, CA 92316

SWEEPS UST **S106931703**
N/A

SWEEPS UST:

Status:	Not reported
Comp Number:	30318
Number:	Not reported
Board Of Equalization:	Not reported
Ref Date:	Not reported
Act Date:	Not reported
Created Date:	Not reported
Tank Status:	Not reported
Owner Tank Id:	Not reported
Swrcb Tank Id:	36-000-030318-000001
Actv Date:	Not reported
Capacity:	1000
Tank Use:	M.V. FUEL
Stg:	PRODUCT
Content:	REG UNLEADED
Number Of Tanks:	1

---

7 **LYTLE CREEK PLANT**
3221 N RIVERSIDE AVE
RIALTO, CA 92335

AST **A100302142**
N/A

AST:

Owner:	CEMEX
Total Gallons:	6220

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7 **CEMEX**
3221 N RIVERSIDE AVE
RIALTO, CA

SLIC **S108542911**
N/A

SLIC:

Type:	AST
Facility Status:	A
Region:	8
Staff:	EGK
Description Information:	SPCC PLAN - LYTLE CREEK
Date:	THRU
Order No:	Not reported
Npdes No:	Not reported
File Type:	UNREG
Sequency:	01

7 **LYTLE CREEK**
3221 N RIVERSIDE AVE
RIALTO, CA 92376

HIST UST **U001575544**
N/A

HIST UST:

Region:	STATE
Facility ID:	00000000823
Facility Type:	Other
Other Type:	AGGREGATE PRODUCTION
Total Tanks:	0002
Contact Name:	MARK OSBORN
Telephone:	7146861610
Owner Name:	OWL ROCK PRODUCTS CO.
Owner Address:	5435 PECK ROAD
Owner City,St,Zip:	ARCADIA, CA 91006

Tank Num:	001
Container Num:	79
Year Installed:	Not reported
Tank Capacity:	00010000
Tank Used for:	PRODUCT
Type of Fuel:	UNLEADED
Tank Construction:	Not reported
Leak Detection:	Stock Inventor

Tank Num:	002
Container Num:	53
Year Installed:	Not reported
Tank Capacity:	00010000
Tank Used for:	PRODUCT
Type of Fuel:	DIESEL
Tank Construction:	Not reported
Leak Detection:	Stock Inventor

---

7 **OWL ROCK PRODUCTS**
3221 RIVERSIDE AVE
RIALTO, CA 92376

LUST **S105025768**
Cortese **N/A**
San Bern. Co. Permit

LUST:

Region:	STATE
Case Type:	Soil only
Cross Street:	SIERRA
Enf Type:	Not reported
Funding:	CLOS
How Discovered:	Tank Closure
How Stopped:	Not reported
Leak Cause:	UNK
Leak Source:	UNK
Global Id:	T0607100299
Stop Date:	1993-07-09 00:00:00
Confirm Leak:	Not reported
Workplan:	1993-07-09 00:00:00
Prelim Assess:	1993-07-23 00:00:00
Pollution Char:	Not reported
Remed Plan:	Not reported
Remed Action:	Not reported
Monitoring:	Not reported
Close Date:	1994-01-24 00:00:00
Discover Date:	1993-07-09 00:00:00
Enforcement Dt:	Not reported

OWL ROCK PRODUCTS (Continued) **S105025768**

Release Date:	1993-07-28 00:00:00
Review Date:	Not reported
Enter Date:	1993-12-22 00:00:00
MTBE Date:	Not reported
GW Qualifier:	Not reported
Soil Qualifier:	Not reported
Max MTBE GW ppb:	Not reported
Max MTBE Soil ppb:	Not reported
County:	36
Org Name:	Not reported
Reg Board:	Santa Ana Region
Status:	Case Closed
Chemical:	Diesel
Contact Person:	Not reported
Responsible Party:	OWL ROCK PRODUCTS
RP Address:	P.O. BOX 330, ARCADIA CA 91006
Interim:	Yes
Oversight Prgm:	LUST
MTBE Class:	*
MTBE Conc:	0
MTBE Fuel:	0
MTBE Tested:	Not Required to be Tested.
Staff:	NOM
Staff Initials:	CR2
Lead Agency:	Local Agency
Local Agency:	36000L
Hydr Basin #:	UPPER SANTA ANA VALL
Beneficial:	Not reported
Priority:	Not reported
Cleanup Fund Id:	Not reported
Work Suspended:	Not reported
Local Case #:	93035
Case Number:	083602346T
Qty Leaked:	Not reported
Abate Method:	Excavate and Dispose - remove contaminated soil and dispose in approved site
Operator:	Not reported
Water System Name:	Not reported
Well Name:	Not reported
Distance To Lust:	0
Waste Discharge Global ID:	Not reported
Waste Disch Assigned Name:	Not reported
Summary:	Not reported

LUST:

Region:	8
Case Type:	Soil only
Cross Street:	SIERRA
Enf Type:	CLOS
Funding:	Not reported
How Discovered:	Tank Closure
How Stopped:	Not reported
Leak Cause:	UNK
Leak Source:	UNK
Global ID:	T0607100299
How Stopped Date:	7/9/1993
Review Date:	Not reported

OWL ROCK PRODUCTS (Continued) **S105025768**

Facility Status: ACTIVE
Expiration Date: 2/28/2008 12:00:00AM

Region: SAN BERNARDINO
Facility ID: FA0008065
Owner: MATICH CORP
Permit Number: PT0014169
Permit Category: SPECIAL GENERATOR(B)
Facility Status: ACTIVE
Expiration Date: 2/28/2008 12:00:00AM

Region: SAN BERNARDINO
Facility ID: FA0008065
Owner: MATICH CORP
Permit Number: PT0016559
Permit Category: AST OPERATING PERMIT
Facility Status: ACTIVE
Expiration Date: 2/28/2008 12:00:00AM

Region: SAN BERNARDINO
Facility ID: FA0008065
Owner: MATICH CORP
Permit Number: PT0016558
Permit Category: ABOVEGROUND PETROLEUM STORAGE (AST) (SPCC)
Facility Status: ACTIVE
Expiration Date: 2/28/2008 12:00:00AM

Region: SAN BERNARDINO
Facility ID: FA0008065
Owner: MATICH CORP
Permit Number: PT0014170
Permit Category: SPECIAL HANDLER
Facility Status: ACTIVE
Expiration Date: 2/28/2008 12:00:00AM

Region: SAN BERNARDINO
Facility ID: FA0008065
Owner: MATICH CORP
Permit Number: PT0016560
Permit Category: AST OPERATING PERMIT
Facility Status: INACTIVE
Expiration Date: 2/28/2005 12:00:00AM

---

7 **CEMEX USA CONST MATERIALS**
3221 N RIVERSIDE AVE
RIALTO, CA 92377

UST **U003784635**
San Bern. Co. Permit **N/A**

UST:
Local Agency: 36000
Facility ID: 86008410

San Bern. Co. Permit:
Region: SAN BERNARDINO
Facility ID: FA0001822
Owner: CEMEX USA CONST MATERIALS
Permit Number: PT0001980
Permit Category: ABOVEGROUND PETROLEUM STORAGE (AST) (SPCC)

CEMEX USA CONST MATERIALS (Continued) **U003784635**

Facility Status: ACTIVE
Expiration Date: 7/31/2008 12:00:00AM

Region: SAN BERNARDINO
Facility ID: FA0001822
Owner: CEMEX USA CONST MATERIALS
Permit Number: PT0001978
Permit Category: HAZMAT HANDLER 26-50 EMPLOYEES
Facility Status: ACTIVE
Expiration Date: 7/31/2008 12:00:00AM

Region: SAN BERNARDINO
Facility ID: FA0001822
Owner: CEMEX USA CONST MATERIALS
Permit Number: PT0017618
Permit Category: EPCRA FACILITY (RIGHT TO KNOW PLAN)
Facility Status: ACTIVE
Expiration Date: 7/31/2008 12:00:00AM

Region: SAN BERNARDINO
Facility ID: FA0001822
Owner: CEMEX USA CONST MATERIALS
Permit Number: PT0018384
Permit Category: AST OPERATING PERMIT
Facility Status: ACTIVE
Expiration Date: 7/31/2008 12:00:00AM

Region: SAN BERNARDINO
Facility ID: FA0001822
Owner: CEMEX USA CONST MATERIALS
Permit Number: PT0018383
Permit Category: AST OPERATING PERMIT
Facility Status: ACTIVE
Expiration Date: 7/31/2008 12:00:00AM

Region: SAN BERNARDINO
Facility ID: FA0001822
Owner: CEMEX USA CONST MATERIALS
Permit Number: PT0001979
Permit Category: SPECIAL GENERATOR(B)
Facility Status: ACTIVE
Expiration Date: 7/31/2008 12:00:00AM

Region: SAN BERNARDINO
Facility ID: FA0001822
Owner: CEMEX USA CONST MATERIALS
Permit Number: PT0012178
Permit Category: UST OWNERSHIP/OPERATING PERMIT (PER UST)
Facility Status: INACTIVE
Expiration Date: 7/31/2007 12:00:00AM

Region: SAN BERNARDINO
Facility ID: FA0001822
Owner: CEMEX USA CONST MATERIALS
Permit Number: PT0012177
Permit Category: UST OWNERSHIP/OPERATING PERMIT (PER UST)
Facility Status: INACTIVE

CEMEX USA CONST MATERIALS (Continued) **U003784635**

Expiration Date: 7/31/2007 12:00:00AM

Region: SAN BERNARDINO
Facility ID: FA0001822
Owner: CEMEX USA CONST MATERIALS
Permit Number: PT0012179
Permit Category: UST OWNERSHIP/OPERATING PERMIT (PER UST)
Facility Status: INACTIVE
Expiration Date: 7/31/2007 12:00:00AM

---

7 **OWL ROCK PROD/LYTLE CREEK**
3221 N RIVERSIDE AVE
RIALTO, CA 92376

CA FID UST **1000594210**
SWEEPS UST **N/A**

CA FID UST:
Facility ID: 36001615
Regulated By: UTNKA
Regulated ID: 00000823
Cortese Code: Not reported
SIC Code: Not reported
Facility Phone: Not reported
Mail To: Not reported
Mailing Address: 5435 PECK RD
Mailing Address 2: Not reported
Mailing City,St,Zip: RIALTO 92376
Contact: Not reported
Contact Phone: Not reported
DUNs Number: Not reported
NPDES Number: Not reported
EPA ID: Not reported
Comments: Not reported
Status: Active

SWEEPS UST:
Status: A
Comp Number: 8410
Number: 9
Board Of Equalization: 44-019779
Ref Date: 07-30-93
Act Date: 06-14-94
Created Date: 02-29-88
Tank Status: A
Owner Tank Id: 79
Swrcb Tank Id: 36-000-008410-000001
Actv Date: 08-26-88
Capacity: 10000
Tank Use: M.V. FUEL
Stg: P
Content: REG UNLEADED
Number Of Tanks: 1

Status: Not reported
Comp Number: 8410
Number: Not reported
Board Of Equalization: 44-019779
Ref Date: Not reported
Act Date: Not reported

OWL ROCK PROD/LYTLE CREEK (Continued) **1000594210**

Created Date:	Not reported
Tank Status:	Not reported
Owner Tank Id:	Not reported
Swrcb Tank Id:	36-000-008410-000002
Actv Date:	Not reported
Capacity:	10000
Tank Use:	M.V. FUEL
Stg:	PRODUCT
Content:	DIESEL
Number Of Tanks:	6

Status:	Not reported
Comp Number:	8410
Number:	Not reported
Board Of Equalization:	44-019779
Ref Date:	Not reported
Act Date:	Not reported
Created Date:	Not reported
Tank Status:	Not reported
Owner Tank Id:	Not reported
Swrcb Tank Id:	36-000-008410-000003
Actv Date:	Not reported
Capacity:	10000
Tank Use:	M.V. FUEL
Stg:	PRODUCT
Content:	DIESEL
Number Of Tanks:	Not reported

Status:	Not reported
Comp Number:	8410
Number:	Not reported
Board Of Equalization:	44-019779
Ref Date:	Not reported
Act Date:	Not reported
Created Date:	Not reported
Tank Status:	Not reported
Owner Tank Id:	Not reported
Swrcb Tank Id:	36-000-008410-000004
Actv Date:	Not reported
Capacity:	1000
Tank Use:	OIL
Stg:	PRODUCT
Content:	90 WEIGHT OI
Number Of Tanks:	Not reported

Status:	Not reported
Comp Number:	8410
Number:	Not reported
Board Of Equalization:	44-019779
Ref Date:	Not reported
Act Date:	Not reported
Created Date:	Not reported
Tank Status:	Not reported
Owner Tank Id:	Not reported
Swrcb Tank Id:	36-000-008410-000005
Actv Date:	Not reported
Capacity:	1000

OWL ROCK PROD/LYTLE CREEK (Continued) **1000594210**

Tank Use:	OIL
Stg:	PRODUCT
Content:	10 WEIGHT OI
Number Of Tanks:	Not reported

Status:	Not reported
Comp Number:	8410
Number:	Not reported
Board Of Equalization:	44-019779
Ref Date:	Not reported
Act Date:	Not reported
Created Date:	Not reported
Tank Status:	Not reported
Owner Tank Id:	Not reported
Swrcb Tank Id:	36-000-008410-000006
Actv Date:	Not reported
Capacity:	3000
Tank Use:	OIL
Stg:	PRODUCT
Content:	30 WEIGHT MO
Number Of Tanks:	Not reported

Status:	Not reported
Comp Number:	8410
Number:	Not reported
Board Of Equalization:	44-019779
Ref Date:	Not reported
Act Date:	Not reported
Created Date:	Not reported
Tank Status:	Not reported
Owner Tank Id:	Not reported
Swrcb Tank Id:	36-000-008410-000007
Actv Date:	Not reported
Capacity:	5000
Tank Use:	OIL
Stg:	WASTE
Content:	WASTE OIL
Number Of Tanks:	Not reported

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8 **GWK**
3196 NORTH LOCUST AVENUE
RIALTO, CA 92377

CERCLIS **1007211136**
CAN000906051

CERCLIS:

Site ID:	0906051
Federal Facility:	Not a Federal Facility
NPL Status:	Not on the NPL
Non NPL Status:	Other Cleanup Activity: State-Lead Cleanup

CERCLIS Site Contact Name(s):

Contact Name:	Matt Mitguard
Contact Tel:	(415) 972-3096
Contact Title:	Site Assessment Manager (SAM)

Contact Name:	Dawn Richmond
Contact Tel:	(415) 972-3097
Contact Title:	Site Assessment Manager (SAM)

GWK (Continued) **1007211136**

Contact Name: Dan McMindes
Contact Tel: (415) 972-3401
Contact Title: Site Assessment Manager (SAM)

Contact Name: Dawn Richmond
Contact Tel: (415) 972-3097
Contact Title: Site Assessment Manager (SAM)

Contact Name: Nuria Muniz
Contact Tel: (415) 972-3811
Contact Title: Site Assessment Manager (SAM)

Site Description: Site is a 160 acre area on the Rialto-Colton Plume, Rialto, CA.

CERCLIS Assessment History:

Action: DISCOVERY
Date Started: Not reported
Date Completed: 11/20/2003
Priority Level: Not reported

Action: PRE-CERCLIS SCREENING
Date Started: Not reported
Date Completed: 11/20/2003
Priority Level: Not reported

Action: PRELIMINARY ASSESSMENT
Date Started: Not reported
Date Completed: 08/11/2006
Priority Level: Low

Action: SITE INSPECTION
Date Started: Not reported
Date Completed: 08/11/2006
Priority Level: Low

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8 **AMERICAN PROMOTIONAL EVENTS, INC.**
3196 NORTH LOCUST
RIALTO, CA

SLIC **S106487213**
N/A

SLIC:

Region: STATE
Global Id: SL0607121147
Assigned Name: SLICSITE
Lead Agency Contact: Not reported
Lead Agency: Not reported
Lead Agency Case Number: Not reported
Responsible Party: Not reported
Recent Dtw: Not reported
Substance Released: PER
Facility Status: Not reported

8 **PYRO SPECTACULARS**
3196 NORTH LOCUST AVENUE
RIALTO, CA 92377

CERCLIS **1006932052**
CAN000905987

CERCLIS:

Site ID:	0905987
Federal Facility:	Not a Federal Facility
NPL Status:	Not on the NPL
Non NPL Status:	Addressed as Part of Another non-NPL Site

CERCLIS Site Contact Name(s):

Contact Name:	Dawn Richmond
Contact Tel:	(415) 972-3097
Contact Title:	Site Assessment Manager (SAM)
Contact Name:	Matt Mitguard
Contact Tel:	(415) 972-3096
Contact Title:	Site Assessment Manager (SAM)
Contact Name:	Dan McMindes
Contact Tel:	(415) 972-3401
Contact Title:	Site Assessment Manager (SAM)
Contact Name:	Dawn Richmond
Contact Tel:	(415) 972-3097
Contact Title:	Site Assessment Manager (SAM)
Contact Name:	Nuria Muniz
Contact Tel:	(415) 972-3811
Contact Title:	Site Assessment Manager (SAM)

Site Description: RIALTO COLTONPart of the GWK site.

CERCLIS Assessment History:

Action:	DISCOVERY
Date Started:	Not reported
Date Completed:	06/04/2003
Priority Level:	Not reported
Action:	PRE-CERCLIS SCREENING
Date Started:	Not reported
Date Completed:	06/04/2003
Priority Level:	Not reported
Action:	COMBINED PRELIMINARY ASSESSMENT/SITE INSPECTION
Date Started:	09/10/2003
Date Completed:	08/11/2006
Priority Level:	Low

8 **AMERICAN PROMOTIONAL EVENTS**
3196 NORTH LOCUST AVENUE
RIALTO, CA 92377

CERCLIS **1006932054**
CAN000905989

CERCLIS:

Site ID:	0905989
Federal Facility:	Not a Federal Facility
NPL Status:	Not on the NPL
Non NPL Status:	Addressed as Part of Another non-NPL Site

CERCLIS Site Contact Name(s):

Contact Name:	Dawn Richmond
Contact Tel:	(415) 972-3097
Contact Title:	Site Assessment Manager (SAM)
Contact Name:	Dan McMindes
Contact Tel:	(415) 972-3401
Contact Title:	Site Assessment Manager (SAM)
Contact Name:	Dawn Richmond
Contact Tel:	(415) 972-3097
Contact Title:	Site Assessment Manager (SAM)
Contact Name:	Nuria Muniz
Contact Tel:	(415) 972-3811
Contact Title:	Site Assessment Manager (SAM)

CERCLIS Site Alias Name(s):

Alias Name:	AMERICAN WEST MARKETING, INC.
Alias Address:	Not reported
	Not reported
Alias Name:	PYRODYNE AMERICAN CORP
Alias Address:	Not reported
	Not reported

Site Description: Part of the GWK site. DCR

CERCLIS Assessment History:

Action:	DISCOVERY
Date Started:	Not reported
Date Completed:	06/04/2003
Priority Level:	Not reported
Action:	PRE-CERCLIS SCREENING
Date Started:	Not reported
Date Completed:	06/04/2003
Priority Level:	Not reported
Action:	COMBINED PRELIMINARY ASSESSMENT/SITE INSPECTION
Date Started:	Not reported
Date Completed:	08/11/2006
Priority Level:	Low

8 **ASTRO PYROTECHNICS**
3796 N LOCUST
RIALTO, CA

SLIC **S108542880**
N/A

SLIC:

Type:	ITEM #27
Facility Status:	A
Region:	8
Staff:	Kamron Saremi, Tel 909-782-4303, SLIC
Description Information:	ASTRO PYROTECHNICS FACILITY
Date:	THRU
Order No:	Not reported
Npdes No:	Not reported
File Type:	EXPAN
Sequency:	E1

---

9 **WEST VLLY WATER DIST TRT PLNT**
3010 N CEDAR AVE
RIALTO, CA 92376

San Bern. Co. Permit **S104772139**
N/A

San Bern. Co. Permit:

Region:	SAN BERNARDINO
Facility ID:	FA0007186
Owner:	WEST VALLEY WATER DISTRICT
Permit Number:	PT0008040
Permit Category:	HAZMAT HANDLER 0-10 EMPLOYEES
Facility Status:	ACTIVE
Expiration Date:	7/31/2008 12:00:00AM

Region:	SAN BERNARDINO
Facility ID:	FA0007186
Owner:	WEST VALLEY WATER DISTRICT
Permit Number:	PT0008041
Permit Category:	ABOVEGROUND PETROLEUM STORAGE (AST) (SPCC)
Facility Status:	ACTIVE
Expiration Date:	7/31/2008 12:00:00AM

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10 **RIALTO AMMUNITION STORAGE POIT**

RIALTO, CA

FUDS **1007212209**
N/A

FUDS:

Federal Facility ID:	CA9799F5579
FUDS #:	J09CA0572
Facility Name:	RIALTO AMMUNITION STORAGE POIT
City:	Rialto
State:	CA
EPA Region:	9
County:	Not reported
Congressional District:	43
US Army District:	Los Angeles District (SPL)
Fiscal Year:	2006
Telephone:	213-452-3921
NPL Status:	Not Listed
RAB:	Not reported
CTC:	7.48
Current Owner:	PRIVATE
Current Prog:	Not reported

RIALTO AMMUNITION STORAGE POIT (Continued) **1007212209**

Future Prog: Not reported

FUDS Description Details:

The site is located on 2,821.75 acres 7 miles northwest of San Bernardino, California. In 1942, the Department of War acquired 2,814.55 acres by fee through deed and declaration of taking and a 7.6-acre railroad easement for a total acquisition of 2, ,822.15 acres. The site was known as the Los Angeles Backup Storage Facility. This name was later changed to Rialto Ammunition Storage Point. The Rialto Ammunition Storage Point is located in San Bernardino County approximately 5 miles north of the C City of Rialto and 10 miles northeast of the City of Fontana, California. The property is now used for both industrial (including a municipal landfill owned and operated by the County of San Bernardino) and residential purposes.

FUDS History Details:

The site was developed for use as depot, including construction of a complete storage facility. A building area was also established east of the storage area with buildings used for administration, kitchen, barracks, vehicle storage and maintenance, shops, and a fire station. Additionally, a gas station, shelters, sewage plant, and water supply were constructed. The Army leased out approximately 2,000 acres for crop cultivation and grazing. Rialto Ammunition Storage Point remained active until l late 1945. On 13 November 1945, the Army reported 2814.55 acres fee and 7.60 acres leased as excess to the War Assets Administration. Custody was assumed by the Farm Credit Administration on 9 July 1946. This acreage was then subdivided over a number r of years and sold. Most of the property is currently zoned industrial and occupied by a municipal landfill and various companies, including pyrotechnics companies. Some portions of the property, including portions of the building area, have been de eveloped into residential use. Military improvements that have been beneficially used include the water well, and concrete storage bunkers.

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11 **WEST VALLEY WATER DIST WELL#5A** **San Bern. Co. Permit** **S106911178**
5914 N SYCAMORE AVE **N/A**
RIALTO, CA 92376

San Bern. Co. Permit:

Region:	SAN BERNARDINO
Facility ID:	FA0007188
Owner:	WEST VALLEY WATER DISTRICT
Permit Number:	PT0009042
Permit Category:	HAZMAT HANDLER 0-10 EMPLOYEES
Facility Status:	INACTIVE
Expiration Date:	7/31/2003 12:00:00AM

Region:	SAN BERNARDINO
Facility ID:	FA0007188
Owner:	WEST VALLEY WATER DISTRICT
Permit Number:	PT0009043
Permit Category:	CALARP FACILITY PERMIT
Facility Status:	INACTIVE
Expiration Date:	7/31/2003 12:00:00AM

12 **WEST VALLEY WATER DIST WELL #34**
19653 COUNTRY CLUB DR
RIALTO, CA 92377

San Bern. Co. Permit **S105974435**
N/A

San Bern. Co. Permit:

Region:	SAN BERNARDINO
Facility ID:	FA0007859
Owner:	WEST VALLEY WATER DISTRICT
Permit Number:	PT0013725
Permit Category:	HAZMAT HANDLER 0-10 EMPLOYEES
Facility Status:	ACTIVE
Expiration Date:	8/31/2008 12:00:00AM

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13 **NEW CINGULAR WIRELESS - 15 FWY**
2602 N RIVERSIDE AVE
RIALTO, CA 92377

San Bern. Co. Permit **S106718479**
N/A

San Bern. Co. Permit:

Region:	SAN BERNARDINO
Facility ID:	FA0009026
Owner:	AT & T MOBILITY
Permit Number:	PT0015894
Permit Category:	HAZMAT HANDLER - UNSTAFFED REMOTE FACILITY
Facility Status:	INACTIVE
Expiration Date:	8/31/2005 12:00:00AM

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14 **LARRY ZELKE RESIDENCE (2)**
6061 RIVERSIDE AVENUE
RIALTO, CA 92376

ENVIROSTOR **S100182101**
N/A

ENVIROSTOR:

Site Type:	Historical
Site Type Detailed:	* Historical
Acres:	Not reported
NPL:	NO
Regulatory Agencies:	NONE SPECIFIED
Lead Agency:	NONE SPECIFIED
Program Manager:	Not reported
Supervisor:	* MMONROY
Division Branch:	So Cal - Cypress
Facility ID:	36350022
Site Code:	Not reported
Assembly:	62
Senate:	32
Special Program:	Not reported
Status:	Refer: Other Agency
Status Date:	1995-08-22 00:00:00
Restricted Use:	NO
Funding:	Not reported
Latitude:	34.1522222222222
Longitude:	-117.393055555556
Alias Name:	36350022
	CAD982400442
	19-35-0467
Alias Type:	Envirostor ID Number
	Envirostor ID Number
	EPA Identification Number
APN:	NONE SPECIFIED

LARRY ZELKE RESIDENCE (2) (Continued) **S100182101**

APN Description:	Not reported
Comments:	Database verification program concurs with the EPA recommendation that NFA is needed at the site.FACILITY IDENTIFIED EPA FIT PA EPA COMPLETED PRELIMINARY ASSESSMENT AND RECOMMEND NO FURTHER ACTION; RECOMMEND SITE SCREENING FOR STATE.
Completed Area Name:	PROJECT WIDE
Completed Sub Area Name:	Not reported
Completed Document Type:	Site Screening
Completed Date:	1994-10-25 00:00:00
Completed Area Name:	PROJECT WIDE
Completed Sub Area Name:	Not reported
Completed Document Type:	Discovery
Completed Date:	1990-03-28 00:00:00
Confirmed:	NONE SPECIFIED
Confirmed Description:	Not reported
Future Area Name:	Not reported
Future Sub Area Name:	Not reported
Future Document Type:	Not reported
Future Due Date:	Not reported
Media Affected:	NONE SPECIFIED
Media Affected Desc:	Not reported
Management Required:	NONE SPECIFIED
Management Required Desc:	Not reported
Potential:	NONE SPECIFIED
Potenital Description:	Not reported
Schedule Area Name:	Not reported
Schedule Sub Area Name:	Not reported
Schedule Document Type:	Not reported
Schedule Due Date:	Not reported
Schedule Revised Date:	Not reported
PastUse:	NONE SPECIFIED

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14 **ARCO COLTON TERMINAL**
2395 RIVERSIDE AVE
RIALTO, CA 92316

LUST S103249208
AIRS N/A

LUST:

Region:	STATE
Case Type:	Drinking Water Aquifer affected
Cross Street:	Not reported
Enf Type:	Not reported
Funding:	Not reported
How Discovered:	Not reported
How Stopped:	Not reported
Leak Cause:	Not reported
Leak Source:	Not reported
Global Id:	T0607100467
Stop Date:	Not reported
Confirm Leak:	Not reported
Workplan:	Not reported
Prelim Assess:	Not reported
Pollution Char:	1965-01-01 00:00:00
Remed Plan:	Not reported
Remed Action:	Not reported
Monitoring:	Not reported
Close Date:	Not reported
Discover Date:	1994-02-18 00:00:00
Enforcement Dt:	Not reported

ARCO COLTON TERMINAL (Continued) **S103249208**

Release Date: 1994-06-13 00:00:00
Review Date: 1998-02-11 00:00:00
Enter Date: 1998-02-11 00:00:00
MTBE Date: 1997-05-08 00:00:00
GW Qualifier: =
Soil Qualifier: Not reported
Max MTBE GW ppb: 460
Max MTBE Soil ppb: Not reported
County: 36
Org Name: Not reported
Reg Board: Santa Ana Region
Status: Pollution Characterization
Chemical: 8006619, MTB
Contact Person: Not reported
Responsible Party: ARCO PRODUCTS
RP Address: 155 SEVENTH ST., LOS ANGELES, CA 90017
Interim: Not reported
Oversight Prgm: LUST
MTBE Class: B
MTBE Conc: 1
MTBE Fuel: 0
MTBE Tested: MTBE Detected. Site tested for MTBE and MTBE detected
Staff: RS
Staff Initials: JC3
Lead Agency: Local Agency
Local Agency: 36000L
Hydr Basin #: UPPER SANTA ANA VALL
Beneficial: MUN
Priority: A1
Cleanup Fund Id: Not reported
Work Suspended: Not reported
Local Case #: 94024
Case Number: 083603126T
Qty Leaked: Not reported
Abate Method: Vapor Extraction
Operator: Not reported
Water System Name: Not reported
Well Name: Not reported
Distance To Lust: 0
Waste Discharge Global ID: Not reported
Waste Disch Assigned Name: Not reported
Summary: Not reported

LUST:
Region: 8
Case Type: Drinking Water Aquifer affected
Cross Street: Not reported
Enf Type: Not reported
Funding: Not reported
How Discovered: Not reported
How Stopped: Not reported
Leak Cause: Not reported
Leak Source: Not reported
Global ID: T0607100467
How Stopped Date: Not reported
Review Date: Not reported
Workplan: Not reported

ARCO COLTON TERMINAL (Continued) **S103249208**

Prelim Assess:	Not reported
Pollution Char:	1/1/1965
Remed Plan:	Not reported
Remed Action:	Not reported
Monitoring:	Not reported
Close Date:	Not reported
Discover Date:	2/18/1994
Enforcement Date:	Not reported
Review Date:	2/11/1998
Enter Date:	2/11/1998
MTBE Date:	5/13/2002
GW Qualifies:	=
Soil Qualifies:	=
Max MTBE GW:	1300
Max MTBE Soil:	2.5
County:	San Bernardino
Operator:	Not reported
Regional Board:	08
Facility Status:	Pollution Characterization
Substance:	8006619, MTB
Facility Contact:	Not reported
Interim:	Not reported
Oversite Program:	LUST
Latitude:	34.05881393
Longitude:	-117.3693243
MTBE Concentration:	1
MTBE Fuel:	0
MTBE Tested:	YES
Staff:	RS
Staff Initials:	JC3
Lead Agency:	Local Agency
Local Agency:	36000L
Hydr Basin #:	UPPER SANTA ANA VALL
Beneficial:	MUN
Priority:	A1
Cleanup Fund Id:	Not reported
Work Suspended:	Not reported
Local Case Num:	94024
Case Number:	083603126T
Qty Leaked:	Not reported
Abate Method:	Vapor Extraction
MTBE Class:	B
Summary:	Not reported

EMI:

Year:	1987
Carbon Monoxide Emissions Tons/Yr:	36
Air Basin:	SC
Facility ID:	800013
Air District Name:	SC
SIC Code:	5171
Air District Name:	SOUTH COAST AQMD
Community Health Air Pollution Info System:	Not reported
Consolidated Emission Reporting Rule:	Not reported
Total Organic Hydrocarbon Gases Tons/Yr:	5
Reactive Organic Gases Tons/Yr:	5
Carbon Monoxide Emissions Tons/Yr:	0

ARCO COLTON TERMINAL (Continued) **S103249208**

NOX - Oxides of Nitrogen Tons/Yr:	0
SOX - Oxides of Sulphur Tons/Yr:	0
Particulate Matter Tons/Yr:	0
Part. Matter 10 Micrometers & Smllr Tons/Yr:	0

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15 **PENHALL COMPANY**
2190 RIVERSIDE AVE
RIALTO, CA 92376

LUST **S105025775**
Cortese **N/A**

LUST:

Region:	STATE
Case Type:	Soil only
Cross Street:	SLOVER
Enf Type:	Not reported
Funding:	CLOS
How Discovered:	Not reported
How Stopped:	Not reported
Leak Cause:	Not reported
Leak Source:	Not reported
Global Id:	T0607100486
Stop Date:	Not reported
Confirm Leak:	Not reported
Workplan:	1998-08-14 00:00:00
Prelim Assess:	Not reported
Pollution Char:	Not reported
Remed Plan:	Not reported
Remed Action:	Not reported
Monitoring:	Not reported
Close Date:	1998-11-12 00:00:00
Discover Date:	1998-06-05 00:00:00
Enforcement Dt:	Not reported
Release Date:	1998-06-24 00:00:00
Review Date:	Not reported
Enter Date:	1998-09-11 00:00:00
MTBE Date:	Not reported
GW Qualifier:	Not reported
Soil Qualifier:	Not reported
Max MTBE GW ppb:	Not reported
Max MTBE Soil ppb:	Not reported
County:	36
Org Name:	Not reported
Reg Board:	Santa Ana Region
Status:	Case Closed
Chemical:	Gasoline
Contact Person:	Not reported
Responsible Party:	PENHALL COMPANY
RP Address:	1801 PENHALL WAY, ANAHEIM, CA 92803
Interim:	Not reported
Oversight Prgm:	LUST
MTBE Class:	*
MTBE Conc:	0
MTBE Fuel:	1
MTBE Tested:	Site NOT Tested for MTBE.Includes Unknown and Not Analyzed.
Staff:	NOM
Staff Initials:	JC3
Lead Agency:	Local Agency
Local Agency:	36000L
Hydr Basin #:	UPPER SANTA ANA VALL

PENHALL COMPANY (Continued) **S105025775**

Beneficial: Not reported
Priority: Not reported
Cleanup Fund Id: Not reported
Work Suspended: Not reported
Local Case #: 98036
Case Number: 083603198T
Qty Leaked: Not reported
Abate Method: Not reported
Operator: Not reported
Water System Name: Not reported
Well Name: Not reported
Distance To Lust: 0
Waste Discharge Global ID: Not reported
Waste Disch Assigned Name: Not reported
Summary: Not reported

LUST:
Region: 8
Case Type: Soil only
Cross Street: SLOVER
Enf Type: CLOS
Funding: Not reported
How Discovered: Not reported
How Stopped: Not reported
Leak Cause: Not reported
Leak Source: Not reported
Global ID: T0607100486
How Stopped Date: Not reported
Review Date: Not reported
Workplan: 8/14/1998
Prelim Assess: Not reported
Pollution Char: Not reported
Remed Plan: Not reported
Remed Action: Not reported
Monitoring: Not reported
Close Date: 11/12/1998
Discover Date: 6/5/1998
Enforcement Date: Not reported
Review Date: Not reported
Enter Date: 9/11/1998
MTBE Date: Not reported
GW Qualifies: Not reported
Soil Qualifies: Not reported
Max MTBE GW: Not reported
Max MTBE Soil: Not reported
County: San Bernardino
Operator: Not reported
Regional Board: 08
Facility Status: Case Closed
Substance: 8006619
Facility Contact: Not reported
Interim: Not reported
Oversite Program: LUST
Latitude: 34.140671
Longitude: -117.3745945
MTBE Concentration: 0
MTBE Fuel: 1

PENHALL COMPANY (Continued) **S105025775**

MTBE Tested:	NT
Staff:	NOM
Staff Initials:	JC3
Lead Agency:	Local Agency
Local Agency:	36000L
Hydr Basin #:	UPPER SANTA ANA VALL
Beneficial:	Not reported
Priority:	Not reported
Cleanup Fund Id:	Not reported
Work Suspended:	Not reported
Local Case Num:	98036
Case Number:	083603198T
Qty Leaked:	Not reported
Abate Method:	Not reported
MTBE Class:	*
Summary:	Not reported

Cortese:

Region:	CORTESE
Facility Addr2:	2190 RIVERSIDE AVE

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16 **ARCO - RIVERSIDE SERVICE** **LUST** **S101301258**
1877 RIVERSIDE AVE **N/A**
RIALTO, CA 92376

LUST:

Region:	STATE
Case Type:	Soil only
Cross Street:	EASTON
Enf Type:	Not reported
Funding:	CLOS
How Discovered:	OM
How Stopped:	Not reported
Leak Cause:	Overfill
Leak Source:	Other Source
Global Id:	T0607100178
Stop Date:	1990-06-27 00:00:00
Confirm Leak:	Not reported
Workplan:	Not reported
Prelim Assess:	1990-07-02 00:00:00
Pollution Char:	Not reported
Remed Plan:	Not reported
Remed Action:	Not reported
Monitoring:	Not reported
Close Date:	1990-10-03 00:00:00
Discover Date:	1990-06-27 00:00:00
Enforcement Dt:	1965-01-01 00:00:00
Release Date:	1990-06-27 00:00:00
Review Date:	Not reported
Enter Date:	1990-07-02 00:00:00
MTBE Date:	Not reported
GW Qualifier:	Not reported
Soil Qualifier:	Not reported
Max MTBE GW ppb:	Not reported
Max MTBE Soil ppb:	Not reported
County:	36
Org Name:	Not reported

ARCO - RIVERSIDE SERVICE (Continued) **S101301258**

Reg Board:	Santa Ana Region
Status:	Case Closed
Chemical:	Gasoline
Contact Person:	Not reported
Responsible Party:	RON ROSE
RP Address:	16325 OLD VALLEY BOULEVARD
Interim:	Not reported
Oversight Prgm:	LUST
MTBE Class:	*
MTBE Conc:	0
MTBE Fuel:	1
MTBE Tested:	Site NOT Tested for MTBE.Includes Unknown and Not Analyzed.
Staff:	VJB
Staff Initials:	CR2
Lead Agency:	Local Agency
Local Agency:	36000L
Hydr Basin #:	UPPER SANTA ANA VALL
Beneficial:	Not reported
Priority:	Not reported
Cleanup Fund Id:	Not reported
Work Suspended:	Not reported
Local Case #:	87039
Case Number:	083601577T
Qty Leaked:	Not reported
Abate Method:	Not reported
Operator:	Not reported
Water System Name:	Not reported
Well Name:	Not reported
Distance To Lust:	0
Waste Discharge Global ID:	Not reported
Waste Disch Assigned Name:	Not reported
Summary:	Not reported

LUST:

Region:	8
Case Type:	Soil only
Cross Street:	EASTON
Enf Type:	CLOS
Funding:	Not reported
How Discovered:	OM
How Stopped:	Not reported
Leak Cause:	Overfill
Leak Source:	Other Source
Global ID:	T0607100178
How Stopped Date:	6/27/1990
Review Date:	Not reported
Workplan:	Not reported
Prelim Assess:	7/2/1990
Pollution Char:	Not reported
Remed Plan:	Not reported
Remed Action:	Not reported
Monitoring:	Not reported
Close Date:	10/3/1990
Discover Date:	6/27/1990
Enforcement Date:	1/1/1965
Review Date:	Not reported
Enter Date:	7/2/1990

ARCO - RIVERSIDE SERVICE (Continued) **S101301258**

MTBE Date:	Not reported
GW Qualifies:	Not reported
Soil Qualifies:	Not reported
Max MTBE GW:	Not reported
Max MTBE Soil:	Not reported
County:	San Bernardino
Operator:	Not reported
Regional Board:	08
Facility Status:	Case Closed
Substance:	8006619
Facility Contact:	Not reported
Interim:	Not reported
Oversite Program:	LUST
Latitude:	34.1336003
Longitude:	-117.3702853
MTBE Concentration:	0
MTBE Fuel:	1
MTBE Tested:	NT
Staff:	VJJ
Staff Initials:	CR2
Lead Agency:	Local Agency
Local Agency:	36000L
Hydr Basin #:	UPPER SANTA ANA VALL
Beneficial:	Not reported
Priority:	Not reported
Cleanup Fund Id:	Not reported
Work Suspended:	Not reported
Local Case Num:	87039
Case Number:	083601577T
Qty Leaked:	Not reported
Abate Method:	Not reported
MTBE Class:	*
Summary:	Not reported

ORPHAN SUMMARY

City	EDR ID	Site Name	Site Address	Zip	Database(s)
BLOOMINGTON	S106544693	C C ENTERPRISES	2830 S RIVERSIDE AVE STE A	92377	San Bern. Co. Permit
CAJON	94386971	NB 5 AT CAJON REST AREA	NB 5 AT CAJON REST AREA	92407	ERNS
CAJON JCT	1001815497	CALTRANS	I 15 AT STATE RTE 138	92407	RCRA-SQG, FINDS, HAZNET
DEVORE	S108240211	COFFMAN SPECIALTIES INC	I-15 EASTSIDE @ KENWOOD	92407	San Bern. Co. Permit
DEVORE	1001231354	SOUTHERN CALIFORNIA GAS CO	GLEN HELEN RD BY GLEN HELEN PA	92407	RCRA-SQG, FINDS
DEVORE	S101591501	GLEN HELEN REHAB CENTER	GLEN HELEN RD	92407	CA FID UST, SWEEPS UST
DEVORE	S105857355	GLEN HELEN REHAB CTR	1800 INSTITUTION RD	92407	San Bern. Co. Permit
DEVORE	1001231355	SOUTHERN CALIFORNIA GAS CO - DEVORE	2000 FT NW I-15 FREEWAY	92407	RCRA-SQG, FINDS, HAZNET
FONTANA	S104572109	ALPER DEVELOPMENT	5401 BRIDLE PATH	92336	HAZNET
FONTANA	S108724319	ELECTRIC MOTOR & ACTUATOR TECH	7940 CHERRY AVE UNIT #204	92336	San Bern. Co. Permit
FONTANA	S105697480	FONTANA WATER CO	5868 CITRUS AVE F-15	92336	San Bern. Co. Permit
FONTANA	S105697481	FONTANA WATER CO	6910 CITRUS AVE F-16	92336	San Bern. Co. Permit
FONTANA	1010313496	FONTANA VALVE STATION	NW CORNER OF CITRUS AVE	92336	RCRA-LQG
FONTANA	S108419407	WEST VALLEY WATER DISTRICT	DUNCAN CANYON	92336	San Bern. Co. Permit
FONTANA	S106910728	CAL-GA CRETE	17140 HIGHLAND AVE	92336	San Bern. Co. Permit
FONTANA	S108087327	ROTOLO CHEVROLET	16666 S HIGHLAND	92336	San Bern. Co. Permit
FONTANA	S108195928	PROPOSED ELEMENTARY SCHOOL #35	LYTLE CREEK ROAD/THREE MILE ROAD	92336	SCH, ENVIROSTOR
FONTANA	S106568117	HIGH SCHOOL NO. 9	SAN SEVAINE ROAD/WALNUT AVENUE	92336	SCH, ENVIROSTOR
FONTANA	1010313572	HOME DEPOT NO HD6960	15933 SIERRA LAKES PKWY	92336	RCRA-SQG
FONTANA	1010313707	COSTCO WHOLESALE NO 627	16505 SIERRA LAKES PKWY	92336	RCRA-SQG
FONTANA	1010313712	HOME DEPOT NO HD 6960	16005 SIERRA LAKES PKWY	92336	RCRA-SQG
FONTANA	S108087283	HOME DEPOT #6960	16005 SIERRA LAKES PKY	92336	San Bern. Co. Permit
FONTANA	S108419361	COSTCO WHOLESALE #627	16505 SIERRA LAKES PKY	92336	San Bern. Co. Permit
FONTANA	U004082790	COSTCO GASOLINE	16505 SIERRA LAKES PARKWAY	92336	UST
FONTANA	S105697558	FONTANA WATER CO	18518 SUMMIT AVE F-14	92376	San Bern. Co. Permit
MT. BALDY	94378549	MT. BALDY AREA	MT. BALDY AREA	91759	ERNS
MT. BALDY	94377643	MT. BALDY AREA	MT. BALDY AREA	91759	ERNS
RIALTO	S107619964	BF GOODRICH	160 ACRES LOCUST AVE		SLIC
RIALTO	S107619980	GOODRICH CORPORATION	160 ACRES LOCUST		SLIC
RIALTO	S105964603	AGUA MANSA LANDFILL	588 EAST AGUA MANSA ROAD		SWF/LF
RIALTO	S101591667	ABANDONED SERVICE STATION	ALDER AVE	92376	CA FID UST, SWEEPS UST
RIALTO	S105805963	DENOVA ENVIRONMENTAL, INC.	2610 N ALDER AVE	92377	SLIC
RIALTO	S106544690	SUKUT EQUIPMENT INC	2390 N ALDER	92377	HAZNET, San Bern. Co. Permit
RIALTO	S107592139	TARGET IMPORT WAREHOUSE T3807	3110 N ALDER AVE	92377	HAZNET, San Bern. Co. Permit
RIALTO	S108542897	BROCO, INC.	ALDER / LOCUST		SLIC
RIALTO	S108543031	MARQUARDT CO., THE & FERRANTI INT'L., INC.	N ALDER		SLIC
RIALTO	S106803262	PYRO SPECTACULARS, INC/STORAGE AREA	APN 1113-021-01, SW POR	92377	San Bern. Co. Permit
RIALTO	S101619233	FAIRBURN TRANSPORTATION INC	1771 S CACTUS	92376	CA FID UST, SWEEPS UST
RIALTO	S106911158	U S FLEET SERVICES	2143 CACTUS AVE	92376	San Bern. Co. Permit
RIALTO	S105974434	WEST VALLEY WATER DIST WELL #2	19973 COUNTRY CLUB DR	92376	San Bern. Co. Permit
RIALTO	S108536435	EL RANCHO VERDE GOLF CLUB	355 E COUNTRY CLUB DR	92376	San Bern. Co. Permit
RIALTO	S108755414	SOUTHERN CA HOUSING DEVELOPMENT CORP	220 N GLENWOOD AVE UNIT A / B	92376	HAZNET
RIALTO	S101591300	M C I	157 LILAC AVE	92376	CA FID UST, SWEEPS UST

ORPHAN SUMMARY

City	EDR ID	Site Name	Site Address	Zip	Database(s)
RIALTO	S105838318	D & M DRUM CO	137 LILAC AVENUE	92376	RESPONSE, ENVIROSTOR, HIST Cal-Sites
RIALTO	S106911022	PACIFIC ORNAMENTAL IRON	1625 S LILAC AVE	92376	San Bern. Co. Permit
RIALTO	U004049956	T-21 WEST SAN BERDO WATER	LINDEN AVE	92377	UST
RIALTO	S106910689	AUTO CRAFT	2631 N LOCUST AVE B	92377	San Bern. Co. Permit
RIALTO	S108542883	B. F. GOODRICH - PERCHLORATE	LOCUST		SLIC
RIALTO	S108543143	WCLC/KWIKSET/BLACK & DECKER /EMHART IND., INC.	N LOCUST		SLIC
RIALTO	1004676040	RIALTO CONCRETE PRODUCTS INC	2250 W LOWELL	92376	RCRA-SQG, FINDS, HAZNET
RIALTO	S108724292	LYTLE CREEK POWERHOUSE	ON LYTLE CREEK CANYON RD1 1/4 MILE NO OF NEALEY'S	92376	San Bern. Co. Permit
RIALTO	1008152485	SO CAL EDISON LYTLE CREEK PH	LYTLE CREEK 5445 N RIVERSIDE	92376	FINDS
RIALTO	S103659817	HOUSING URBAN & DEVELOPMENT DEPARTMENT	442 MARCELLA AVE	92376	HAZNET
RIALTO	S104769194	PRODUCTS/TECHNIQUES INC	3271 S RIVERSIDE AV	92376	San Bern. Co. Permit
RIALTO	S104905668	RANCHO VERDE CLEANERS	2012 RIVERSIDE AV A	92376	San Bern. Co. Permit
RIALTO	S107863436	WALGREENS #5555	550 RIVERSIDE AVE	92377	San Bern. Co. Permit
RIALTO	S105790499	RIALTO SHELL TRAVEL CENTER	3610 S RIVERSIDE AVE	92377	San Bern. Co. Permit
RIALTO	S106910858	FLEET MAINTENANCE SVC/SPL	2312 S RIVERSIDE AVE	92377	San Bern. Co. Permit
RIALTO	S106910949	KINDER MORGAN	2305 S RIVERSIDE AVE	92377	San Bern. Co. Permit
RIALTO	S106911338	SAL'S PROPANE INC.	2312 S RIVERSIDE AVE	92377	San Bern. Co. Permit
RIALTO	S107030295	SHELL OIL PRODUCTS-COLTON TERMINAL	2307 S RIVERSIDE AVE	92377	CHMIRS, SLIC
RIALTO	S105668867		2359 SOUTH RIVERSIDE AVE	92377	LUST
RIALTO	S108418322	ARCO COLTON TERMINAL	2395 RIVERSIDE AVENUE SOUTH	92377	LUST
RIALTO	S108935368	CHASTAIN PROPERTY	2591 S. RIVERSIDE AVE.		SWF/LF
RIALTO	S108239507	ENER TECH ENVIRONMENTAL CALIFORNIA LLC	501 EAST SANTA AVENUE		SLIC
RIALTO	S108543019	LOCKHEED	SIERRA / HIGHLAND AVE	92376	San Bern. Co. Permit
RIALTO	S106112262	ACA AUTO SALVAGE II	2091 W STONEHURST DR	92377	SLIC
RIALTO	S105805961	AEROJECT (GENCORP) BUNKERS	2170 W STONEHURST	92377	SLIC
RIALTO	S106487215	MID VALLEY SANITARY LANDFILL	2170 W. STONEHURST		SLIC
RIALTO	S108543140	W. A. MURPHY, INC.	STONEHURST	92377	San Bern. Co. Permit
RIALTO	S106911176	WEST VALLEY WATER DISTR. WELL #4	5914 N SYCAMORE	92376	San Bern. Co. Permit
RIALTO	S108724332	KUEHNE & NAGEL INC.	2580 W WALNUT AVE	92407	San Bern. Co. Permit
SAN BERNARDINO	S106718500	AT & T MOBILITY - LYTLE CREEK	8316 HWY 138	92376	San Bern. Co. Permit
SAN BERNARDINO	S108240246	NEW CINGULAR WIRELESS #50964	2794 W 2ND ST	92407	FINDS
SAN BERNARDINO	1007999050	LOCATED IN VACANT LOT OF NEW RESIDENTIAL DEVELOPMENT AREA	BALDY MESA - CAJON	92407	RCRA-SQG, FINDS, HAZNET
SAN BERNARDINO	1000305186	GLEN HELEN REHAB CENTER	1200 INSTITUTION RD	92407	San Bern. Co. Permit
SAN BERNARDINO	S104769882	CHILD NUTRITION CENTER	1257 NORTH PARK BLVD	92407	San Bern. Co. Permit
SAN BERNARDINO	S105047569	SCE-SHANDIN SUBSTATION	STATE ST / KENDALL DR		

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

To maintain currency of the following federal and state databases, EDR contacts the appropriate governmental agency on a monthly or quarterly basis, as required.

Number of Days to Update: Provides confirmation that EDR is reporting records that have been updated within 90 days from the date the government agency made the information available to the public.

FEDERAL RECORDS

NPL: National Priority List
National Priorities List (Superfund). The NPL is a subset of CERCLIS and identifies over 1,200 sites for priority cleanup under the Superfund Program. NPL sites may encompass relatively large areas. As such, EDR provides polygon coverage for over 1,000 NPL site boundaries produced by EPA's Environmental Photographic Interpretation Center (EPIC) and regional EPA offices.

Date of Government Version: 10/02/2007
Date Data Arrived at EDR: 12/03/2007
Date Made Active in Reports: 12/28/2007
Number of Days to Update: 25

Source: EPA
Telephone: N/A
Last EDR Contact: 01/28/2008
Next Scheduled EDR Contact: 04/28/2008
Data Release Frequency: Quarterly

NPL Site Boundaries

Sources:

EPA's Environmental Photographic Interpretation Center (EPIC)
Telephone: 202-564-7333

EPA Region 1
Telephone 617-918-1143

EPA Region 3
Telephone 215-814-5418

EPA Region 4
Telephone 404-562-8033

EPA Region 5
Telephone 312-886-6686

EPA Region 10
Telephone 206-553-8665

EPA Region 6
Telephone: 214-655-6659

EPA Region 7
Telephone: 913-551-7247

EPA Region 8
Telephone: 303-312-6774

EPA Region 9
Telephone: 415-947-4246

Proposed NPL: Proposed National Priority List Sites
A site that has been proposed for listing on the National Priorities List through the issuance of a proposed rule in the Federal Register. EPA then accepts public comments on the site, responds to the comments, and places on the NPL those sites that continue to meet the requirements for listing.

Date of Government Version: 10/02/2007
Date Data Arrived at EDR: 12/03/2007
Date Made Active in Reports: 12/28/2007
Number of Days to Update: 25

Source: EPA
Telephone: N/A
Last EDR Contact: 01/28/2008
Next Scheduled EDR Contact: 04/28/2008
Data Release Frequency: Quarterly

DELISTED NPL: National Priority List Deletions
The National Oil and Hazardous Substances Pollution Contingency Plan (NCP) establishes the criteria that the EPA uses to delete sites from the NPL. In accordance with 40 CFR 300.425.(e), sites may be deleted from the NPL where no further response is appropriate.

Date of Government Version: 10/02/2007
Date Data Arrived at EDR: 12/03/2007
Date Made Active in Reports: 12/28/2007
Number of Days to Update: 25

Source: EPA
Telephone: N/A
Last EDR Contact: 01/28/2008
Next Scheduled EDR Contact: 04/28/2008
Data Release Frequency: Quarterly

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

NPL LIENS: Federal Superfund Liens
Federal Superfund Liens. Under the authority granted the USEPA by CERCLA of 1980, the USEPA has the authority to file liens against real property in order to recover remedial action expenditures or when the property owner received notification of potential liability. USEPA compiles a listing of filed notices of Superfund Liens.

Date of Government Version: 10/15/1991
Date Data Arrived at EDR: 02/02/1994
Date Made Active in Reports: 03/30/1994
Number of Days to Update: 56

Source: EPA
Telephone: 202-564-4267
Last EDR Contact: 02/19/2008
Next Scheduled EDR Contact: 05/19/2008
Data Release Frequency: No Update Planned

CERCLIS: Comprehensive Environmental Response, Compensation, and Liability Information System
CERCLIS contains data on potentially hazardous waste sites that have been reported to the USEPA by states, municipalities, private companies and private persons, pursuant to Section 103 of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). CERCLIS contains sites which are either proposed to or on the National Priorities List (NPL) and sites which are in the screening and assessment phase for possible inclusion on the NPL.

Date of Government Version: 01/09/2008
Date Data Arrived at EDR: 02/05/2008
Date Made Active in Reports: 02/20/2008
Number of Days to Update: 15

Source: EPA
Telephone: 703-412-9810
Last EDR Contact: 02/05/2008
Next Scheduled EDR Contact: 03/17/2008
Data Release Frequency: Quarterly

CERCLIS-NFRAP: CERCLIS No Further Remedial Action Planned
Archived sites are sites that have been removed and archived from the inventory of CERCLIS sites. Archived status indicates that, to the best of EPA's knowledge, assessment at a site has been completed and that EPA has determined no further steps will be taken to list this site on the National Priorities List (NPL), unless information indicates this decision was not appropriate or other considerations require a recommendation for listing at a later time. This decision does not necessarily mean that there is no hazard associated with a given site; it only means that, based upon available information, the location is not judged to be a potential NPL site.

Date of Government Version: 12/03/2007
Date Data Arrived at EDR: 12/06/2007
Date Made Active in Reports: 02/20/2008
Number of Days to Update: 76

Source: EPA
Telephone: 703-412-9810
Last EDR Contact: 12/06/2007
Next Scheduled EDR Contact: 03/17/2008
Data Release Frequency: Quarterly

LIENS 2: CERCLA Lien Information
A Federal CERCLA ('Superfund') lien can exist by operation of law at any site or property at which EPA has spent Superfund monies. These monies are spent to investigate and address releases and threatened releases of contamination. CERCLIS provides information as to the identity of these sites and properties.

Date of Government Version: 12/09/2007
Date Data Arrived at EDR: 01/07/2008
Date Made Active in Reports: 02/20/2008
Number of Days to Update: 44

Source: Environmental Protection Agency
Telephone: 202-564-6023
Last EDR Contact: 02/15/2008
Next Scheduled EDR Contact: 05/19/2008
Data Release Frequency: Varies

CORRACTS: Corrective Action Report
CORRACTS identifies hazardous waste handlers with RCRA corrective action activity.

Date of Government Version: 12/12/2007
Date Data Arrived at EDR: 12/18/2007
Date Made Active in Reports: 02/20/2008
Number of Days to Update: 64

Source: EPA
Telephone: 800-424-9346
Last EDR Contact: 03/03/2008
Next Scheduled EDR Contact: 06/02/2008
Data Release Frequency: Quarterly

RCRA-TSDF: RCRA - Transporters, Storage and Disposal
RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Transporters are individuals or entities that move hazardous waste from the generator offsite to a facility that can recycle, treat, store, or dispose of the waste. TSDFs treat, store, or dispose of the waste.

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

Date of Government Version: 09/11/2007
Date Data Arrived at EDR: 12/03/2007
Date Made Active in Reports: 12/28/2007
Number of Days to Update: 25

Source: Environmental Protection Agency
Telephone: (415) 495-8895
Last EDR Contact: 03/06/2008
Next Scheduled EDR Contact: 05/19/2008
Data Release Frequency: Quarterly

RCRA-LQG: RCRA - Large Quantity Generators
RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Large quantity generators (LQGs) generate over 1,000 kilograms (kg) of hazardous waste, or over 1 kg of acutely hazardous waste per month.

Date of Government Version: 09/11/2007
Date Data Arrived at EDR: 12/03/2007
Date Made Active in Reports: 12/28/2007
Number of Days to Update: 25

Source: Environmental Protection Agency
Telephone: (415) 495-8895
Last EDR Contact: 03/06/2008
Next Scheduled EDR Contact: 05/19/2008
Data Release Frequency: Quarterly

RCRA-SQG: RCRA - Small Quantity Generators
RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Small quantity generators (SQGs) generate between 100 kg and 1,000 kg of hazardous waste per month.

Date of Government Version: 09/11/2007
Date Data Arrived at EDR: 12/03/2007
Date Made Active in Reports: 12/28/2007
Number of Days to Update: 25

Source: Environmental Protection Agency
Telephone: (415) 495-8895
Last EDR Contact: 03/06/2008
Next Scheduled EDR Contact: 05/19/2008
Data Release Frequency: Quarterly

RCRA-CESQG: RCRA - Conditionally Exempt Small Quantity Generators
RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Conditionally exempt small quantity generators (CESQGs) generate less than 100 kg of hazardous waste, or less than 1 kg of acutely hazardous waste per month.

Date of Government Version: 09/11/2007
Date Data Arrived at EDR: 12/03/2007
Date Made Active in Reports: 12/28/2007
Number of Days to Update: 25

Source: Environmental Protection Agency
Telephone: (415) 495-8895
Last EDR Contact: 03/06/2008
Next Scheduled EDR Contact: 05/19/2008
Data Release Frequency: Varies

RCRA-NonGen: RCRA - Non Generators
RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Non-Generators do not presently generate hazardous waste.

Date of Government Version: 09/11/2007
Date Data Arrived at EDR: 12/03/2007
Date Made Active in Reports: 12/28/2007
Number of Days to Update: 25

Source: Environmental Protection Agency
Telephone: (415) 495-8895
Last EDR Contact: 03/06/2008
Next Scheduled EDR Contact: 05/19/2008
Data Release Frequency: Varies

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

US ENG CONTROLS: Engineering Controls Sites List
A listing of sites with engineering controls in place. Engineering controls include various forms of caps, building foundations, liners, and treatment methods to create pathway elimination for regulated substances to enter environmental media or effect human health.

Date of Government Version: 07/16/2007
Date Data Arrived at EDR: 08/03/2007
Date Made Active in Reports: 10/11/2007
Number of Days to Update: 69

Source: Environmental Protection Agency
Telephone: 703-603-8905
Last EDR Contact: 01/02/2008
Next Scheduled EDR Contact: 03/31/2008
Data Release Frequency: Varies

US INST CONTROL: Sites with Institutional Controls
A listing of sites with institutional controls in place. Institutional controls include administrative measures, such as groundwater use restrictions, construction restrictions, property use restrictions, and post remediation care requirements intended to prevent exposure to contaminants remaining on site. Deed restrictions are generally required as part of the institutional controls.

Date of Government Version: 07/16/2007
Date Data Arrived at EDR: 08/03/2007
Date Made Active in Reports: 10/11/2007
Number of Days to Update: 69

Source: Environmental Protection Agency
Telephone: 703-603-8905
Last EDR Contact: 01/02/2008
Next Scheduled EDR Contact: 03/31/2008
Data Release Frequency: Varies

ERNS: Emergency Response Notification System
Emergency Response Notification System. ERNS records and stores information on reported releases of oil and hazardous substances.

Date of Government Version: 12/31/2006
Date Data Arrived at EDR: 01/24/2007
Date Made Active in Reports: 03/12/2007
Number of Days to Update: 47

Source: National Response Center, United States Coast Guard
Telephone: 202-267-2180
Last EDR Contact: 01/23/2008
Next Scheduled EDR Contact: 04/21/2008
Data Release Frequency: Annually

HMIRS: Hazardous Materials Information Reporting System
Hazardous Materials Incident Report System. HMIRS contains hazardous material spill incidents reported to DOT.

Date of Government Version: 10/01/2007
Date Data Arrived at EDR: 12/03/2007
Date Made Active in Reports: 12/28/2007
Number of Days to Update: 25

Source: U.S. Department of Transportation
Telephone: 202-366-4555
Last EDR Contact: 01/17/2008
Next Scheduled EDR Contact: 04/14/2008
Data Release Frequency: Annually

DOT OPS: Incident and Accident Data
Department of Transporation, Office of Pipeline Safety Incident and Accident data.

Date of Government Version: 11/14/2007
Date Data Arrived at EDR: 11/29/2007
Date Made Active in Reports: 02/20/2008
Number of Days to Update: 83

Source: Department of Transporation, Office of Pipeline Safety
Telephone: 202-366-4595
Last EDR Contact: 02/27/2008
Next Scheduled EDR Contact: 05/26/2008
Data Release Frequency: Varies

CDL: Clandestine Drug Labs
A listing of clandestine drug lab locations. The U.S. Department of Justice ("the Department") provides this web site as a public service. It contains addresses of some locations where law enforcement agencies reported they found chemicals or other items that indicated the presence of either clandestine drug laboratories or dumpsites. In most cases, the source of the entries is not the Department, and the Department has not verified the entry and does not guarantee its accuracy. Members of the public must verify the accuracy of all entries by, for example, contacting local law enforcement and local health departments.

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

Date of Government Version: 09/01/2007
Date Data Arrived at EDR: 12/03/2007
Date Made Active in Reports: 12/28/2007
Number of Days to Update: 25

Source: Drug Enforcement Administration
Telephone: 202-307-1000
Last EDR Contact: 12/28/2007
Next Scheduled EDR Contact: 03/24/2008
Data Release Frequency: Quarterly

US BROWNFIELDS: A Listing of Brownfields Sites
Included in the listing are brownfields properties addresses by Cooperative Agreement Recipients and brownfields properties addressed by Targeted Brownfields Assessments. Targeted Brownfields Assessments-EPA's Targeted Brownfields Assessments (TBA) program is designed to help states, tribes, and municipalities--especially those without EPA Brownfields Assessment Demonstration Pilots--minimize the uncertainties of contamination often associated with brownfields. Under the TBA program, EPA provides funding and/or technical assistance for environmental assessments at brownfields sites throughout the country. Targeted Brownfields Assessments supplement and work with other efforts under EPA's Brownfields Initiative to promote cleanup and redevelopment of brownfields. Cooperative Agreement Recipients-States, political subdivisions, territories, and Indian tribes become Brownfields Cleanup Revolving Loan Fund (BCRLF) cooperative agreement recipients when they enter into BCRLF cooperative agreements with the U.S. EPA. EPA selects BCRLF cooperative agreement recipients based on a proposal and application process. BCRLF cooperative agreement recipients must use EPA funds provided through BCRLF cooperative agreement for specified brownfields-related cleanup activities.

Date of Government Version: 01/03/2008
Date Data Arrived at EDR: 01/17/2008
Date Made Active in Reports: 02/20/2008
Number of Days to Update: 34

Source: Environmental Protection Agency
Telephone: 202-566-2777
Last EDR Contact: 01/17/2008
Next Scheduled EDR Contact: 03/10/2008
Data Release Frequency: Semi-Annually

DOD: Department of Defense Sites
This data set consists of federally owned or administered lands, administered by the Department of Defense, that have any area equal to or greater than 640 acres of the United States, Puerto Rico, and the U.S. Virgin Islands.

Date of Government Version: 12/31/2005
Date Data Arrived at EDR: 11/10/2006
Date Made Active in Reports: 01/11/2007
Number of Days to Update: 62

Source: USGS
Telephone: 703-692-8801
Last EDR Contact: 02/08/2008
Next Scheduled EDR Contact: 05/05/2008
Data Release Frequency: Semi-Annually

FUDS: Formerly Used Defense Sites
The listing includes locations of Formerly Used Defense Sites properties where the US Army Corps of Engineers is actively working or will take necessary cleanup actions.

Date of Government Version: 12/31/2006
Date Data Arrived at EDR: 08/31/2007
Date Made Active in Reports: 10/11/2007
Number of Days to Update: 41

Source: U.S. Army Corps of Engineers
Telephone: 202-528-4285
Last EDR Contact: 01/02/2008
Next Scheduled EDR Contact: 03/31/2008
Data Release Frequency: Varies

LUCIS: Land Use Control Information System
LUCIS contains records of land use control information pertaining to the former Navy Base Realignment and Closure properties.

Date of Government Version: 12/09/2005
Date Data Arrived at EDR: 12/11/2006
Date Made Active in Reports: 01/11/2007
Number of Days to Update: 31

Source: Department of the Navy
Telephone: 843-820-7326
Last EDR Contact: 03/10/2008
Next Scheduled EDR Contact: 06/09/2008
Data Release Frequency: Varies

CONSENT: Superfund (CERCLA) Consent Decrees
Major legal settlements that establish responsibility and standards for cleanup at NPL (Superfund) sites. Released periodically by United States District Courts after settlement by parties to litigation matters.

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

Date of Government Version: 09/01/2007
Date Data Arrived at EDR: 12/03/2007
Date Made Active in Reports: 12/28/2007
Number of Days to Update: 25

Source: Department of Justice, Consent Decree Library
Telephone: Varies
Last EDR Contact: 01/21/2008
Next Scheduled EDR Contact: 04/21/2008
Data Release Frequency: Varies

ROD: Records Of Decision
Record of Decision. ROD documents mandate a permanent remedy at an NPL (Superfund) site containing technical and health information to aid in the cleanup.

Date of Government Version: 01/14/2008
Date Data Arrived at EDR: 01/22/2008
Date Made Active in Reports: 01/30/2008
Number of Days to Update: 8

Source: EPA
Telephone: 703-416-0223
Last EDR Contact: 01/02/2008
Next Scheduled EDR Contact: 03/31/2008
Data Release Frequency: Annually

UMTRA: Uranium Mill Tailings Sites
Uranium ore was mined by private companies for federal government use in national defense programs. When the mills shut down, large piles of the sand-like material (mill tailings) remain after uranium has been extracted from the ore. Levels of human exposure to radioactive materials from the piles are low; however, in some cases tailings were used as construction materials before the potential health hazards of the tailings were recognized.

Date of Government Version: 07/13/2007
Date Data Arrived at EDR: 12/03/2007
Date Made Active in Reports: 01/24/2008
Number of Days to Update: 52

Source: Department of Energy
Telephone: 505-845-0011
Last EDR Contact: 12/17/2007
Next Scheduled EDR Contact: 03/17/2008
Data Release Frequency: Varies

ODI: Open Dump Inventory
An open dump is defined as a disposal facility that does not comply with one or more of the Part 257 or Part 258 Subtitle D Criteria.

Date of Government Version: 06/30/1985
Date Data Arrived at EDR: 08/09/2004
Date Made Active in Reports: 09/17/2004
Number of Days to Update: 39

Source: Environmental Protection Agency
Telephone: 800-424-9346
Last EDR Contact: 06/05/2004
Next Scheduled EDR Contact: N/A
Data Release Frequency: No Update Planned

DEBRIS REGION 9: Torres Martinez Reservation Illegal Dump Site Locations
A listing of illegal dump sites location on the Torres Martinez Indian Reservation located in eastern Riverside County and northern Imperial County, California.

Date of Government Version: 12/28/2007
Date Data Arrived at EDR: 12/28/2007
Date Made Active in Reports: 01/24/2008
Number of Days to Update: 27

Source: EPA, Region 9
Telephone: 415-972-3336
Last EDR Contact: 12/26/2007
Next Scheduled EDR Contact: 03/24/2008
Data Release Frequency: Varies

MINES: Mines Master Index File
Contains all mine identification numbers issued for mines active or opened since 1971. The data also includes violation information.

Date of Government Version: 11/20/2007
Date Data Arrived at EDR: 01/03/2008
Date Made Active in Reports: 02/20/2008
Number of Days to Update: 48

Source: Department of Labor, Mine Safety and Health Administration
Telephone: 303-231-5959
Last EDR Contact: 01/03/2008
Next Scheduled EDR Contact: 03/24/2008
Data Release Frequency: Semi-Annually

TRIS: Toxic Chemical Release Inventory System
Toxic Release Inventory System. TRIS identifies facilities which release toxic chemicals to the air, water and land in reportable quantities under SARA Title III Section 313.

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

Date of Government Version: 12/31/2005
Date Data Arrived at EDR: 04/27/2007
Date Made Active in Reports: 07/05/2007
Number of Days to Update: 69

Source: EPA
Telephone: 202-566-0250
Last EDR Contact: 02/29/2008
Next Scheduled EDR Contact: 06/16/2008
Data Release Frequency: Annually

TSCA: Toxic Substances Control Act
Toxic Substances Control Act. TSCA identifies manufacturers and importers of chemical substances included on the TSCA Chemical Substance Inventory list. It includes data on the production volume of these substances by plant site.

Date of Government Version: 12/31/2002
Date Data Arrived at EDR: 04/14/2006
Date Made Active in Reports: 05/30/2006
Number of Days to Update: 46

Source: EPA
Telephone: 202-260-5521
Last EDR Contact: 01/28/2008
Next Scheduled EDR Contact: 04/14/2008
Data Release Frequency: Every 4 Years

FTTS: FIFRA/ TSCA Tracking System - FIFRA (Federal Insecticide, Fungicide, & Rodenticide Act)/TSCA (Toxic Substances Control Act)
FTTS tracks administrative cases and pesticide enforcement actions and compliance activities related to FIFRA, TSCA and EPCRA (Emergency Planning and Community Right-to-Know Act). To maintain currency, EDR contacts the Agency on a quarterly basis.

Date of Government Version: 01/15/2008
Date Data Arrived at EDR: 01/22/2008
Date Made Active in Reports: 01/30/2008
Number of Days to Update: 8

Source: EPA/Office of Prevention, Pesticides and Toxic Substances
Telephone: 202-566-1667
Last EDR Contact: 12/17/2007
Next Scheduled EDR Contact: 03/17/2008
Data Release Frequency: Quarterly

FTTS INSP: FIFRA/ TSCA Tracking System - FIFRA (Federal Insecticide, Fungicide, & Rodenticide Act)/TSCA (Toxic Substances Control Act)
A listing of FIFRA/TSCA Tracking System (FTTS) inspections and enforcements.

Date of Government Version: 01/15/2008
Date Data Arrived at EDR: 01/22/2008
Date Made Active in Reports: 01/30/2008
Number of Days to Update: 8

Source: EPA
Telephone: 202-566-1667
Last EDR Contact: 12/17/2007
Next Scheduled EDR Contact: 03/17/2008
Data Release Frequency: Quarterly

HIST FTTS: FIFRA/TSCA Tracking System Administrative Case Listing
A complete administrative case listing from the FIFRA/TSCA Tracking System (FTTS) for all ten EPA regions. The information was obtained from the National Compliance Database (NCDB). NCDB supports the implementation of FIFRA (Federal Insecticide, Fungicide, and Rodenticide Act) and TSCA (Toxic Substances Control Act). Some EPA regions are now closing out records. Because of that, and the fact that some EPA regions are not providing EPA Headquarters with updated records, it was decided to create a HIST FTTS database. It included records that may not be included in the newer FTTS database updates. This database is no longer updated.

Date of Government Version: 10/19/2006
Date Data Arrived at EDR: 03/01/2007
Date Made Active in Reports: 04/10/2007
Number of Days to Update: 40

Source: Environmental Protection Agency
Telephone: 202-564-2501
Last EDR Contact: 12/17/2007
Next Scheduled EDR Contact: 03/17/2008
Data Release Frequency: No Update Planned

HIST FTTS INSP: FIFRA/TSCA Tracking System Inspection & Enforcement Case Listing
A complete inspection and enforcement case listing from the FIFRA/TSCA Tracking System (FTTS) for all ten EPA regions. The information was obtained from the National Compliance Database (NCDB). NCDB supports the implementation of FIFRA (Federal Insecticide, Fungicide, and Rodenticide Act) and TSCA (Toxic Substances Control Act). Some EPA regions are now closing out records. Because of that, and the fact that some EPA regions are not providing EPA Headquarters with updated records, it was decided to create a HIST FTTS database. It included records that may not be included in the newer FTTS database updates. This database is no longer updated.

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

Date of Government Version: 10/19/2006
Date Data Arrived at EDR: 03/01/2007
Date Made Active in Reports: 04/10/2007
Number of Days to Update: 40

Source: Environmental Protection Agency
Telephone: 202-564-2501
Last EDR Contact: 12/17/2008
Next Scheduled EDR Contact: 03/17/2008
Data Release Frequency: No Update Planned

SSTS: Section 7 Tracking Systems
Section 7 of the Federal Insecticide, Fungicide and Rodenticide Act, as amended (92 Stat. 829) requires all registered pesticide-producing establishments to submit a report to the Environmental Protection Agency by March 1st each year. Each establishment must report the types and amounts of pesticides, active ingredients and devices being produced, and those having been produced and sold or distributed in the past year.

Date of Government Version: 12/31/2005
Date Data Arrived at EDR: 03/13/2007
Date Made Active in Reports: 04/27/2007
Number of Days to Update: 45

Source: EPA
Telephone: 202-564-4203
Last EDR Contact: 01/28/2008
Next Scheduled EDR Contact: 04/14/2008
Data Release Frequency: Annually

ICIS: Integrated Compliance Information System
The Integratad Compliance Information System (ICIS) supports the information needs of the national enforcement and compliance program as well as the unique needs of the National Pollutant Discharge Elimination System (NPDES) program.

Date of Government Version: 07/27/2007
Date Data Arrived at EDR: 08/13/2007
Date Made Active in Reports: 10/11/2007
Number of Days to Update: 59

Source: Environmental Protection Agency
Telephone: 202-564-5088
Last EDR Contact: 01/15/2008
Next Scheduled EDR Contact: 04/14/2008
Data Release Frequency: Quarterly

PADS: PCB Activity Database System
PCB Activity Database. PADS Identifies generators, transporters, commercial storers and/or brokers and disposers of PCB's who are required to notify the EPA of such activities.

Date of Government Version: 04/12/2007
Date Data Arrived at EDR: 06/08/2007
Date Made Active in Reports: 08/29/2007
Number of Days to Update: 82

Source: EPA
Telephone: 202-566-0500
Last EDR Contact: 02/07/2008
Next Scheduled EDR Contact: 05/05/2008
Data Release Frequency: Annually

MLTS: Material Licensing Tracking System
MLTS is maintained by the Nuclear Regulatory Commission and contains a list of approximately 8,100 sites which possess or use radioactive materials and which are subject to NRC licensing requirements. To maintain currency, EDR contacts the Agency on a quarterly basis.

Date of Government Version: 10/04/2007
Date Data Arrived at EDR: 12/03/2007
Date Made Active in Reports: 12/28/2007
Number of Days to Update: 25

Source: Nuclear Regulatory Commission
Telephone: 301-415-7169
Last EDR Contact: 01/02/2008
Next Scheduled EDR Contact: 03/31/2008
Data Release Frequency: Quarterly

RADINFO: Radiation Information Database
The Radiation Information Database (RADINFO) contains information about facilities that are regulated by U.S. Environmental Protection Agency (EPA) regulations for radiation and radioactivity.

Date of Government Version: 10/30/2007
Date Data Arrived at EDR: 12/03/2007
Date Made Active in Reports: 01/24/2008
Number of Days to Update: 52

Source: Environmental Protection Agency
Telephone: 202-343-9775
Last EDR Contact: 01/31/2008
Next Scheduled EDR Contact: 04/28/2008
Data Release Frequency: Quarterly

FINDS: Facility Index System/Facility Registry System
Facility Index System. FINDS contains both facility information and 'pointers' to other sources that contain more detail. EDR includes the following FINDS databases in this report: PCS (Permit Compliance System), AIRS (Aerometric Information Retrieval System), DOCKET (Enforcement Docket used to manage and track information on civil judicial enforcement cases for all environmental statutes), FURS (Federal Underground Injection Control), C-DOCKET (Criminal Docket System used to track criminal enforcement actions for all environmental statutes), FFIS (Federal Facilities Information System), STATE (State Environmental Laws and Statutes), and PADS (PCB Activity Data System).

Date of Government Version: 01/04/2008
Date Data Arrived at EDR: 01/10/2008
Date Made Active in Reports: 02/20/2008
Number of Days to Update: 41

Source: EPA
Telephone: (415) 947-8000
Last EDR Contact: 01/02/2008
Next Scheduled EDR Contact: 03/31/2008
Data Release Frequency: Quarterly

RAATS: RCRA Administrative Action Tracking System
RCRA Administration Action Tracking System. RAATS contains records based on enforcement actions issued under RCRA pertaining to major violators and includes administrative and civil actions brought by the EPA. For administration actions after September 30, 1995, data entry in the RAATS database was discontinued. EPA will retain a copy of the database for historical records. It was necessary to terminate RAATS because a decrease in agency resources made it impossible to continue to update the information contained in the database.

Date of Government Version: 04/17/1995
Date Data Arrived at EDR: 07/03/1995
Date Made Active in Reports: 08/07/1995
Number of Days to Update: 35

Source: EPA
Telephone: 202-564-4104
Last EDR Contact: 03/03/2008
Next Scheduled EDR Contact: 06/02/2008
Data Release Frequency: No Update Planned

BRS: Biennial Reporting System
The Biennial Reporting System is a national system administered by the EPA that collects data on the generation and management of hazardous waste. BRS captures detailed data from two groups: Large Quantity Generators (LQG) and Treatment, Storage, and Disposal Facilities.

Date of Government Version: 12/31/2005
Date Data Arrived at EDR: 03/06/2007
Date Made Active in Reports: 04/13/2007
Number of Days to Update: 38

Source: EPA/NTIS
Telephone: 800-424-9346
Last EDR Contact: 03/13/2008
Next Scheduled EDR Contact: 06/09/2008
Data Release Frequency: Biennially

STATE AND LOCAL RECORDS

HIST CAL-SITES: Calsites Database
The Calsites database contains potential or confirmed hazardous substance release properties. In 1996, California EPA reevaluated and significantly reduced the number of sites in the Calsites database. No longer updated by the state agency. It has been replaced by ENVIROSTOR.

Date of Government Version: 08/08/2005
Date Data Arrived at EDR: 08/03/2006
Date Made Active in Reports: 08/24/2006
Number of Days to Update: 21

Source: Department of Toxic Substance Control
Telephone: 916-323-3400
Last EDR Contact: 02/25/2008
Next Scheduled EDR Contact: 05/26/2008
Data Release Frequency: No Update Planned

CA BOND EXP. PLAN: Bond Expenditure Plan
Department of Health Services developed a site-specific expenditure plan as the basis for an appropriation of Hazardous Substance Cleanup Bond Act funds. It is not updated.

Date of Government Version: 01/01/1989
Date Data Arrived at EDR: 07/27/1994
Date Made Active in Reports: 08/02/1994
Number of Days to Update: 6

Source: Department of Health Services
Telephone: 916-255-2118
Last EDR Contact: 05/31/1994
Next Scheduled EDR Contact: N/A
Data Release Frequency: No Update Planned

SCH: School Property Evaluation Program
This category contains proposed and existing school sites that are being evaluated by DTSC for possible hazardous materials contamination. In some cases, these properties may be listed in the CalSites category depending on the level of threat to public health and safety or the environment they pose.

Date of Government Version: 11/27/2007
Date Data Arrived at EDR: 11/28/2007
Date Made Active in Reports: 02/14/2008
Number of Days to Update: 78

Source: Department of Toxic Substances Control
Telephone: 916-323-3400
Last EDR Contact: 02/27/2008
Next Scheduled EDR Contact: 02/25/2008
Data Release Frequency: Quarterly

TOXIC PITS: Toxic Pits Cleanup Act Sites
Toxic PITS Cleanup Act Sites. TOXIC PITS identifies sites suspected of containing hazardous substances where cleanup has not yet been completed.

Date of Government Version: 07/01/1995
Date Data Arrived at EDR: 08/30/1995
Date Made Active in Reports: 09/26/1995
Number of Days to Update: 27

Source: State Water Resources Control Board
Telephone: 916-227-4364
Last EDR Contact: 02/11/2008
Next Scheduled EDR Contact: 04/28/2008
Data Release Frequency: No Update Planned

SWF/LF (SWIS): Solid Waste Information System
Active, Closed and Inactive Landfills. SWF/LF records typically contain an inve ntory of solid waste disposal facilities or landfills. These may be active or i nactive facilities or open dumps that failed to meet RCRA Section 4004 criteria for solid waste landfills or disposal sites.

Date of Government Version: 12/12/2007
Date Data Arrived at EDR: 12/13/2007
Date Made Active in Reports: 02/14/2008
Number of Days to Update: 63

Source: Integrated Waste Management Board
Telephone: 916-341-6320
Last EDR Contact: 03/12/2008
Next Scheduled EDR Contact: 06/09/2008
Data Release Frequency: Quarterly

WMUDS/SWAT: Waste Menagement Unit Database
Waste Menagement Unit Database System. WMUDS is used by the State Water Resources Control Board staff and the Regional Water Quality Control Boards for program tracking and inventory of waste management units. WMUDS is composed of the following databases: Facility Information, Scheduled Inspections Information, Waste Management Unit Information, SWAT Program Information, SWAT Report Summary Information, SWAT Report Summary Data, Chapter 15 (formerly Subchapter 15) Information, Chapter 15 Monitoring Parameters, TPCA Program Information, RCRA Program Information, Closure Information, and Interested Parties Information.

Date of Government Version: 04/01/2000
Date Data Arrived at EDR: 04/10/2000
Date Made Active in Reports: 05/10/2000
Number of Days to Update: 30

Source: State Water Resources Control Board
Telephone: 916-227-4448
Last EDR Contact: 03/03/2008
Next Scheduled EDR Contact: 06/02/2008
Data Release Frequency: Quarterly

CA WDS: Waste Discharge System
Sites which have been issued waste discharge requirements.

Date of Government Version: 06/19/2007
Date Data Arrived at EDR: 06/20/2007
Date Made Active in Reports: 06/29/2007
Number of Days to Update: 9

Source: State Water Resources Control Board
Telephone: 916-341-5227
Last EDR Contact: 12/17/2007
Next Scheduled EDR Contact: 03/17/2008
Data Release Frequency: Quarterly

CORTESE: "Cortese" Hazardous Waste & Substances Sites List
The sites for the list are designated by the State Water Resource Control Board (LUST), the Integrated Waste Board (SWF/LS), and the Department of Toxic Substances Control (Cal-Sites). This listing is no longer updated by the state agency.

Date of Government Version: 04/01/2001
Date Data Arrived at EDR: 05/29/2001
Date Made Active in Reports: 07/26/2001
Number of Days to Update: 58

Source: CAL EPA/Office of Emergency Information
Telephone: 916-323-3400
Last EDR Contact: 01/21/2008
Next Scheduled EDR Contact: 04/21/2008
Data Release Frequency: No Update Planned

SWRCY: Recycler Database
A listing of recycling facilities in California.

Date of Government Version: 01/07/2008
Date Data Arrived at EDR: 01/09/2008
Date Made Active in Reports: 02/14/2008
Number of Days to Update: 36

Source: Department of Conservation
Telephone: 916-323-3836
Last EDR Contact: 01/09/2008
Next Scheduled EDR Contact: 04/07/2008
Data Release Frequency: Quarterly

LUST REG 9: Leaking Underground Storage Tank Report
Orange, Riverside, San Diego counties. For more current information, please refer to the State Water Resources Control Board's LUST database.

Date of Government Version: 03/01/2001
Date Data Arrived at EDR: 04/23/2001
Date Made Active in Reports: 05/21/2001
Number of Days to Update: 28

Source: California Regional Water Quality Control Board San Diego Region (9)
Telephone: 858-637-5595
Last EDR Contact: 01/15/2008
Next Scheduled EDR Contact: 04/14/2008
Data Release Frequency: No Update Planned

LUST REG 8: Leaking Underground Storage Tanks
California Regional Water Quality Control Board Santa Ana Region (8). For more current information, please refer to the State Water Resources Control Board's LUST database.

Date of Government Version: 02/14/2005
Date Data Arrived at EDR: 02/15/2005
Date Made Active in Reports: 03/28/2005
Number of Days to Update: 41

Source: California Regional Water Quality Control Board Santa Ana Region (8)
Telephone: 909-782-4496
Last EDR Contact: 02/05/2008
Next Scheduled EDR Contact: 05/05/2008
Data Release Frequency: Varies

LUST REG 6V: Leaking Underground Storage Tank Case Listing
Leaking Underground Storage Tank locations. Inyo, Kern, Los Angeles, Mono, San Bernardino counties.

Date of Government Version: 06/07/2005
Date Data Arrived at EDR: 06/07/2005
Date Made Active in Reports: 06/29/2005
Number of Days to Update: 22

Source: California Regional Water Quality Control Board Victorville Branch Office (6)
Telephone: 760-241-7365
Last EDR Contact: 01/02/2008
Next Scheduled EDR Contact: 03/31/2008
Data Release Frequency: No Update Planned

LUST REG 6L: Leaking Underground Storage Tank Case Listing
For more current information, please refer to the State Water Resources Control Board's LUST database.

Date of Government Version: 09/09/2003
Date Data Arrived at EDR: 09/10/2003
Date Made Active in Reports: 10/07/2003
Number of Days to Update: 27

Source: California Regional Water Quality Control Board Lahontan Region (6)
Telephone: 530-542-5572
Last EDR Contact: 03/03/2008
Next Scheduled EDR Contact: 06/02/2008
Data Release Frequency: No Update Planned

LUST REG 5: Leaking Underground Storage Tank Database
Leaking Underground Storage Tank locations. Alameda, Alpine, Amador, Butte, Colusa, Contra Costa, Calveras, El Dorado, Fresno, Glenn, Kern, Kings, Lake, Lassen, Madera, Mariposa, Merced, Modoc, Napa, Nevada, Placer, Plumas, Sacramento, San Joaquin, Shasta, Solano, Stanislaus, Sutter, Tehama, Tulare, Tuolumne, Yolo, Yuba counties.

Date of Government Version: 01/01/2008
Date Data Arrived at EDR: 01/23/2008
Date Made Active in Reports: 02/14/2008
Number of Days to Update: 22

Source: California Regional Water Quality Control Board Central Valley Region (5)
Telephone: 916-464-4834
Last EDR Contact: 01/23/2008
Next Scheduled EDR Contact: 03/31/2008
Data Release Frequency: Quarterly

LUST REG 4: Underground Storage Tank Leak List
Los Angeles, Ventura counties. For more current information, please refer to the State Water Resources Control Board's LUST database.

Date of Government Version: 09/07/2004
Date Data Arrived at EDR: 09/07/2004
Date Made Active in Reports: 10/12/2004
Number of Days to Update: 35

Source: California Regional Water Quality Control Board Los Angeles Region (4)
Telephone: 213-576-6710
Last EDR Contact: 12/26/2007
Next Scheduled EDR Contact: 03/24/2008
Data Release Frequency: No Update Planned

LUST REG 3: Leaking Underground Storage Tank Database
Leaking Underground Storage Tank locations. Monterey, San Benito, San Luis Obispo, Santa Barbara, Santa Cruz counties.

Date of Government Version: 05/19/2003
Date Data Arrived at EDR: 05/19/2003
Date Made Active in Reports: 08/02/2003
Number of Days to Update: 14

Source: California Regional Water Quality Control Board Central Coast Region (3)
Telephone: 805-542-4786
Last EDR Contact: 02/11/2008
Next Scheduled EDR Contact: 05/12/2008
Data Release Frequency: No Update Planned

LUST REG 2: Fuel Leak List
Leaking Underground Storage Tank locations. Alameda, Contra Costa, Marin, Napa, San Francisco, San Mateo, Santa Clara, Solano, Sonoma counties.

Date of Government Version: 09/30/2004
Date Data Arrived at EDR: 10/20/2004
Date Made Active in Reports: 11/19/2004
Number of Days to Update: 30

Source: California Regional Water Quality Control Board San Francisco Bay Region (2)
Telephone: 510-622-2433
Last EDR Contact: 01/07/2008
Next Scheduled EDR Contact: 04/07/2008
Data Release Frequency: Quarterly

LUST REG 1: Active Toxic Site Investigation
Del Norte, Humboldt, Lake, Mendocino, Modoc, Siskiyou, Sonoma, Trinity counties. For more current information, please refer to the State Water Resources Control Board's LUST database.

Date of Government Version: 02/01/2001
Date Data Arrived at EDR: 02/28/2001
Date Made Active in Reports: 03/29/2001
Number of Days to Update: 29

Source: California Regional Water Quality Control Board North Coast (1)
Telephone: 707-570-3769
Last EDR Contact: 02/19/2008
Next Scheduled EDR Contact: 05/19/2008
Data Release Frequency: No Update Planned

LUST: Geotracker's Leaking Underground Fuel Tank Report
Leaking Underground Storage Tank Incident Reports. LUST records contain an inventory of reported leaking underground storage tank incidents. Not all states maintain these records, and the information stored varies by state. For more information on a particular leaking underground storage tank sites, please contact the appropriate regulatory agency.

Date of Government Version: 01/07/2008
Date Data Arrived at EDR: 01/09/2008
Date Made Active in Reports: 02/14/2008
Number of Days to Update: 36

Source: State Water Resources Control Board
Telephone: see region list
Last EDR Contact: 01/09/2008
Next Scheduled EDR Contact: 04/07/2008
Data Release Frequency: Quarterly

LUST REG 7: Leaking Underground Storage Tank Case Listing
Leaking Underground Storage Tank locations. Imperial, Riverside, San Diego, Santa Barbara counties.

Date of Government Version: 02/26/2004
Date Data Arrived at EDR: 02/26/2004
Date Made Active in Reports: 03/24/2004
Number of Days to Update: 27

Source: California Regional Water Quality Control Board Colorado River Basin Region (7)
Telephone: 760-776-8943
Last EDR Contact: 02/19/2008
Next Scheduled EDR Contact: 05/19/2008
Data Release Frequency: No Update Planned

CA FID UST: Facility Inventory Database
The Facility Inventory Database (FID) contains a historical listing of active and inactive underground storage tank locations from the State Water Resource Control Board. Refer to local/county source for current data.

Date of Government Version: 10/31/1994
Date Data Arrived at EDR: 09/05/1995
Date Made Active in Reports: 09/29/1995
Number of Days to Update: 24

Source: California Environmental Protection Agency
Telephone: 916-341-5851
Last EDR Contact: 12/28/1998
Next Scheduled EDR Contact: N/A
Data Release Frequency: No Update Planned

SLIC: Statewide SLIC Cases
The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 01/07/2008
Date Data Arrived at EDR: 01/09/2008
Date Made Active in Reports: 02/14/2008
Number of Days to Update: 36

Source: State Water Resources Control Board
Telephone: 866-480-1028
Last EDR Contact: 01/09/2008
Next Scheduled EDR Contact: 04/07/2008
Data Release Frequency: Varies

SLIC REG 1: Active Toxic Site Investigations
The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 04/03/2003
Date Data Arrived at EDR: 04/07/2003
Date Made Active in Reports: 04/25/2003
Number of Days to Update: 18

Source: California Regional Water Quality Control Board, North Coast Region (1)
Telephone: 707-576-2220
Last EDR Contact: 02/19/2008
Next Scheduled EDR Contact: 05/19/2008
Data Release Frequency: No Update Planned

SLIC REG 2: Spills, Leaks, Investigation & Cleanup Cost Recovery Listing
The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 09/30/2004
Date Data Arrived at EDR: 10/20/2004
Date Made Active in Reports: 11/19/2004
Number of Days to Update: 30

Source: Regional Water Quality Control Board San Francisco Bay Region (2)
Telephone: 510-286-0457
Last EDR Contact: 01/07/2008
Next Scheduled EDR Contact: 04/07/2008
Data Release Frequency: Quarterly

SLIC REG 3: Spills, Leaks, Investigation & Cleanup Cost Recovery Listing
The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 05/18/2006
Date Data Arrived at EDR: 05/18/2006
Date Made Active in Reports: 06/15/2006
Number of Days to Update: 28

Source: California Regional Water Quality Control Board Central Coast Region (3)
Telephone: 805-549-3147
Last EDR Contact: 02/11/2008
Next Scheduled EDR Contact: 05/12/2008
Data Release Frequency: Semi-Annually

SLIC REG 4: Spills, Leaks, Investigation & Cleanup Cost Recovery Listing
The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 11/17/2004
Date Data Arrived at EDR: 11/18/2004
Date Made Active in Reports: 01/04/2005
Number of Days to Update: 47

Source: Region Water Quality Control Board Los Angeles Region (4)
Telephone: 213-576-6600
Last EDR Contact: 01/21/2008
Next Scheduled EDR Contact: 04/21/2008
Data Release Frequency: Varies

SLIC REG 5: Spills, Leaks, Investigation & Cleanup Cost Recovery Listing
The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 04/01/2005
Date Data Arrived at EDR: 04/05/2005
Date Made Active in Reports: 04/21/2005
Number of Days to Update: 16

Source: Regional Water Quality Control Board Central Valley Region (5)
Telephone: 916-464-3291
Last EDR Contact: 01/02/2008
Next Scheduled EDR Contact: 03/31/2008
Data Release Frequency: Semi-Annually

SLIC REG 6V: Spills, Leaks, Investigation & Cleanup Cost Recovery Listing
The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 05/24/2005
Date Data Arrived at EDR: 05/25/2005
Date Made Active in Reports: 06/16/2005
Number of Days to Update: 22

Source: Regional Water Quality Control Board, Victorville Branch
Telephone: 619-241-6583
Last EDR Contact: 01/02/2008
Next Scheduled EDR Contact: 03/31/2008
Data Release Frequency: Semi-Annually

SLIC REG 6L: SLIC Sites
The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 09/07/2004
Date Data Arrived at EDR: 09/07/2004
Date Made Active in Reports: 10/12/2004
Number of Days to Update: 35

Source: California Regional Water Quality Control Board, Lahontan Region
Telephone: 530-542-5574
Last EDR Contact: 03/03/2008
Next Scheduled EDR Contact: 06/02/2008
Data Release Frequency: No Update Planned

SLIC REG 7: SLIC List
The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 11/24/2004
Date Data Arrived at EDR: 11/29/2004
Date Made Active in Reports: 01/04/2005
Number of Days to Update: 36

Source: California Regional Quality Control Board, Colorado River Basin Region
Telephone: 760-346-7491
Last EDR Contact: 03/03/2008
Next Scheduled EDR Contact: 05/19/2008
Data Release Frequency: No Update Planned

SLIC REG 8: Spills, Leaks, Investigation & Cleanup Cost Recovery Listing
The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 10/02/2007
Date Data Arrived at EDR: 10/03/2007
Date Made Active in Reports: 11/07/2007
Number of Days to Update: 35

Source: California Region Water Quality Control Board Santa Ana Region (8)
Telephone: 951-782-3298
Last EDR Contact: 01/02/2008
Next Scheduled EDR Contact: 03/31/2008
Data Release Frequency: Semi-Annually

SLIC REG 9: Spills, Leaks, Investigation & Cleanup Cost Recovery Listing
The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 09/10/2007
Date Data Arrived at EDR: 09/11/2007
Date Made Active in Reports: 09/28/2007
Number of Days to Update: 17

Source: California Regional Water Quality Control Board San Diego Region (9)
Telephone: 858-467-2980
Last EDR Contact: 02/25/2008
Next Scheduled EDR Contact: 05/26/2008
Data Release Frequency: Annually

UST: Active UST Facilities
Active UST facilities gathered from the local regulatory agencies

Date of Government Version: 01/07/2008
Date Data Arrived at EDR: 01/09/2008
Date Made Active in Reports: 02/08/2008
Number of Days to Update: 30

Source: SWRCB
Telephone: 916-480-1028
Last EDR Contact: 01/09/2008
Next Scheduled EDR Contact: 04/07/2008
Data Release Frequency: Semi-Annually

UST MENDOCINO: Mendocino County UST Database
A listing of underground storage tank locations in Mendocino County.

Date of Government Version: 12/26/2007
Date Data Arrived at EDR: 12/28/2007
Date Made Active in Reports: 02/08/2008
Number of Days to Update: 42

Source: Department of Public Health
Telephone: 707-463-4466
Last EDR Contact: 12/26/2007
Next Scheduled EDR Contact: 03/24/2008
Data Release Frequency: Varies

HIST UST: Hazardous Substance Storage Container Database
The Hazardous Substance Storage Container Database is a historical listing of UST sites. Refer to local/county source for current data.

Date of Government Version: 10/15/1990
Date Data Arrived at EDR: 01/25/1991
Date Made Active in Reports: 02/12/1991
Number of Days to Update: 18

Source: State Water Resources Control Board
Telephone: 916-341-5851
Last EDR Contact: 07/26/2001
Next Scheduled EDR Contact: N/A
Data Release Frequency: No Update Planned

LIENS: Environmental Liens Listing
A listing of property locations with environmental liens for California where DTSC is a lien holder.

Date of Government Version: 02/05/2008
Date Data Arrived at EDR: 02/06/2008
Date Made Active in Reports: 03/14/2008
Number of Days to Update: 37

Source: Department of Toxic Substances Control
Telephone: 916-323-3400
Last EDR Contact: 02/05/2008
Next Scheduled EDR Contact: 05/05/2008
Data Release Frequency: Varies

AST: Aboveground Petroleum Storage Tank Facilities
Registered Aboveground Storage Tanks.

Date of Government Version: 11/01/2007
Date Data Arrived at EDR: 11/27/2007
Date Made Active in Reports: 02/14/2008
Number of Days to Update: 79

Source: State Water Resources Control Board
Telephone: 916-341-5712
Last EDR Contact: 01/28/2008
Next Scheduled EDR Contact: 04/28/2008
Data Release Frequency: Quarterly

SWEEPS UST: SWEEPS UST Listing
Statewide Environmental Evaluation and Planning System. This underground storage tank listing was updated and maintained by a company contacted by the SWRCB in the early 1990's. The listing is no longer updated or maintained. The local agency is the contact for more information on a site on the SWEEPS list.

Date of Government Version: 06/01/1994
Date Data Arrived at EDR: 07/07/2005
Date Made Active in Reports: 08/11/2005
Number of Days to Update: 35

Source: State Water Resources Control Board
Telephone: N/A
Last EDR Contact: 06/03/2005
Next Scheduled EDR Contact: N/A
Data Release Frequency: No Update Planned

CHMIRS: California Hazardous Material Incident Report System
California Hazardous Material Incident Reporting System. CHMIRS contains information on reported hazardous material incidents (accidental releases or spills).

Date of Government Version: 12/31/2005
Date Data Arrived at EDR: 02/23/2007
Date Made Active in Reports: 04/06/2007
Number of Days to Update: 42

Source: Office of Emergency Services
Telephone: 916-845-8400
Last EDR Contact: 02/19/2008
Next Scheduled EDR Contact: 05/19/2008
Data Release Frequency: Varies

NOTIFY 65: Proposition 65 Records
Proposition 65 Notification Records. NOTIFY 65 contains facility notifications about any release which could impact drinking water and thereby expose the public to a potential health risk.

Date of Government Version: 10/21/1993
Date Data Arrived at EDR: 11/01/1993
Date Made Active in Reports: 11/19/1993
Number of Days to Update: 18

Source: State Water Resources Control Board
Telephone: 916-445-3846
Last EDR Contact: 01/15/2008
Next Scheduled EDR Contact: 04/14/2008
Data Release Frequency: No Update Planned

DEED: Deed Restriction Listing
Site Mitigation and Brownfields Reuse Program Facility Sites with Deed Restrictions & Hazardous Waste Management Program Facility Sites with Deed / Land Use Restriction. The DTSC Site Mitigation and Brownfields Reuse Program (SMBRP) list includes sites cleaned up under the program's oversight and generally does not include current or former hazardous waste facilities that required a hazardous waste facility permit. The list represents deed restrictions that are active. Some sites have multiple deed restrictions. The DTSC Hazardous Waste Management Program (HWMP) has developed a list of current or former hazardous waste facilities that have a recorded land use restriction at the local county recorder's office. The land use restrictions on this list were required by the DTSC HWMP as a result of the presence of hazardous substances that remain on site after the facility (or part of the facility) has been closed or cleaned up. The types of land use restriction include deed notice, deed restriction, or a land use restriction that binds current and future owners.

Date of Government Version: 01/03/2008
Date Data Arrived at EDR: 01/04/2008
Date Made Active in Reports: 02/14/2008
Number of Days to Update: 41

Source: Department of Toxic Substances Control
Telephone: 916-323-3400
Last EDR Contact: 01/04/2008
Next Scheduled EDR Contact: 03/31/2008
Data Release Frequency: Semi-Annually

VCP: Voluntary Cleanup Program Properties
Contains low threat level properties with either confirmed or unconfirmed releases and the project proponents have request that DTSC oversee investigation and/or cleanup activities and have agreed to provide coverage for DTSC's costs.

Date of Government Version: 11/27/2007
Date Data Arrived at EDR: 11/28/2007
Date Made Active in Reports: 02/14/2008
Number of Days to Update: 78

Source: Department of Toxic Substances Control
Telephone: 916-323-3400
Last EDR Contact: 02/27/2008
Next Scheduled EDR Contact: 05/26/2008
Data Release Frequency: Quarterly

DRYCLEANERS: Cleaner Facilities
A list of drycleaner related facilities that have EPA ID numbers. These are facilities with certain SIC codes: power laundries, family and commercial; garment pressing and cleaner's agents; linen supply; coin-operated laundries and cleaning; drycleaning plants, except rugs; carpet and upholster cleaning; industrial launderers; laundry and garment services.

Date of Government Version: 07/31/2007
Date Data Arrived at EDR: 07/31/2007
Date Made Active in Reports: 08/09/2007
Number of Days to Update: 9

Source: Department of Toxic Substance Control
Telephone: 916-327-4498
Last EDR Contact: 01/02/2008
Next Scheduled EDR Contact: 03/31/2008
Data Release Frequency: Annually

WIP: Well Investigation Program Case List
Well Investigation Program case in the San Gabriel and San Fernando Valley area.

Date of Government Version: 10/25/2007
Date Data Arrived at EDR: 01/23/2008
Date Made Active in Reports: 02/14/2008
Number of Days to Update: 22

Source: Los Angeles Water Quality Control Board
Telephone: 213-576-6726
Last EDR Contact: 01/23/2008
Next Scheduled EDR Contact: 04/21/2008
Data Release Frequency: Varies

CDL: Clandestine Drug Labs
A listing of drug lab locations. Listing of a location in this database does not indicate that any illegal drug lab materials were or were not present there, and does not constitute a determination that the location either requires or does not require additional cleanup work.

Date of Government Version: 09/30/2007
Date Data Arrived at EDR: 10/15/2007
Date Made Active in Reports: 11/07/2007
Number of Days to Update: 23

Source: Department of Toxic Substances Control
Telephone: 916-255-6504
Last EDR Contact: 02/19/2008
Next Scheduled EDR Contact: 04/21/2008
Data Release Frequency: Varies

RESPONSE: State Response Sites
Identifies confirmed release sites where DTSC is involved in remediation, either in a lead or oversight capacity. These confirmed release sites are generally high-priority and high potential risk.

Date of Government Version: 11/27/2007
Date Data Arrived at EDR: 11/28/2007
Date Made Active in Reports: 02/14/2008
Number of Days to Update: 78

Source: Department of Toxic Substances Control
Telephone: 916-323-3400
Last EDR Contact: 02/27/2008
Next Scheduled EDR Contact: 05/26/2008
Data Release Frequency: Quarterly

HAZNET: Facility and Manifest Data
Facility and Manifest Data. The data is extracted from the copies of hazardous waste manifests received each year by the DTSC. The annual volume of manifests is typically 700,000 - 1,000,000 annually, representing approximately 350,000 - 500,000 shipments. Data are from the manifests submitted without correction, and therefore many contain some invalid values for data elements such as generator ID, TSD ID, waste category, and disposal method.

Date of Government Version: 12/31/2006
Date Data Arrived at EDR: 10/04/2007
Date Made Active in Reports: 11/07/2007
Number of Days to Update: 34

Source: California Environmental Protection Agency
Telephone: 916-255-1136
Last EDR Contact: 02/08/2008
Next Scheduled EDR Contact: 05/05/2008
Data Release Frequency: Annually

EMI: Emissions Inventory Data
Toxics and criteria pollutant emissions data collected by the ARB and local air pollution agencies.

Date of Government Version: 12/31/2005
Date Data Arrived at EDR: 04/17/2007
Date Made Active in Reports: 05/10/2007
Number of Days to Update: 23

Source: California Air Resources Board
Telephone: 916-322-2990
Last EDR Contact: 01/18/2008
Next Scheduled EDR Contact: 04/14/2008
Data Release Frequency: Varies

ENVIROSTOR: EnviroStor Database
The Department of Toxic Substances Control's (DTSC's) Site Mitigation and Brownfields Reuse Program's (SMBRP's) EnviroStor database identifies sites that have known contamination or sites for which there may be reasons to investigate further. The database includes the following site types: Federal Superfund sites (National Priorities List (NPL)); State Response, including Military Facilities and State Superfund; Voluntary Cleanup; and School sites. EnviroStor provides similar information to the information that was available in CalSites, and provides additional site information, including, but not limited to, identification of formerly-contaminated properties that have been released for reuse, properties where environmental deed restrictions have been recorded to prevent inappropriate land uses, and risk characterization information that is used to assess potential impacts to public health and the environment at contaminated sites.

Date of Government Version: 11/27/2007
Date Data Arrived at EDR: 11/28/2007
Date Made Active in Reports: 02/14/2008
Number of Days to Update: 78

Source: Department of Toxic Substances Control
Telephone: 916-323-3400
Last EDR Contact: 02/27/2008
Next Scheduled EDR Contact: 05/26/2008
Data Release Frequency: Quarterly

HAULERS: Registered Waste Tire Haulers Listing
A listing of registered waste tire haulers.

Date of Government Version: 02/12/2008
Date Data Arrived at EDR: 02/14/2008
Date Made Active in Reports: 03/14/2008
Number of Days to Update: 29

Source: Integrated Waste Management Board
Telephone: 916-341-6422
Last EDR Contact: 03/10/2008
Next Scheduled EDR Contact: 06/09/2008
Data Release Frequency: Varies

TRIBAL RECORDS

INDIAN RESERV: Indian Reservations
This map layer portrays Indian administered lands of the United States that have any area equal to or greater than 640 acres.

Date of Government Version: 12/31/2005
Date Data Arrived at EDR: 12/06/2006
Date Made Active in Reports: 01/11/2007
Number of Days to Update: 34

Source: USGS
Telephone: 202-208-3710
Last EDR Contact: 02/08/2008
Next Scheduled EDR Contact: 05/05/2008
Data Release Frequency: Semi-Annually

INDIAN ODI: Report on the Status of Open Dumps on Indian Lands
Location of open dumps on Indian land.

Date of Government Version: 12/31/1998
Date Data Arrived at EDR: 12/03/2007
Date Made Active in Reports: 01/24/2008
Number of Days to Update: 52

Source: Environmental Protection Agency
Telephone: 703-308-8245
Last EDR Contact: 02/25/2008
Next Scheduled EDR Contact: 05/26/2008
Data Release Frequency: Varies

INDIAN LUST R7: Leaking Underground Storage Tanks on Indian Land
LUSTs on Indian land in Iowa, Kansas, and Nebraska

Date of Government Version: 05/01/2007
Date Data Arrived at EDR: 06/14/2007
Date Made Active in Reports: 07/05/2007
Number of Days to Update: 21

Source: EPA Region 7
Telephone: 913-551-7003
Last EDR Contact: 02/15/2008
Next Scheduled EDR Contact: 05/19/2008
Data Release Frequency: Varies

INDIAN LUST R8: Leaking Underground Storage Tanks on Indian Land
LUSTs on Indian land in Colorado, Montana, North Dakota, South Dakota, Utah and Wyoming.

Date of Government Version: 12/03/2007
Date Data Arrived at EDR: 12/06/2007
Date Made Active in Reports: 12/26/2007
Number of Days to Update: 22

Source: EPA Region 8
Telephone: 303-312-6271
Last EDR Contact: 02/15/2008
Next Scheduled EDR Contact: 05/19/2008
Data Release Frequency: Quarterly

INDIAN LUST R1: Leaking Underground Storage Tanks on Indian Land
A listing of leaking underground storage tank locations on Indian Land.

Date of Government Version: 12/01/2006
Date Data Arrived at EDR: 12/01/2006
Date Made Active in Reports: 01/29/2007
Number of Days to Update: 59

Source: EPA Region 1
Telephone: 617-918-1313
Last EDR Contact: 02/15/2008
Next Scheduled EDR Contact: 05/19/2008
Data Release Frequency: Varies

INDIAN LUST R6: Leaking Underground Storage Tanks on Indian Land
LUSTs on Indian land in New Mexico and Oklahoma.

Date of Government Version: 12/12/2007
Date Data Arrived at EDR: 12/12/2007
Date Made Active in Reports: 01/24/2008
Number of Days to Update: 43

Source: EPA Region 6
Telephone: 214-665-6597
Last EDR Contact: 02/15/2008
Next Scheduled EDR Contact: 05/19/2008
Data Release Frequency: Varies

INDIAN LUST R9: Leaking Underground Storage Tanks on Indian Land
LUSTs on Indian land in Arizona, California, New Mexico and Nevada

Date of Government Version: 11/30/2007
Date Data Arrived at EDR: 11/30/2007
Date Made Active in Reports: 12/28/2007
Number of Days to Update: 28

Source: Environmental Protection Agency
Telephone: 415-972-3372
Last EDR Contact: 02/15/2008
Next Scheduled EDR Contact: 05/19/2008
Data Release Frequency: Quarterly

INDIAN LUST R10: Leaking Underground Storage Tanks on Indian Land
LUSTs on Indian land in Alaska, Idaho, Oregon and Washington.

Date of Government Version: 11/27/2007
Date Data Arrived at EDR: 12/03/2007
Date Made Active in Reports: 01/24/2008
Number of Days to Update: 52

Source: EPA Region 10
Telephone: 206-553-2857
Last EDR Contact: 02/15/2008
Next Scheduled EDR Contact: 05/19/2008
Data Release Frequency: Quarterly

INDIAN LUST R4: Leaking Underground Storage Tanks on Indian Land
LUSTs on Indian land in Florida, Mississippi and North Carolina.

Date of Government Version: 09/05/2007
Date Data Arrived at EDR: 10/02/2007
Date Made Active in Reports: 10/11/2007
Number of Days to Update: 9

Source: EPA Region 4
Telephone: 404-562-8677
Last EDR Contact: 02/15/2008
Next Scheduled EDR Contact: 05/19/2008
Data Release Frequency: Semi-Annually

INDIAN UST R1: Underground Storage Tanks on Indian Land
A listing of underground storage tank locations on Indian Land.

Date of Government Version: 12/01/2006
Date Data Arrived at EDR: 12/01/2006
Date Made Active in Reports: 01/29/2007
Number of Days to Update: 59

Source: EPA, Region 1
Telephone: 617-918-1313
Last EDR Contact: 02/15/2008
Next Scheduled EDR Contact: 05/19/2008
Data Release Frequency: Varies

INDIAN UST R6: Underground Storage Tanks on Indian Land
No description is available for this data

Date of Government Version: 12/12/2007
Date Data Arrived at EDR: 12/12/2007
Date Made Active in Reports: 01/24/2008
Number of Days to Update: 43

Source: EPA Region 6
Telephone: 214-665-7591
Last EDR Contact: 02/15/2008
Next Scheduled EDR Contact: 05/19/2008
Data Release Frequency: Semi-Annually

INDIAN UST R7: Underground Storage Tanks on Indian Land
No description is available for this data

Date of Government Version: 05/01/2007
Date Data Arrived at EDR: 06/14/2007
Date Made Active in Reports: 07/05/2007
Number of Days to Update: 21

Source: EPA Region 7
Telephone: 913-551-7003
Last EDR Contact: 02/15/2008
Next Scheduled EDR Contact: 05/19/2008
Data Release Frequency: Varies

INDIAN UST R9: Underground Storage Tanks on Indian Land
No description is available for this data

Date of Government Version: 11/30/2007
Date Data Arrived at EDR: 12/03/2007
Date Made Active in Reports: 01/24/2008
Number of Days to Update: 52

Source: EPA Region 9
Telephone: 415-972-3368
Last EDR Contact: 02/15/2008
Next Scheduled EDR Contact: 05/19/2008
Data Release Frequency: Quarterly

INDIAN UST R4: Underground Storage Tanks on Indian Land
No description is available for this data

Date of Government Version: 09/05/2007
Date Data Arrived at EDR: 10/02/2007
Date Made Active in Reports: 10/11/2007
Number of Days to Update: 9

Source: EPA Region 4
Telephone: 404-562-9424
Last EDR Contact: 02/15/2008
Next Scheduled EDR Contact: 05/19/2008
Data Release Frequency: Semi-Annually

INDIAN UST R5: Underground Storage Tanks on Indian Land
No description is available for this data

Date of Government Version: 12/21/2007
Date Data Arrived at EDR: 12/21/2007
Date Made Active in Reports: 01/24/2008
Number of Days to Update: 34

Source: EPA Region 5
Telephone: 312-886-6136
Last EDR Contact: 02/15/2008
Next Scheduled EDR Contact: 05/19/2008
Data Release Frequency: Varies

INDIAN UST R10: Underground Storage Tanks on Indian Land
No description is available for this data

Date of Government Version: 11/27/2007
Date Data Arrived at EDR: 12/03/2007
Date Made Active in Reports: 01/24/2008
Number of Days to Update: 52

Source: EPA Region 10
Telephone: 206-553-2857
Last EDR Contact: 02/15/2008
Next Scheduled EDR Contact: 05/19/2008
Data Release Frequency: Quarterly

INDIAN UST R8: Underground Storage Tanks on Indian Land
No description is available for this data

Date of Government Version: 12/03/2007
Date Data Arrived at EDR: 12/06/2007
Date Made Active in Reports: 01/24/2008
Number of Days to Update: 49

Source: EPA Region 8
Telephone: 303-312-6137
Last EDR Contact: 02/15/2008
Next Scheduled EDR Contact: 05/19/2008
Data Release Frequency: Quarterly

EDR PROPRIETARY RECORDS

Manufactured Gas Plants: EDR Proprietary Manufactured Gas Plants
The EDR Proprietary Manufactured Gas Plant Database includes records of coal gas plants (manufactured gas plants) compiled by EDR's researchers. Manufactured gas sites were used in the United States from the 1800's to 1950's to produce a gas that could be distributed and used as fuel. These plants used whale oil, rosin, coal, or a mixture of coal, oil, and water that also produced a significant amount of waste. Many of the byproducts of the gas production, such as coal tar (oily waste containing volatile and non-volatile chemicals), sludges, oils and other compounds are potentially hazardous to human health and the environment. The byproduct from this process was frequently disposed of directly at the plant site and can remain or spread slowly, serving as a continuous source of soil and groundwater contamination.

Date of Government Version: N/A
Date Data Arrived at EDR: N/A
Date Made Active in Reports: N/A
Number of Days to Update: N/A

Source: EDR, Inc.
Telephone: N/A
Last EDR Contact: N/A
Next Scheduled EDR Contact: N/A
Data Release Frequency: No Update Planned

Hazardous Material Permits
This listing includes underground storage tanks, medical waste handlers/generators, hazardous materials handlers, hazardous waste generators, and waste oil generators/handlers.

Date of Government Version: 12/28/2007
Date Data Arrived at EDR: 12/28/2007
Date Made Active in Reports: 02/14/2008
Number of Days to Update: 48

Source: San Bernardino County Fire Department Hazardous Materials Division
Telephone: 909-387-3041
Last EDR Contact: 03/03/2008
Next Scheduled EDR Contact: 12/03/2007
Data Release Frequency: Quarterly

SAN DIEGO COUNTY:

Hazardous Materials Management Division Database
The database includes: HE58 - This report contains the business name, site address, business phone number, establishment 'H' permit number, type of permit, and the business status. HE17 - In addition to providing the same information provided in the HE58 listing, HE17 provides inspection dates, violations received by the establishment, hazardous waste generated, the quantity, method of storage, treatment/disposal of waste and the hauler, and information on underground storage tanks. Unauthorized Release List - Includes a summary of environmental contamination cases in San Diego County (underground tank cases, non-tank cases, groundwater contamination, and soil contamination are included.)

Date of Government Version: 05/18/2005
Date Data Arrived at EDR: 05/18/2005
Date Made Active in Reports: 06/16/2005
Number of Days to Update: 29

Source: Hazardous Materials Management Division
Telephone: 619-338-2268
Last EDR Contact: 01/04/2008
Next Scheduled EDR Contact: 03/31/2008
Data Release Frequency: Quarterly

Solid Waste Facilities
San Diego County Solid Waste Facilities.

Date of Government Version: 08/01/2007
Date Data Arrived at EDR: 02/05/2008
Date Made Active in Reports: 02/14/2008
Number of Days to Update: 9

Source: Department of Health Services
Telephone: 619-338-2209
Last EDR Contact: 02/19/2008
Next Scheduled EDR Contact: 05/19/2008
Data Release Frequency: Varies

Environmental Case Listing
The listing contains all underground tank release cases and projects pertaining to properties contaminated with hazardous substances that are actively under review by the Site Assessment and Mitigation Program.

Date of Government Version: 08/22/2007
Date Data Arrived at EDR: 10/03/2007
Date Made Active in Reports: 11/07/2007
Number of Days to Update: 35

Source: San Diego County Department of Environmental Health
Telephone: 619-338-2371
Last EDR Contact: 01/04/2008
Next Scheduled EDR Contact: 03/31/2008
Data Release Frequency: Varies

SAN FRANCISCO COUNTY:

Local Oversite Facilities
A listing of leaking underground storage tank sites located in San Francisco county.

Date of Government Version: 03/03/2008
Date Data Arrived at EDR: 03/04/2008
Date Made Active in Reports: 03/14/2008
Number of Days to Update: 10

Source: Department Of Public Health San Francisco County
Telephone: 415-252-3920
Last EDR Contact: 03/03/2008
Next Scheduled EDR Contact: 06/02/2008
Data Release Frequency: Quarterly

Underground Storage Tank Information
Underground storage tank sites located in San Francisco county.

Date of Government Version: 03/03/2008
Date Data Arrived at EDR: 03/04/2008
Date Made Active in Reports: 03/14/2008
Number of Days to Update: 10

Source: Department of Public Health
Telephone: 415-252-3920
Last EDR Contact: 03/03/2008
Next Scheduled EDR Contact: 06/02/2008
Data Release Frequency: Quarterly

SAN JOAQUIN COUNTY:

San Joaquin Co. UST
A listing of underground storage tank locations in San Joaquin county.

Date of Government Version: 02/01/2008
Date Data Arrived at EDR: 02/26/2008
Date Made Active in Reports: 03/14/2008
Number of Days to Update: 17

Source: Environmental Health Department
Telephone: N/A
Last EDR Contact: 01/15/2008
Next Scheduled EDR Contact: 04/14/2008
Data Release Frequency: Semi-Annually

SAN MATEO COUNTY:

Business Inventory
List includes Hazardous Materials Business Plan, hazardous waste generators, and underground storage tanks.

Date of Government Version: 01/31/2008
Date Data Arrived at EDR: 02/01/2008
Date Made Active in Reports: 02/14/2008
Number of Days to Update: 13

Source: San Mateo County Environmental Health Services Division
Telephone: 650-363-1921
Last EDR Contact: 10/09/2007
Next Scheduled EDR Contact: 01/07/2008
Data Release Frequency: Annually

Fuel Leak List
A listing of leaking underground storage tank sites located in San Mateo county.

Date of Government Version: 01/09/2008
Date Data Arrived at EDR: 01/11/2008
Date Made Active in Reports: 02/14/2008
Number of Days to Update: 34

Source: San Mateo County Environmental Health Services Division
Telephone: 650-363-1921
Last EDR Contact: 01/07/2008
Next Scheduled EDR Contact: 04/07/2008
Data Release Frequency: Semi-Annually

SANTA CLARA COUNTY:

HIST LUST - Fuel Leak Site Activity Report
A listing of open and closed leaking underground storage tanks. This listing is no longer updated by the county. Leaking underground storage tanks are now handled by the Department of Environmental Health.

Date of Government Version: 03/29/2005
Date Data Arrived at EDR: 03/30/2005
Date Made Active in Reports: 04/21/2005
Number of Days to Update: 22

Source: Santa Clara Valley Water District
Telephone: 408-265-2600
Last EDR Contact: 12/26/2007
Next Scheduled EDR Contact: 03/24/2008
Data Release Frequency: No Update Planned

LOP Listing
A listing of leaking underground storage tanks located in Santa Clara county.

Date of Government Version: 02/01/2008
Date Data Arrived at EDR: 02/05/2008
Date Made Active in Reports: 02/14/2008
Number of Days to Update: 9

Source: Department of Environmental Health
Telephone: 408-918-3417
Last EDR Contact: 01/15/2008
Next Scheduled EDR Contact: 03/24/2008
Data Release Frequency: Varies

Hazardous Material Facilities
Hazardous material facilities, including underground storage tank sites.

Date of Government Version: 03/04/2008
Date Data Arrived at EDR: 03/04/2008
Date Made Active in Reports: 03/14/2008
Number of Days to Update: 10

Source: City of San Jose Fire Department
Telephone: 408-277-4659
Last EDR Contact: 03/03/2008
Next Scheduled EDR Contact: 06/02/2008
Data Release Frequency: Annually

SOLANO COUNTY:

Leaking Underground Storage Tanks
A listing of leaking underground storage tank sites located in Solano county.

Date of Government Version: 09/24/2007
Date Data Arrived at EDR: 10/23/2007
Date Made Active in Reports: 11/07/2007
Number of Days to Update: 15

Source: Solano County Department of Environmental Management
Telephone: 707-784-6770
Last EDR Contact: 01/07/2008
Next Scheduled EDR Contact: 03/24/2008
Data Release Frequency: Quarterly

Underground Storage Tanks
Underground storage tank sites located in Solano county.

Date of Government Version: 01/07/2008
Date Data Arrived at EDR: 01/30/2008
Date Made Active in Reports: 02/08/2008
Number of Days to Update: 9

Source: Solano County Department of Environmental Management
Telephone: 707-784-6770
Last EDR Contact: 01/07/2008
Next Scheduled EDR Contact: 03/24/2008
Data Release Frequency: Quarterly

SONOMA COUNTY:

Leaking Underground Storage Tank Sites
A listing of leaking underground storage tank sites located in Sonoma county.

Date of Government Version: 01/22/2008
Date Data Arrived at EDR: 01/23/2008
Date Made Active in Reports: 02/14/2008
Number of Days to Update: 23

Source: Department of Health Services
Telephone: 707-565-6565
Last EDR Contact: 01/21/2008
Next Scheduled EDR Contact: 04/21/2008
Data Release Frequency: Quarterly

SUTTER COUNTY:

Underground Storage Tanks
Underground storage tank sites located in Sutter county.

Date of Government Version: 05/04/2007
Date Data Arrived at EDR: 05/04/2007
Date Made Active in Reports: 05/24/2007
Number of Days to Update: 20

Source: Sutter County Department of Agriculture
Telephone: 530-822-7500
Last EDR Contact: 01/02/2008
Next Scheduled EDR Contact: 03/31/2008
Data Release Frequency: Semi-Annually

VENTURA COUNTY:

Business Plan, Hazardous Waste Producers, and Operating Underground Tanks
The BWT list indicates by site address whether the Environmental Health Division has Business Plan (B), Waste Producer (W), and/or Underground Tank (T) information.

Date of Government Version: 11/26/2007
Date Data Arrived at EDR: 01/07/2008
Date Made Active in Reports: 02/14/2008
Number of Days to Update: 38

Source: Ventura County Environmental Health Division
Telephone: 805-654-2813
Last EDR Contact: 03/12/2008
Next Scheduled EDR Contact: 06/09/2008
Data Release Frequency: Quarterly

Inventory of Illegal Abandoned and Inactive Sites
Ventura County Inventory of Closed, Illegal Abandoned, and Inactive Sites.

Date of Government Version: 08/01/2007
Date Data Arrived at EDR: 08/28/2007
Date Made Active in Reports: 09/26/2007
Number of Days to Update: 28

Source: Environmental Health Division
Telephone: 805-654-2813
Last EDR Contact: 02/19/2008
Next Scheduled EDR Contact: 05/19/2008
Data Release Frequency: Annually

Listing of Underground Tank Cleanup Sites
Ventura County Underground Storage Tank Cleanup Sites (LUST).

Date of Government Version: 11/26/2007
Date Data Arrived at EDR: 01/07/2008
Date Made Active in Reports: 02/14/2008
Number of Days to Update: 38

Source: Environmental Health Division
Telephone: 805-654-2813
Last EDR Contact: 03/12/2008
Next Scheduled EDR Contact: 06/09/2008
Data Release Frequency: Quarterly

Underground Tank Closed Sites List
Ventura County Operating Underground Storage Tank Sites (UST)/Underground Tank Closed Sites List.

Date of Government Version: 12/26/2007
Date Data Arrived at EDR: 01/09/2008
Date Made Active in Reports: 02/08/2008
Number of Days to Update: 30

Source: Environmental Health Division
Telephone: 805-654-2813
Last EDR Contact: 01/08/2008
Next Scheduled EDR Contact: 04/07/2008
Data Release Frequency: Quarterly

YOLO COUNTY:

Underground Storage Tank Comprehensive Facility Report
Underground storage tank sites located in Yolo county.

Date of Government Version: 01/29/2008
Date Data Arrived at EDR: 02/20/2008
Date Made Active in Reports: 03/14/2008
Number of Days to Update: 23

Source: Yolo County Department of Health
Telephone: 530-666-8646
Last EDR Contact: 01/28/2008
Next Scheduled EDR Contact: 04/14/2008
Data Release Frequency: Annually

OTHER DATABASE(S)

Depending on the geographic area covered by this report, the data provided in these specialty databases may or may not be complete. For example, the existence of wetlands information data in a specific report does not mean that all wetlands in the area covered by the report are included. Moreover, the absence of any reported wetlands information does not necessarily mean that wetlands do not exist in the area covered by the report.

CT MANIFEST: Hazardous Waste Manifest Data
Facility and manifest data. Manifest is a document that lists and tracks hazardous waste from the generator through transporters to a tsd facility.

Date of Government Version: 12/31/2005
Date Data Arrived at EDR: 06/15/2007
Date Made Active in Reports: 08/20/2007
Number of Days to Update: 66

Source: Department of Environmental Protection
Telephone: 860-424-3375
Last EDR Contact: 03/14/2008
Next Scheduled EDR Contact: 06/09/2008
Data Release Frequency: Annually

NJ MANIFEST: Manifest Information
Hazardous waste manifest information.

Date of Government Version: 09/30/2007	Source: Department of Environmental Protection
Date Data Arrived at EDR: 12/04/2007	Telephone: N/A
Date Made Active in Reports: 12/31/2007	Last EDR Contact: 01/03/2008
Number of Days to Update: 27	Next Scheduled EDR Contact: 03/31/2008
	Data Release Frequency: Annually

NY MANIFEST: Facility and Manifest Data
Manifest is a document that lists and tracks hazardous waste from the generator through transporters to a TSD facility.

Date of Government Version: 11/26/2007	Source: Department of Environmental Conservation
Date Data Arrived at EDR: 11/29/2007	Telephone: 518-402-8651
Date Made Active in Reports: 02/05/2008	Last EDR Contact: 02/28/2008
Number of Days to Update: 68	Next Scheduled EDR Contact: 05/26/2008
	Data Release Frequency: Annually

PA MANIFEST: Manifest Information
Hazardous waste manifest information.

Date of Government Version: 12/31/2006	Source: Department of Environmental Protection
Date Data Arrived at EDR: 12/21/2007	Telephone: N/A
Date Made Active in Reports: 01/10/2008	Last EDR Contact: 03/10/2008
Number of Days to Update: 20	Next Scheduled EDR Contact: 06/09/2008
	Data Release Frequency: Annually

RI MANIFEST: Manifest Information
Hazardous waste manifest information

Date of Government Version: 10/01/2007	Source: Department of Environmental Management
Date Data Arrived at EDR: 11/09/2007	Telephone: 401-222-2797
Date Made Active in Reports: 01/15/2008	Last EDR Contact: 12/17/2007
Number of Days to Update: 67	Next Scheduled EDR Contact: 03/17/2008
	Data Release Frequency: Annually

WI MANIFEST: Manifest Information
Hazardous waste manifest information.

Date of Government Version: 12/31/2006	Source: Department of Natural Resources
Date Data Arrived at EDR: 04/27/2007	Telephone: N/A
Date Made Active in Reports: 06/08/2007	Last EDR Contact: 01/07/2008
Number of Days to Update: 42	Next Scheduled EDR Contact: 04/07/2008
	Data Release Frequency: Annually

Sensitive Receptors: There are individuals deemed sensitive receptors due to their fragile immune systems and special sensitivity to environmental discharges. These sensitive receptors typically include the elderly, the sick, and children. While the location of all sensitive receptors cannot be determined, EDR indicates those buildings and facilities - schools, daycares, hospitals, medical centers, and nursing homes - where individuals who are sensitive receptors are likely to be located.

AHA Hospitals:
Source: American Hospital Association, Inc.
Telephone: 312-280-5991
The database includes a listing of hospitals based on the American Hospital Association's annual survey of hospitals.

Medical Centers: Provider of Services Listing
Source: Centers for Medicare & Medicaid Services
Telephone: 410-786-3000
A listing of hospitals with Medicare provider number, produced by Centers of Medicare & Medicaid Services, a federal agency within the U.S. Department of Health and Human Services.

Nursing Homes
Source: National Institutes of Health
Telephone: 301-594-6248
Information on Medicare and Medicaid certified nursing homes in the United States.

Public Schools
Source: National Center for Education Statistics
Telephone: 202-502-7300
The National Center for Education Statistics' primary database on elementary and secondary public education in the United States. It is a comprehensive, annual, national statistical database of all public elementary and secondary schools and school districts, which contains data that are comparable across all states.

Private Schools
Source: National Center for Education Statistics
Telephone: 202-502-7300
The National Center for Education Statistics' primary database on private school locations in the United States.

Daycare Centers: Licensed Facilities
Source: Department of Social Services
Telephone: 916-657-4041

Flood Zone Data: This data, available in select counties across the country, was obtained by EDR in 1999 from the Federal Emergency Management Agency (FEMA). Data depicts 100-year and 500-year flood zones as defined by FEMA.

NWI: National Wetlands Inventory. This data, available in select counties across the country, was obtained by EDR in 2002 and 2005 from the U.S. Fish and Wildlife Service.

STREET AND ADDRESS INFORMATION

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EDR Site Report™

EL RANCHO VERDE GOLF CLUB
355 E COUNTRY CLUB DR
RIALTO, CA 92376

Inquiry Number:

April 7, 2008

EDR® Environmental Data Resources Inc

The Standard in Environmental Risk Information

440 Wheelers Farms Road
Milford, Connecticut 06461

Nationwide Customer Service

Telephone: 1-800-352-0050
Fax: 1-800-231-6802
Internet: www.edrnet.com

TABLE OF CONTENTS

The EDR-Site Report™ is a comprehensive presentation of government filings on a facility identified in a search of over 4 million government records from more than 600 federal, state and local environmental databases. The report is divided into three sections:

Section 1: Facility Summary ..... **Page 3**

Summary of facility filings including a review of the following areas: waste management, waste disposal, multi-media issues, and Superfund liability.

Section 2: Facility Detail Reports ..... **Page 4**

All available detailed information from databases where sites are identified.

Section 3: Databases Searched and Update Information ..... **Page 5**

Name, source, update dates, contact phone number and description of each of the databases searched for this report.

Thank you for your business.
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with any questions or comments.

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SECTION 1: FACILITY SUMMARY

FACILITY AREA	FACILITY 1 EL RANCHO VERDE GOLF CLUB 355 E COUNTRY CLUB DR RIALTO, CA 92376 EDR ID #S108536435
WASTE MANAGEMENT Facility generates hazardous waste (RCRA)	NO
Facility treats, stores, or disposes of hazardous waste on-site (RCRA/TSDF)	NO
Facility has received Notices of Violations (RCRA/VIOL)	NO
Facility has been subject to RCRA administrative actions (RAATS)	NO
Facility has been subject to corrective actions (CORRACTS)	NO
Facility handles PCBs (PADS)	NO
Facility uses radioactive materials (MLTS)	NO
Facility manages registered aboveground storage tanks (AST)	NO
Facility manages registered underground storage tanks (UST)	NO
Facility has reported leaking underground storage tank incidents (LUST)	NO
Facility has reported emergency releases to the soil (ERNS)	NO
Facility has reported hazardous material incidents to DOT (HMIRS)	NO
WASTE DISPOSAL Facility is a Superfund Site (NPL)	NO
Facility has a known or suspect abandoned, inactive or uncontrolled hazardous waste site (CERCLIS)	NO
Facility has a reported Superfund Lien on it (LIENS)	NO
Facility is listed as a state hazardous waste site (SHWS)	NO
Facility has disposed of solid waste on-site (SWF/LF)	NO
MULTIMEDIA Facility uses toxic chemicals and has notified EPA under SARA Title III, Section 313 (TRIS)	NO
Facility produces pesticides and has notified EPA under Section 7 of FIFRA (SSTS)	NO
Facility manufactures or imports toxic chemicals on the TSCA list (TSCA)	NO
Facility has inspections under FIFRA, TSCA or EPCRA (FTTS)	NO
Facility is listed in EPA's index system (FINDS)	NO
Facility is listed in a county/local unique database (LOCAL)	YES - p4
POTENTIAL SUPERFUND LIABILITY Facility has a list of potentially responsible parties PRP	NO
TOTAL (YES)	1

SECTION 2: FACILITY DETAIL REPORTS

MULTIMEDIA

Facility is listed in a county/local unique database

DATABASE: State/County (LOCAL)

EL RANCHO VERDE GOLF CLUB
355 E COUNTRY CLUB DR
RIALTO, CA 92376
EDR ID #S108536435

San Bern. Co. Permit:
Region: SAN BERNARDINO
Facility ID: FA0002884
Owner: PACIFIC GOLF ENTERPRISES LLC
Permit Number: PT0018772
Permit Category: HAZMAT HANDLER 0-10 EMPLOYEES
Facility Status: ACTIVE
Expiration Date: 4/30/2008 12:00:00AM

Region: SAN BERNARDINO
Facility ID: FA0002884
Owner: PACIFIC GOLF ENTERPRISES LLC
Permit Number: PT0018773
Permit Category: SPECIAL GENERATOR(B)
Facility Status: ACTIVE
Expiration Date: 4/30/2008 12:00:00AM

EDR Site Report™

GLEN HELEN REHAB CENTER
1200 INSTITUTION RD
SAN BERNARDINO, CA 92407

Inquiry Number:

April 7, 2008

EDR® Environmental Data Resources Inc

The Standard in Environmental Risk Information

440 Wheelers Farms Road
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SECTION 1: FACILITY SUMMARY

FACILITY AREA	FACILITY 1 GLEN HELEN REHAB CENTER 1200 INSTITUTION RD SAN BERNARDINO, CA 92407 EDR ID #1000305186 EPA #CAD981568777
WASTE MANAGEMENT Facility generates hazardous waste (RCRA)	YES - p4
Facility treats, stores, or disposes of hazardous waste on-site (RCRA/TSDF)	NO
Facility has received Notices of Violations (RCRA/VIOL)	NO
Facility has been subject to RCRA administrative actions (RAATS)	NO
Facility has been subject to corrective actions (CORRACTS)	NO
Facility handles PCBs (PADS)	NO
Facility uses radioactive materials (MLTS)	NO
Facility manages registered aboveground storage tanks (AST)	NO
Facility manages registered underground storage tanks (UST)	NO
Facility has reported leaking underground storage tank incidents (LUST)	NO
Facility has reported emergency releases to the soil (ERNS)	NO
Facility has reported hazardous material incidents to DOT (HMIRS)	NO
WASTE DISPOSAL Facility is a Superfund Site (NPL)	NO
Facility has a known or suspect abandoned, inactive or uncontrolled hazardous waste site (CERCUS)	NO
Facility has a reported Superfund Lien on it (LIENS)	NO
Facility is listed as a state hazardous waste site (SHWS)	NO
Facility has disposed of solid waste on-site (SWF/LF)	NO
MULTIMEDIA Facility uses toxic chemicals and has notified EPA under SARA Title III, Section 313 (TRIS)	NO
Facility produces pesticides and has notified EPA under Section 7 of FIFRA (SSTS)	NO
Facility manufactures or imports toxic chemicals on the TSCA list (TSCA)	NO
Facility has inspections under FIFRA, TSCA or EPCRA (FTTS)	NO
Facility is listed in EPA's index system (FINDS)	YES - p5
Facility is listed in a county/local unique database (LOCAL)	YES - p6
POTENTIAL SUPERFUND LIABILITY Facility has a list of potentially responsible parties PRP	NO
TOTAL (YES)	3

SECTION 2: FACILITY DETAIL REPORTS

WASTE MANAGEMENT

Facility generates hazardous waste

DATABASE: Resource Conservation and Recovery Information (RCRAInfo)

GLEN HELEN REHAB CENTER
1200 INSTITUTION RD
SAN BERNARDINO, CA 92407
EDR ID #1000305186

RCRA-SQG:
Date form received by agency: 09/19/1986
Facility name: GLEN HELEN REHAB CENTER
Facility address: 1200 INSTITUTION RD
SAN BERNARDINO, CA 92407
EPA ID: CAD981568777
Contact: ENVIRONMENTAL MANAGER
Contact address: 1200 INSTITUTION RD
SAN BERNARDINO, CA 92407
Contact country: US
Contact telephone: (714) 387-2266
Contact email: Not reported
EPA Region: 09
Classification: Small Small Quantity Generator
Description: Handler: generates more than 100 and less than 1000 kg of hazardous waste during any calendar month and accumulates less than 6000 kg of hazardous waste at any time; or generates 100 kg or less of hazardous waste during any calendar month, and accumulates more than 1000 kg of hazardous waste at any time

Owner/Operator Summary:
Owner/operator name: NOT REQUIRED
Owner/operator address: NOT REQUIRED
NOT REQUIRED, ME 99999
Owner/operator country: Not reported
Owner/operator telephone: (415) 555-1212
Legal status: County
Owner/Operator Type: Operator
Owner/Op start date: Not reported
Owner/Op end date: Not reported

Owner/operator name: SAN BERNARDINO COUNTY
Owner/operator address: NOT REQUIRED
NOT REQUIRED, ME 99999
Owner/operator country: Not reported
Owner/operator telephone: (415) 555-1212
Legal status: County
Owner/Operator Type: Owner
Owner/Op start date: Not reported
Owner/Op end date: Not reported

Handler Activities Summary:
U.S. importer of hazardous waste: Unknown
Mixed waste (haz. and radioactive): Unknown
Recycler of hazardous waste: No
Transporter of hazardous waste: No
Treater, storer or disposer of HW: No
Underground injection activity: No
On-site burner exemption: Unknown
Furnace exemption: Unknown
Used oil fuel burner: No
Used oil processor: No
User oil refiner: No
Used oil fuel marketer to burner: No
Used oil Specification marketer: No
Used oil transfer facility: No
Used oil transporter: No
Off-site waste receiver: Commercial status unknown

Violation Status: No violations found

MULTIMEDIA

Facility is listed in EPA's index system

DATABASE: Facility Index System (FINDS)

GLEN HELEN REHAB CENTER
1200 INSTITUTION RD
SAN BERNARDINO, CA 92407
EDR ID #1000305186

This site is listed in the Federal FINDS database. The FINDS database may contain references to records from government databases included elsewhere in the report.
Please note: the FINDS database may also contain references to out of date records formerly associated with the site.

Registry ID: 110002716909
Facility Name: GLEN HELEN REHAB CENTER
Facility Address: 1200 INSTITUTION RD
SAN BERNARDINO, CA 92407
Facility County: SAN BERNARDINO
EPA Region: 09
Fed. Gov. Facility: Not reported
Indian Tribal Land: No
EPA Records Indicate Facility Is Listed In
California - Hazardous Waste Tracking System - Datamart

RCRAInfo is a national information system that supports the Resource Conservation and Recovery Act (RCRA) program through the tracking of events and activities related to facilities that generate, transport, and treat, store, or dispose of hazardous waste. RCRAInfo allows RCRA program staff to track the notification, permit, compliance, and corrective action activities required under RCRA.

Prg. Sys. ID: CAD981568777
Supplemental Interest: HAZARDOU WASTE PROGRAM
Facility SIC Codes: Not reported
Facility NAICS Codes: Not reported

Prg. Sys. ID: CAD981568777
Supplemental Interest: Not reported
Facility SIC Codes: Not reported
Facility NAICS Codes: 541611

Alternative name: GLEN HELEN REHAB CENTER

MULTIMEDIA

Facility is listed in a county/local unique database

DATABASE: State/County (LOCAL)

GLEN HELEN REHAB CENTER
1200 INSTITUTION RD
SAN BERNARDINO, CA 92407
EDR ID #1000305186

HAZNET:
Gepaid: CAD981568777
Contact: SAN BERNARDINO COUNTY SHERIFF
Telephone: 0000000000
Facility Addr2: Not reported
Mailing Name: Not reported
Mailing Address: 18000 INSTITUTION RD
Mailing City,St,Zip: SAN BERNARDINO, CA 924070000
Gen County: San Bernardino
TSD EPA ID: CAD009007626
TSD County: Los Angeles
Waste Category: Asbestos-containing waste
Disposal Method: Not reported
Tons: 2.5284
Facility County: San Bernardino

Gepaid: CAD981568777
Contact: SAN BERNARDINO COUNTY SHERIFF
Telephone: 0000000000
Facility Addr2: Not reported
Mailing Name: Not reported
Mailing Address: 18000 INSTITUTION RD
Mailing City,St,Zip: SAN BERNARDINO, CA 924070000
Gen County: San Bernardino
TSD EPA ID: CAD009007626
TSD County: Los Angeles
Waste Category: Asbestos-containing waste
Disposal Method: Disposal, Land Fill
Tons: .8428
Facility County: San Bernardino

Gepaid: CAD981568777
Contact: SAN BERNARDINO COUNTY SHERIFF
Telephone: 0000000000
Facility Addr2: Not reported
Mailing Name: Not reported
Mailing Address: 18000 INSTITUTION RD
Mailing City,St,Zip: SAN BERNARDINO, CA 924070000
Gen County: San Bernardino
TSD EPA ID: CAD008252405
TSD County: Los Angeles
Waste Category: Other organic solids
Disposal Method: Recycler
Tons: .0600
Facility County: San Bernardino

Gepaid: CAD981568777
Contact: SAN BERNARDINO COUNTY SHERIFF
Telephone: 0000000000
Facility Addr2: Not reported
Mailing Name: Not reported
Mailing Address: 18000 INSTITUTION RD
Mailing City,St,Zip: SAN BERNARDINO, CA 924070000
Gen County: San Bernardino
TSD EPA ID: CAD009007626
TSD County: Los Angeles
Waste Category: Asbestos-containing waste
Disposal Method: Disposal, Land Fill
Tons: .0842
Facility County: San Bernardino

Gepaid: CAD981568777
Contact: SAN BERNARDINO COUNTY SHERIFF
Telephone: 0000000000
Facility Addr2: Not reported
Mailing Name: Not reported
Mailing Address: 18000 INSTITUTION RD
Mailing City,St,Zip: SAN BERNARDINO, CA 924070000
Gen County: San Bernardino
TSD EPA ID: CAD028409019

TSD County: Los Angeles
Waste Category: Unspecified organic liquid mixture
Disposal Method: Treatment, Tank
Tons: .2919
Facility County: San Bernardino

Gepaid: CAD981568777
Contact: SAN BERNARDINO COUNTY SHERIFF
Telephone: 0000000000
Facility Addr2: Not reported
Mailing Name: Not reported
Mailing Address: 18000 INSTITUTION RD
Mailing City,St,Zip: SAN BERNARDINO, CA 924070000
Gen County: San Bernardino
TSD EPA ID: CAD028409019
TSD County: Los Angeles
Waste Category: Unspecified organic liquid mixture
Disposal Method: Transfer Station
Tons: .1251
Facility County: San Bernardino

Gepaid: CAD981568777
Contact: SAN BERNARDINO COUNTY SHERIFF
Telephone: 0000000000
Facility Addr2: Not reported
Mailing Name: Not reported
Mailing Address: 18000 INSTITUTION RD
Mailing City,St,Zip: SAN BERNARDINO, CA 924070000
Gen County: San Bernardino
TSD EPA ID: CAD028409019
TSD County: Los Angeles
Waste Category: Waste oil and mixed oil
Disposal Method: Transfer Station
Tons: .1668
Facility County: San Bernardino

Gepaid: CAD981568777
Contact: SAN BERNARDINO COUNTY SHERIFF
Telephone: 0000000000
Facility Addr2: Not reported
Mailing Name: Not reported
Mailing Address: 18000 INSTITUTION RD
Mailing City,St,Zip: SAN BERNARDINO, CA 924070000
Gen County: San Bernardino
TSD EPA ID: CAD028409019
TSD County: Los Angeles
Waste Category: Unspecified oil-containing waste
Disposal Method: Treatment, Tank
Tons: .8340
Facility County: San Bernardino

Gepaid: CAD981568777
Contact: SAN BERNARDINO COUNTY SHERIFF
Telephone: 0000000000
Facility Addr2: Not reported
Mailing Name: Not reported
Mailing Address: 18000 INSTITUTION RD
Mailing City,St,Zip: SAN BERNARDINO, CA 924070000
Gen County: San Bernardino
TSD EPA ID: CAD028409019
TSD County: Los Angeles
Waste Category: Other inorganic solid waste
Disposal Method: Transfer Station
Tons: .0100
Facility County: San Bernardino

Gepaid: CAD981568777
Contact: SAN BERNARDINO COUNTY SHERIFF
Telephone: 0000000000
Facility Addr2: Not reported
Mailing Name: Not reported
Mailing Address: 18000 INSTITUTION RD
Mailing City,St,Zip: SAN BERNARDINO, CA 924070000
Gen County: San Bernardino
TSD EPA ID: CAD008252405
TSD County: Los Angeles
Waste Category: Other organic solids
Disposal Method: Transfer Station
Tons: .1600
Facility County: San Bernardino

Gepaid: CAD981568777
Contact: KATHY WILD HEALTH SVC ADMIN
Telephone: 9094635007
Facility Addr2: Not reported

Mailing Name: Not reported
Mailing Address: 18000 INSTITUTION RD
Mailing City,St,Zip: SAN BERNARDINO, CA 924070000
Gen County: San Bernardino
TSD EPA ID: CAD008252405
TSD County: Los Angeles
Waste Category: Other organic solids
Disposal Method: Transfer Station
Tons: 0.11
Facility County: Not reported

Gepaid: CAD981568777
Contact: KATHY WILD HEALTH SVC ADMIN
Telephone: 9094635007
Facility Addr2: Not reported
Mailing Name: Not reported
Mailing Address: 18000 INSTITUTION RD
Mailing City,St,Zip: SAN BERNARDINO, CA 924070000
Gen County: San Bernardino
TSD EPA ID: Not reported
TSD County: 99
Waste Category: Alkaline solution without metals (pH > 12.5)
Disposal Method: Recycler
Tons: 0.62
Facility County: Not reported

Gepaid: CAD981568777
Contact: KATHY WILD HEALTH SVC ADMIN
Telephone: 9094635007
Facility Addr2: Not reported
Mailing Name: Not reported
Mailing Address: 18000 INSTITUTION RD
Mailing City,St,Zip: SAN BERNARDINO, CA 924070000
Gen County: San Bernardino
TSD EPA ID: Not reported
TSD County: 99
Waste Category: Unspecified alkaline solution
Disposal Method: Recycler
Tons: 0
Facility County: Not reported

Gepaid: CAD981568777
Contact: KATHY WILD HEALTH SVC ADMIN
Telephone: 9094635007
Facility Addr2: Not reported
Mailing Name: Not reported
Mailing Address: 18000 INSTITUTION RD
Mailing City,St,Zip: SAN BERNARDINO, CA 924070000
Gen County: San Bernardino
TSD EPA ID: Not reported
TSD County: 99
Waste Category: Unspecified aqueous solution
Disposal Method: Recycler
Tons: 0.02
Facility County: Not reported

Gepaid: CAD981568777
Contact: KATHY WILD HEALTH SVC ADMIN
Telephone: 9094635007
Facility Addr2: Not reported
Mailing Name: Not reported
Mailing Address: 18000 INSTITUTION RD
Mailing City,St,Zip: SAN BERNARDINO, CA 924070000
Gen County: San Bernardino
TSD EPA ID: Not reported
TSD County: 99
Waste Category: Off-specification, aged, or surplus organics
Disposal Method: Recycler
Tons: 0.3
Facility County: Not reported

Gepaid: CAD981568777
Contact: KATHY WILD HEALTH SVC ADMIN
Telephone: 9094635007
Facility Addr2: Not reported
Mailing Name: Not reported
Mailing Address: 18000 INSTITUTION RD
Mailing City,St,Zip: SAN BERNARDINO, CA 924070000
Gen County: San Bernardino
TSD EPA ID: Not reported
TSD County: Los Angeles
Waste Category: Asbestos-containing waste
Disposal Method: Disposal, Land Fill
Tons: 9.52
Facility County: Not reported

SECTION 2: FACILITY DETAIL REPORTS
...Continued...

Gepaid: CAD981568777
Contact: KATHY WILD HEALTH SVC ADMIN
Telephone: 9094635007
Facility Addr2: Not reported
Mailing Name: Not reported
Mailing Address: 18000 INSTITUTION RD
Mailing City,St,Zip: SAN BERNARDINO, CA 924070000
Gen County: San Bernardino
TSD EPA ID: CAD008252405
TSD County: Los Angeles
Waste Category: Other organic solids
Disposal Method: Transfer Station
Tons: 0.06
Facility County: San Bernardino

Gepaid: CAD981568777
Contact: SAN BERNARDINO COUNTY SHERIFF
Telephone: 0000000000
Facility Addr2: Not reported
Mailing Name: Not reported
Mailing Address: 18000 INSTITUTION RD
Mailing City,St,Zip: SAN BERNARDINO, CA 924070000
Gen County: San Bernardino
TSD EPA ID: CAD008252405
TSD County: Los Angeles
Waste Category: Other organic solids
Disposal Method: Recycler
Tons: .1100
Facility County: San Bernardino

Gepaid: CAD981568777
Contact: SAN BERNARDINO COUNTY SHERIFF
Telephone: 0000000000
Facility Addr2: Not reported
Mailing Name: Not reported
Mailing Address: 18000 INSTITUTION RD
Mailing City,St,Zip: SAN BERNARDINO, CA 924070000
Gen County: San Bernardino
TSD EPA ID: CAD008252405
TSD County: Los Angeles
Waste Category: Latex waste
Disposal Method: Recycler
Tons: .7297
Facility County: San Bernardino

Gepaid: CAD981568777
Contact: SAN BERNARDINO COUNTY SHERIFF
Telephone: 0000000000
Facility Addr2: Not reported
Mailing Name: Not reported
Mailing Address: 18000 INSTITUTION RD
Mailing City,St,Zip: SAN BERNARDINO, CA 924070000
Gen County: San Bernardino
TSD EPA ID: CAD009007626
TSD County: Los Angeles
Waste Category: Asbestos-containing waste
Disposal Method: Disposal, Land Fill
Tons: .2528
Facility County: San Bernardino

Gepaid: CAD981568777
Contact: SAN BERNARDINO COUNTY SHERIFF
Telephone: 0000000000
Facility Addr2: Not reported
Mailing Name: Not reported
Mailing Address: 18000 INSTITUTION RD
Mailing City,St,Zip: SAN BERNARDINO, CA 924070000
Gen County: San Bernardino
TSD EPA ID: CAD008252405
TSD County: Los Angeles
Waste Category: Unspecified solvent mixture Waste
Disposal Method: Recycler
Tons: 2.1684
Facility County: San Bernardino

Gepaid: CAD981568777
Contact: KATHY WILD HEALTH SVC ADMIN
Telephone: 9094635007
Facility Addr2: Not reported
Mailing Name: Not reported
Mailing Address: 18000 INSTITUTION RD
Mailing City,St,Zip: SAN BERNARDINO, CA 924070000
Gen County: San Bernardino
TSD EPA ID: Not reported

SECTION 2: FACILITY DETAIL REPORTS
...Continued...

TSD County: Los Angeles
Waste Category: Other organic solids
Disposal Method: Transfer Station
Tons: 0.15
Facility County: Not reported

Gepaid: CAD981568777
Contact: SAN BERNARDINO COUNTY SHERIFF
Telephone: 0000000000
Facility Addr2: Not reported
Mailing Name: Not reported
Mailing Address: 18000 INSTITUTION RD
Mailing City,St,Zip: SAN BERNARDINO, CA 924070000
Gen County: San Bernardino
TSD EPA ID: CAD008252405
TSD County: Los Angeles
Waste Category: Unspecified solvent mixture Waste
Disposal Method: Recycler
Tons: .1500
Facility County: San Bernardino

Gepaid: CAD981568777
Contact: SAN BERNARDINO COUNTY SHERIFF
Telephone: 0000000000
Facility Addr2: Not reported
Mailing Name: Not reported
Mailing Address: 18000 INSTITUTION RD
Mailing City,St,Zip: SAN BERNARDINO, CA 924070000
Gen County: San Bernardino
TSD EPA ID: CAD009007626
TSD County: Los Angeles
Waste Category: Asbestos-containing waste
Disposal Method: Disposal, Land Fill
Tons: 6.7424
Facility County: San Bernardino

Gepaid: CAD981568777
Contact: KATHY WILD HEALTH SVC ADMIN
Telephone: 9094635007
Facility Addr2: Not reported
Mailing Name: Not reported
Mailing Address: 18000 INSTITUTION RD
Mailing City,St,Zip: SAN BERNARDINO, CA 924070000
Gen County: San Bernardino
TSD EPA ID: CAD028409019
TSD County: San Bernardino
Waste Category: Alkaline solution without metals (pH > 12.5)
Disposal Method: Transfer Station
Tons: 0.14
Facility County: San Bernardino

Gepaid: CAD981568777
Contact: KATHY WILD HEALTH SVC ADMIN
Telephone: 9094635007
Facility Addr2: Not reported
Mailing Name: Not reported
Mailing Address: 18000 INSTITUTION RD
Mailing City,St,Zip: SAN BERNARDINO, CA 924070000
Gen County: San Bernardino
TSD EPA ID: CAD009007626
TSD County: San Bernardino
Waste Category: Asbestos-containing waste
Disposal Method: Disposal, Land Fill
Tons: 0.84
Facility County: San Bernardino

Gepaid: CAD981568777
Contact: KATHY WILD HEALTH SVC ADMIN
Telephone: 9094635007
Facility Addr2: Not reported
Mailing Name: Not reported
Mailing Address: 18000 INSTITUTION RD
Mailing City,St,Zip: SAN BERNARDINO, CA 924070000
Gen County: San Bernardino
TSD EPA ID: CAD028409019
TSD County: San Bernardino
Waste Category: Unspecified aqueous solution
Disposal Method: Transfer Station
Tons: 0.04
Facility County: San Bernardino

Gepaid: CAD981568777
Contact: KATHY WILD HEALTH SVC ADMIN
Telephone: 9094635007
Facility Addr2: Not reported

SECTION 2: FACILITY DETAIL REPORTS
...Continued...

Mailing Name: Not reported
Mailing Address: 18000 INSTITUTION RD
Mailing City,St,Zip: SAN BERNARDINO, CA 924070000
Gen County: San Bernardino
TSD EPA ID: CAD008252405
TSD County: San Bernardino
Waste Category: Other organic solids
Disposal Method: Transfer Station
Tons: 0.07
Facility County: San Bernardino

Gepaid: CAD981568777
Contact: SAN BERNARDINO COUNTY SHERIFF
Telephone: 0000000000
Facility Addr2: Not reported
Mailing Name: Not reported
Mailing Address: 18000 INSTITUTION RD
Mailing City,St,Zip: SAN BERNARDINO, CA 924070000
Gen County: San Bernardino
TSD EPA ID: CAD008252405
TSD County: Los Angeles
Waste Category: Other organic solids
Disposal Method: Recycler
Tons: 0.075
Facility County: San Bernardino

Gepaid: CAD981568777
Contact: SAN BERNARDINO COUNTY SHERIFF
Telephone: 0000000000
Facility Addr2: Not reported
Mailing Name: Not reported
Mailing Address: 18000 INSTITUTION RD
Mailing City,St,Zip: SAN BERNARDINO, CA 924070000
Gen County: San Bernardino
TSD EPA ID: CAD980683177
TSD County: Kern
Waste Category: Tank bottom waste
Disposal Method: Recycler
Tons: 1.7722
Facility County: San Bernardino

Gepaid: CAD981568777
Contact: SAN BERNARDINO COUNTY SHERIFF
Telephone: 0000000000
Facility Addr2: Not reported
Mailing Name: Not reported
Mailing Address: 18000 INSTITUTION RD
Mailing City,St,Zip: SAN BERNARDINO, CA 924070000
Gen County: San Bernardino
TSD EPA ID: CAD008252405
TSD County: Los Angeles
Waste Category: Other organic solids
Disposal Method: Treatment, Incineration
Tons: .1325
Facility County: San Bernardino

Gepaid: CAD981568777
Contact: SAN BERNARDINO COUNTY SHERIFF
Telephone: 0000000000
Facility Addr2: Not reported
Mailing Name: Not reported
Mailing Address: 18000 INSTITUTION RD
Mailing City,St,Zip: SAN BERNARDINO, CA 924070000
Gen County: San Bernardino
TSD EPA ID: CAD009007626
TSD County: Los Angeles
Waste Category: Asbestos-containing waste
Disposal Method: Disposal, Land Fill
Tons: 1.9361
Facility County: San Bernardino

Gepaid: CAD981568777
Contact: KATHY WILD HEALTH SVC ADMIN
Telephone: 9094635007
Facility Addr2: Not reported
Mailing Name: Not reported
Mailing Address: 18000 INSTITUTION RD
Mailing City,St,Zip: SAN BERNARDINO, CA 924070000
Gen County: San Bernardino
TSD EPA ID: CAD008252405
TSD County: Los Angeles
Waste Category: Other organic solids
Disposal Method: Transfer Station
Tons: 0.11
Facility County: Not reported

EDR Site Report™

GLEN HELEN REHAB CTR
1800 INSTITUTION RD
DEVORE, CA 92407

Inquiry Number:

April 7, 2008

EDR® Environmental Data Resources Inc

The Standard in Environmental Risk Information

440 Wheelers Farms Road
Milford, Connecticut 06461

Nationwide Customer Service

Telephone: 1-800-352-0050
Fax: 1-800-231-6802
Internet: www.edmet.com

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Section 1: Facility Summary ..... **Page 3**

Summary of facility filings including a review of the following areas: waste management, waste disposal, multi-media issues, and Superfund liability.

Section 2: Facility Detail Reports ..... **Page 4**

All available detailed information from databases where sites are identified.

Section 3: Databases Searched and Update Information ..... **Page 5**

Name, source, update dates, contact phone number and description of each of the databases searched for this report.

Thank you for your business.
Please contact EDR at 1-800-352-0050
with any questions or comments.

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SECTION 1: FACILITY SUMMARY

FACILITY AREA	FACILITY 1 GLEN HELEN REHAB CTR 1800 INSTITUTION RD DEVORE, CA 92407 EDR ID #S105857355
WASTE MANAGEMENT Facility generates hazardous waste (RCRA)	NO
Facility treats, stores, or disposes of hazardous waste on-site (RCRATSDF)	NO
Facility has received Notices of Violations (RCRAVIOL)	NO
Facility has been subject to RCRA administrative actions (RAATS)	NO
Facility has been subject to corrective actions (CORRACTS)	NO
Facility handles PCBs (PADS)	NO
Facility uses radioactive materials (MLTS)	NO
Facility manages registered aboveground storage tanks (AST)	NO
Facility manages registered underground storage tanks (UST)	NO
Facility has reported leaking underground storage tank incidents (LUST)	NO
Facility has reported emergency releases to the soil (ERNS)	NO
Facility has reported hazardous material incidents to DOT (HMIRS)	NO
WASTE DISPOSAL Facility is a Superfund Site (NPL)	NO
Facility has a known or suspect abandoned, inactive or uncontrolled hazardous waste site (CERCLIS)	NO
Facility has a reported Superfund Lien on it (LIENS)	NO
Facility is listed as a state hazardous waste site (SHWS)	NO
Facility has disposed of solid waste on-site (SWF/LF)	NO
MULTIMEDIA Facility uses toxic chemicals and has notified EPA under SARA Title III, Section 313 (TRIS)	NO
Facility produces pesticides and has notified EPA under Section 7 of FIFRA (SSTS)	NO
Facility manufactures or imports toxic chemicals on the TSCA list (TSCA)	NO
Facility has inspections under FIFRA, TSCA, or EPCRA (FTTS)	NO
Facility is listed in EPA's Index system (FINDS)	NO
Facility is listed in a county/local unique database (LOCAL)	YES - p4
POTENTIAL SUPERFUND LIABILITY Facility has a list of potentially responsible parties PRP	NO
TOTAL (YES)	1

SECTION 2: FACILITY DETAIL REPORTS

MULTIMEDIA

Facility is listed in a county/local unique database

DATABASE: State/County (LOCAL)

GLEN HELEN REHAB CTR
1800 INSTITUTION RD
DEVORE, CA 92407
EDR ID #S105857355

San Bern. Co. Permit:
Region: SAN BERNARDINO
Facility ID: FA0002294
Owner: SB COUNTY FLEET MANAGEMENT
Permit Number: PT0004203
Permit Category: ABOVEGROUND PETROLEUM STORAGE (AST) (SPCC)
Facility Status: ACTIVE
Expiration Date: 2/28/2008 12:00:00AM

Region: SAN BERNARDINO
Facility ID: FA0002294
Owner: SB COUNTY FLEET MANAGEMENT
Permit Number: PT0004200
Permit Category: HAZMAT HANDLER - UST ONLY
Facility Status: INACTIVE
Expiration Date: 2/28/2007 12:00:00AM

Region: SAN BERNARDINO
Facility ID: FA0002294
Owner: SB COUNTY FLEET MANAGEMENT
Permit Number: PT0013860
Permit Category: UST OWNERSHIP/OPERATING PERMIT (PER UST)
Facility Status: INACTIVE
Expiration Date: 2/28/2005 12:00:00AM

EDR Site Report™

GLEN HELEN REHAB CENTER
GLEN HELEN RD
DEVORE, CA 92407

Inquiry Number:

April 7, 2008

EDR® Environmental Data Resources Inc

The Standard in Environmental Risk Information

440 Wheelers Farms Road
Milford, Connecticut 06461

Nationwide Customer Service

Telephone: 1-800-352-0050
Fax: 1-800-231-6802
Internet: www.edrnet.com

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Thank you for your business.
Please contact EDR at 1-800-352-0050
with any questions or comments.

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SECTION 1: FACILITY SUMMARY

FACILITY AREA	FACILITY 1 GLEN HELEN REHAB CENTER GLEN HELEN RD DEVORE, CA 92407 EDR ID #S101591501
WASTE MANAGEMENT Facility generates hazardous waste (RCRA)	NO
Facility treats, stores, or disposes of hazardous waste on-site (RCRA/TSDF)	NO
Facility has received Notices of Violations (RCRAVIOL)	NO
Facility has been subject to RCRA administrative actions (RAATS)	NO
Facility has been subject to corrective actions (CORRACTS)	NO
Facility handles PCBs (PADS)	NO
Facility uses radioactive materials (MLTS)	NO
Facility manages registered aboveground storage tanks (AST)	NO
Facility manages registered underground storage tanks (UST)	NO
Facility has reported leaking underground storage tank incidents (LUST)	NO
Facility has reported emergency releases to the soil (ERNS)	NO
Facility has reported hazardous material incidents to DOT (HMIRS)	NO
WASTE DISPOSAL Facility is a Superfund Site (NPL)	NO
Facility has a known or suspect abandoned, inactive or uncontrolled hazardous waste site (CERCLIS)	NO
Facility has a reported Superfund Lien on it (LIENS)	NO
Facility is listed as a state hazardous waste site (SHWS)	NO
Facility has disposed of solid waste on-site (SWF/LF)	NO
MULTIMEDIA Facility uses toxic chemicals and has notified EPA under SARA Title III, Section 313 (TRIS)	NO
Facility produces pesticides and has notified EPA under Section 7 of FIFRA (SSTS)	NO
Facility manufactures or imports toxic chemicals on the TSCA list (TSCA)	NO
Facility has inspections under FIFRA, TSCA or EPCRA (FTTS)	NO
Facility is listed in EPA's index system (FINDS)	NO
Facility is listed in a county/local unique database (LOCAL)	YES - p4
POTENTIAL SUPERFUND LIABILITY Facility has a list of potentially responsible parties PRP	NO
TOTAL (YES)	1

SECTION 2: FACILITY DETAIL REPORTS

MULTIMEDIA

Facility is listed in a county/local unique database

DATABASE: State/County (LOCAL)

GLEN HELEN REHAB CENTER
GLEN HELEN RD
DEVORE, CA 92407
EDR ID #S101591501

SWEEPS UST:
Status: A
Comp Number: 255
Number: 5
Board Of Equalization: 44-019737
Ref Date: 03-19-92
Act Date: 03-19-92
Created Date: 03-28-89
Tank Status: A
Owner Tank Id: 1
Swrch Tank Id: 36-000-000255-000001
Actv Date: 03-28-89
Capacity: 20000
Tank Use: M.V. FUEL
Stg: P
Content: DIESEL
Number Of Tanks: 1

CA FID UST:
Facility ID: 36008267
Regulated By: UTNKA
Regulated ID: Not reported
Cortese Code: Not reported
SIC Code: Not reported
Facility Phone: 7148902500
Mail To: Not reported
Mailing Address: GLEN HELEN RD
Mailing Address 2: Not reported
Mailing City,St,Zip: DEVORE 92407
Contact: Not reported
Contact Phone: Not reported
DUNs Number: Not reported
NPDES Number: Not reported
EPA ID: Not reported
Comments: Not reported
Status: Active

EDR Site Report™

AUTO CRAFT
2631 N LOCUST AVE B
RIALTO, CA 92377

Inquiry Number:

April 7, 2008

EDR® Environmental Data Resources Inc

The Standard in Environmental Risk Information

440 Wheelers Farms Road
Milford, Connecticut 06461

Nationwide Customer Service

Telephone: 1-800-352-0050
Fax: 1-800-231-6802
Internet: www.edrnet.com

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All available detailed information from databases where sites are identified.

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Name, source, update dates, contact phone number and description of each of the databases searched for this report.

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SECTION 1: FACILITY SUMMARY

FACILITY AREA	FACILITY 1 AUTO CRAFT 2631 N LOCUST AVE B RIALTO, CA 92377 EDR ID #S106910699
WASTE MANAGEMENT Facility generates hazardous waste (RCRA)	NO
Facility treats, stores, or disposes of hazardous waste on-site (RCRATSDF)	NO
Facility has received Notices of Violations (RCRAVIOL)	NO
Facility has been subject to RCRA administrative actions (RAATS)	NO
Facility has been subject to corrective actions (CORRACTS)	NO
Facility handles PCBs (PADS)	NO
Facility uses radioactive materials (MLTS)	NO
Facility manages registered aboveground storage tanks (AST)	NO
Facility manages registered underground storage tanks (UST)	NO
Facility has reported leaking underground storage tank incidents (LUST)	NO
Facility has reported emergency releases to the soil (ERNS)	NO
Facility has reported hazardous material incidents to DOT (HMIRS)	NO
WASTE DISPOSAL Facility is a Superfund Site (NPL)	NO
Facility has a known or suspect abandoned, inactive or uncontrolled hazardous waste site (CERCLIS)	NO
Facility has a reported Superfund Lien on it (LIENS)	NO
Facility is listed as a state hazardous waste site (SHWS)	NO
Facility has disposed of solid waste on-site (SWF/LF)	NO
MULTIMEDIA Facility uses toxic chemicals and has notified EPA under SARA Title III, Section 313 (TRIS)	NO
Facility produces pesticides and has notified EPA under Section 7 of FIFRA (SSTS)	NO
Facility manufactures or imports toxic chemicals on the TSCA list (TSCA)	NO
Facility has inspections under FIFRA, TSCA or EPCRA (FTTS)	NO
Facility is listed in EPA's index system (FINDS)	NO
Facility is listed in a county/local unique database (LOCAL)	YES - p4
POTENTIAL SUPERFUND LIABILITY Facility has a list of potentially responsible parties PRP	NO
TOTAL (YES)	1

SECTION 2: FACILITY DETAIL REPORTS

MULTIMEDIA

Facility is listed in a county/local unique database

DATABASE: State/County (LOCAL)

AUTO CRAFT
2631 N LOCUST AVE B
RIALTO, CA 92377
EDR ID #S106910699

San Bern. Co. Permit:
Region: SAN BERNARDINO
Facility ID: FA0001201
Owner: DAVEY, DAVID
Permit Number: PT0000684
Permit Category: SPECIAL GENERATOR(B)
Facility Status: INACTIVE
Expiration Date: 11/30/2001 12:00:00AM

Region: SAN BERNARDINO
Facility ID: FA0001201
Owner: DAVEY, DAVID
Permit Number: PT0000685
Permit Category: LIMITED QUANTITY GENERATOR(B)
Facility Status: INACTIVE
Expiration Date: 11/30/2001 12:00:00AM

EDR Site Report™

RIALTO CONCRETE PRODUCTS INC
2250 W LOWELL
RIALTO, CA 92376

Inquiry Number:

April 7, 2008

EDR® Environmental Data Resources Inc

The Standard in Environmental Risk Information

440 Wheelers Farms Road
Milford, Connecticut 06461

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Telephone: 1-800-352-0050
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Name, source, update dates, contact phone number and description of each of the databases searched for this report.

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SECTION 1: FACILITY SUMMARY

FACILITY AREA	FACILITY 1 RIALTO CONCRETE PRODUCTS INC 2250 W LOWELL RIALTO, CA 92376 EDR ID #1004676040 EPA #CAR000080200
WASTE MANAGEMENT Facility generates hazardous waste (RCRA)	YES - p4
Facility treats, stores, or disposes of hazardous waste on-site (RCRA/TSDF)	NO
Facility has received Notices of Violations (RCRA/VIOL)	NO
Facility has been subject to RCRA administrative actions (RAATS)	NO
Facility has been subject to corrective actions (CORRACTS)	NO
Facility handles PCBs (PADS)	NO
Facility uses radioactive materials (MLTS)	NO
Facility manages registered aboveground storage tanks (AST)	NO
Facility manages registered underground storage tanks (UST)	NO
Facility has reported leaking underground storage tank incidents (LUST)	NO
Facility has reported emergency releases to the soil (ERNS)	NO
Facility has reported hazardous material incidents to DOT (HMIRS)	NO
WASTE DISPOSAL Facility is a Superfund Site (NPL)	NO
Facility has a known or suspect abandoned, inactive or uncontrolled hazardous waste site (CERCLIS)	NO
Facility has a reported Superfund Lien on it (LIENS)	NO
Facility is listed as a state hazardous waste site (SHWS)	NO
Facility has disposed of solid waste on-site (SWF/LF)	NO
MULTIMEDIA Facility uses toxic chemicals and has notified EPA under SARA Title III, Section 313 (TRIS)	NO
Facility produces pesticides and has notified EPA under Section 7 of FIFRA (SSTS)	NO
Facility manufactures or imports toxic chemicals on the TSCA list (TSCA)	NO
Facility has inspections under FIFRA, TSCA or EPCRA (FTTS)	NO
Facility is listed in EPA's index system (FINDS)	YES - p5
Facility is listed in a county/local unique database (LOCAL)	YES - p6
POTENTIAL SUPERFUND LIABILITY Facility has a list of potentially responsible parties PRP	NO
TOTAL (YES)	3

SECTION 2: FACILITY DETAIL REPORTS

WASTE MANAGEMENT

Facility generates hazardous waste

DATABASE: Resource Conservation and Recovery Information (RCRAInfo)

RIALTO CONCRETE PRODUCTS INC
2250 W LOWELL
RIALTO, CA 92376
EDR ID #1004676040

RCRA-SQG:
Date form received by agency: 08/10/2000
Facility name: RIALTO CONCRETE PRODUCTS INC
Facility address: 2250 W LOWELL
RIALTO, CA 92376
EPA ID: CAR000080200
Mailing address: P O BOX 398
RIALTO, CA 92592
Contact: KENNY HARRISON
Contact address: 2250 W LOWELL
RIALTO, CA 92376
Contact country: US
Contact telephone: (909) 355-4629
Contact email: Not reported
EPA Region: 09
Classification: Small Small Quanity Generator
Description: Handler: generates more than 100 and less than 1000 kg of hazardous waste during any calendar month and accumulates less than 6000 kg of hazardous waste at any time; or generates 100 kg or less of hazardous waste during any calendar month, and accumulates more than 1000 kg of hazardous waste at any time

Owner/Operator Summary:
Owner/operator name: RIALTO CONCRETE PRODUCTS INC
Owner/operator address: 2250 W LOWELL
RIALTO, CA 92376
Owner/operator country: Not reported
Owner/operator telephone: (909) 355-4629
Legal status: Private
Owner/Operator Type: Owner
Owner/Op start date: Not reported
Owner/Op end date: Not reported

Handler Activities Summary:
U.S. Importer of hazardous waste: Unknown
Mixed waste (haz. and radioactive): Unknown
Recycler of hazardous waste: No
Transporter of hazardous waste: No
Treater, storer or disposer of HW: No
Underground injection activity: No
On-site burner exemption: Unknown
Furnace exemption: Unknown
Used oil fuel burner: No
Used oil processor: No
User oil refiner: No
Used oil fuel marketer to burner: No
Used oil Specification marketer: No
Used oil transfer facility: No
Used oil transporter: No
Off-site waste receiver: Commercial status unknown

Hazardous Waste Summary:
Waste code: D039
Waste name: TETRACHLOROETHYLENE

Violation Status: No violations found

MULTIMEDIA

Facility is listed in EPA's index system

DATABASE: Facility Index System (FINDS)

RIALTO CONCRETE PRODUCTS INC
2250 W LOWELL
RIALTO, CA 92376
EDR ID #1004676040

This site is listed in the Federal FINDS database. The FINDS database may contain references to records from government databases included elsewhere in the report.
Please note: the FINDS database may also contain references to out of date records formerly associated with the site.

Registry ID: 110002941835
Facility Name: RIALTO CONCRETE PRODUCTS INC
Facility Address: 2250 W LOWELL
RIALTO, CA 92376
Facility County: SAN BERNARDINO
EPA Region: 09
Fed. Gov. Facility: Not reported
Indian Tribal Land: No
EPA Records Indicate Facility Is Listed In
California - Hazardous Waste Tracking System - Datamart

RCRAInfo is a national information system that supports the Resource Conservation and Recovery Act (RCRA) program through the tracking of events and activities related to facilities that generate, transport, and treat, store, or dispose of hazardous waste. RCRAInfo allows RCRA program staff to track the notification, permit, compliance, and corrective action activities required under RCRA.

Prg. Sys. ID: CAR000080200
Supplemental Interest: HAZARDOU WASTE PROGRAM
Facility SIC Codes: Not reported
Facility NAICS Codes: Not reported

Prg. Sys. ID: CAR000080200
Supplemental Interest: Not reported
Facility SIC Codes: Not reported
Facility NAICS Codes: Not reported

MULTIMEDIA

Facility is listed in a county/local unique database

DATABASE: State/County (LOCAL)

RIALTO CONCRETE PRODUCTS INC
2250 W LOWELL
RIALTO, CA 92376
EDR ID #1004676040

HAZNET:
Gepaid: CAR000080200
Contact: KENNY HARRISON
Telephone: 9093554629
Facility Addr2: Not reported
Mailing Name: Not reported
Mailing Address: PO BOX 770
Mailing City,St,Zip: RIALTO, CA 923770000
Gen County: San Bernardino
TSD EPA ID: CAT000613927
TSD County: San Bernardino
Waste Category: Aqueous solution with less than 10% total organic residues
Disposal Method: Not reported
Tons: 0.06
Facility County: Not reported

Gepaid: CAR000080200
Contact: KENNY HARRISON
Telephone: 9093554629
Facility Addr2: Not reported
Mailing Name: Not reported
Mailing Address: PO BOX 770
Mailing City,St,Zip: RIALTO, CA 923770000
Gen County: San Bernardino
TSD EPA ID: CAT000613927
TSD County: San Bernardino
Waste Category: Aqueous solution with less than 10% total organic residues
Disposal Method: Transfer Station
Tons: 0.06
Facility County: San Bernardino

Gepaid: CAR000080200
Contact: --
Telephone: 9093554629
Facility Addr2: Not reported
Mailing Name: Not reported
Mailing Address: 2250 W LOWELL
Mailing City,St,Zip: RIALTO, CA 923760000
Gen County: San Bernardino
TSD EPA ID: Not reported
TSD County: San Bernardino
Waste Category: Aqueous solution with less than 10% total organic residues
Disposal Method: Transfer Station
Tons: 1.15
Facility County: Not reported

Gepaid: CAR000080200
Contact: --
Telephone: 9093554629
Facility Addr2: Not reported
Mailing Name: Not reported
Mailing Address: 2250 W LOWELL
Mailing City,St,Zip: RIALTO, CA 923760000
Gen County: San Bernardino
TSD EPA ID: Not reported
TSD County: Los Angeles
Waste Category: Aqueous solution with less than 10% total organic residues
Disposal Method: Transfer Station
Tons: 0.3
Facility County: Not reported

Gepaid: CAR000080200
Contact: --
Telephone: 9093554629
Facility Addr2: Not reported
Mailing Name: Not reported
Mailing Address: 2250 W LOWELL
Mailing City,St,Zip: RIALTO, CA 923760000
Gen County: San Bernardino
TSD EPA ID: Not reported

TSD County: San Bernardino
Waste Category: Aqueous solution with less than 10% total organic residues
Disposal Method: Transfer Station
Tons: 0.87
Facility County: Not reported

Gepaid: CAR000080200
Contact: Not reported
Telephone: 0000000000
Facility Addr2: Not reported
Mailing Name: Not reported
Mailing Address: 2250 W LOWELL
Mailing City,St,Zip: RIALTO, CA 923760000
Gen County: 0
TSD EPA ID: CAT000613927
TSD County: San Bernardino
Waste Category: Aqueous solution with less than 10% total organic residues
Disposal Method: Transfer Station
Tons: .7379
Facility County: 0

Gepaid: CAR000080200
Contact: KENNY HARRISON
Telephone: 9093554629
Facility Addr2: Not reported
Mailing Name: ENVIRONMENTAL SAFETY
Mailing Address: PO BOX 770
Mailing City,St,Zip: RIALTO, CA 923770000
Gen County: San Bernardino
TSD EPA ID: CAT000613927
TSD County: San Bernardino
Waste Category: Aqueous solution with less than 10% total organic residues
Disposal Method: Transfer Station
Tons: 1.1
Facility County: San Bernardino

Gepaid: CAR000080200
Contact: KENNY HARRISON
Telephone: 9093554629
Facility Addr2: Not reported
Mailing Name: Not reported
Mailing Address: PO BOX 770
Mailing City,St,Zip: RIALTO, CA 923770000
Gen County: San Bernardino
TSD EPA ID: CAT000613927
TSD County: San Bernardino
Waste Category: Aqueous solution with less than 10% total organic residues
Disposal Method: Not reported
Tons: 0.06
Facility County: Not reported

EDR Site Report™

B. F. GOODRICH - PERCHLORATE
LOCUST
RIALTO, CA

Inquiry Number:

April 7, 2008

EDR® Environmental Data Resources Inc

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440 Wheelers Farms Road
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SECTION 1: FACILITY SUMMARY

FACILITY AREA	FACILITY 1 B. F. GOODRICH - PERCHLORATE LOCUST RIALTO, CA EDR ID #S108542883
WASTE MANAGEMENT Facility generates hazardous waste (RCRA)	NO
Facility treats, stores, or disposes of hazardous waste on-site (RCRATSDF)	NO
Facility has received Notices of Violations (RCRAVIOL)	NO
Facility has been subject to RCRA administrative actions (RAATS)	NO
Facility has been subject to corrective actions (CORRACTS)	NO
Facility handles PCBs (PADS)	NO
Facility uses radioactive materials (MLTS)	NO
Facility manages registered aboveground storage tanks (AST)	NO
Facility manages registered underground storage tanks (UST)	NO
Facility has reported leaking underground storage tank incidents (LUST)	NO
Facility has reported emergency releases to the soil (ERNS)	NO
Facility has reported hazardous material incidents to DOT (HMIRS)	NO
WASTE DISPOSAL Facility is a Superfund Site (NPL)	NO
Facility has a known or suspect abandoned, inactive or uncontrolled hazardous waste site (CERCLIS)	NO
Facility has a reported Superfund Lien on it (LIENS)	NO
Facility is listed as a state hazardous waste site (SHWS)	NO
Facility has disposed of solid waste on-site (SWF/LF)	NO
MULTIMEDIA Facility uses toxic chemicals and has notified EPA under SARA Title III, Section 313 (TRIS)	NO
Facility produces pesticides and has notified EPA under Section 7 of FIFRA (SSTS)	NO
Facility manufactures or imports toxic chemicals on the TSCA list (TSCA)	NO
Facility has inspections under FIFRA, TSCA or EPCRA (FTTS)	NO
Facility is listed in EPA's index system (FINDS)	NO
Facility is listed in a county/local unique database (LOCAL)	YES - p4
POTENTIAL SUPERFUND LIABILITY Facility has a list of potentially responsible parties PRP	NO
TOTAL (YES)	1

SECTION 2: FACILITY DETAIL REPORTS

MULTIMEDIA

Facility is listed in a county/local unique database

DATABASE: State/County (LOCAL)

B. F. GOODRICH - PERCHLORATE
LOCUST
RIALTO, CA
EDR ID #S108542883

SLIC:

Type:	ITEM #27
Facility Status:	A
Region:	8
Staff:	Kamron Saremi, Tel 909-782-4303, SLIC
Description Information:	FRMR RIALTO PLANT
Date:	THRU 07/13/02
Order No:	Not reported
Npdes No:	Not reported
File Type:	SLIC
Sequency:	01

Type:	ITEM #27
Facility Status:	A
Region:	8
Staff:	Kamron Saremi, Tel 909-782-4303, SLIC
Description Information:	FRMR RIALTO PLANT
Date:	11/04 THRU 11/16/06
Order No:	Not reported
Npdes No:	Not reported
File Type:	SLIC
Sequency:	05

Type:	ITEM #27
Facility Status:	A
Region:	8
Staff:	Kamron Saremi, Tel 909-782-4303, SLIC
Description Information:	FRMR RIALTO PLANT
Date:	REPORTS
Order No:	Not reported
Npdes No:	Not reported
File Type:	SLIC
Sequency:	E03

Type:	ITEM #27
Facility Status:	A
Region:	8
Staff:	Kamron Saremi, Tel 909-782-4303, SLIC
Description Information:	FRMR RIALTO PLANT
Date:	11/20/06 THRU
Order No:	Not reported
Npdes No:	Not reported
File Type:	SLIC
Sequency:	06

Type:	ITEM #27
Facility Status:	A
Region:	8
Staff:	Kamron Saremi, Tel 909-782-4303, SLIC
Description Information:	FRMR RIALTO PLANT
Date:	05/04 THRU 10/04
Order No:	Not reported
Npdes No:	Not reported
File Type:	SLIC
Sequency:	04

Type:	ITEM #27
Facility Status:	A
Region:	8
Staff:	Kamron Saremi, Tel 909-782-4303, SLIC
Description Information:	FRMR RIALTO PLANT
Date:	04/03 THRU 04/04
Order No:	Not reported
Npdes No:	Not reported
File Type:	SLIC
Sequency:	03

Type:	ITEM #27
Facility Status:	A
Region:	8

EDR Site Report™

MID VALLEY SANITARY LANDFILL
2170 W. STONEHURST
RIALTO, CA 92377

Inquiry Number:

April 7, 2008

EDR® Environmental Data Resources Inc

The Standard in Environmental Risk Information

440 Wheelers Farms Road
Milford, Connecticut 06461

Nationwide Customer Service

Telephone: 1-800-352-0050
Fax: 1-800-231-6802
Internet: www.edrnet.com

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The EDR-Site Report™ is a comprehensive presentation of government filings on a facility identified in a search of over 4 million government records from more than 600 federal, state and local environmental databases. The report is divided into three sections:

Section 1: Facility Summary ..... **Page 3**

Summary of facility filings including a review of the following areas: waste management, waste disposal, multi-media issues, and Superfund liability.

Section 2: Facility Detail Reports ..... **Page 4**

All available detailed information from databases where sites are identified.

Section 3: Databases Searched and Update Information ..... **Page 5**

Name, source, update dates, contact phone number and description of each of the databases searched for this report.

Thank you for your business.
Please contact EDR at 1-800-352-0050
with any questions or comments.

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SECTION 1: FACILITY SUMMARY

FACILITY AREA	FACILITY 1 MID VALLEY SANITARY LANDFILL 2170 W. STONEHURST RIALTO, CA 92377 EDR ID #S106487215
WASTE MANAGEMENT Facility generates hazardous waste (RCRA)	ND
Facility treats, stores, or disposes of hazardous waste on-site (RCRA/TSDF)	NO
Facility has received Notices of Violations (RCRA/VIOL)	NO
Facility has been subject to RCRA administrative actions (RAATS)	NO
Facility has been subject to corrective actions (CORRACTS)	NO
Facility handles PCBs (PADS)	NO
Facility uses radioactive materials (MLTS)	NO
Facility manages registered aboveground storage tanks (AST)	NO
Facility manages registered underground storage tanks (UST)	NO
Facility has reported leaking underground storage tank incidents (LUST)	NO
Facility has reported emergency releases to the soil (ERNS)	NO
Facility has reported hazardous material incidents to DOT (HMIRS)	NO
WASTE DISPOSAL Facility is a Superfund Site (NPL)	NO
Facility has a known or suspect abandoned, inactive or uncontrolled hazardous waste site (CERCLIS)	NO
Facility has a reported Superfund Lien on it (LIENS)	NO
Facility is listed as a state hazardous waste site (SHWS)	NO
Facility has disposed of solid waste on-site (SWF/LF)	NO
MULTIMEDIA Facility uses toxic chemicals and has notified EPA under SARA Title III, Section 313 (TRIS)	NO
Facility produces pesticides and has notified EPA under Section 7 of FIFRA (SSTS)	NO
Facility manufactures or imports toxic chemicals on the TSCA list (TSCA)	NO
Facility has inspections under FIFRA, TSCA or EPCRA (FTTS)	NO
Facility is listed in EPA's index system (FINDS)	NO
Facility is listed in a county/local unique database (LOCAL)	YES - p4
POTENTIAL SUPERFUND LIABILITY Facility has a list of potentially responsible parties PRP	NO
TOTAL (YES)	1

SECTION 2: FACILITY DETAIL REPORTS

MULTIMEDIA

Facility is listed in a county/local unique database

DATABASE: State/County (LOCAL)

MID VALLEY SANITARY LANDFILL
2170 W. STONEHURST
RIALTO, CA 92377
EDR ID #S106487215

SLIC:

Region:	STATE
Global Id:	SL0607131601
Assigned Name:	SLICSITE
Lead Agency Contact:	KAMRON SAREMI
Lead Agency:	SANTA ANA RWQCB (REGION 8)
Lead Agency Case Number:	Not reported
Responsible Party:	Not reported
Recent Dtw:	Not reported
Substance Released:	PER
Facility Status:	Pollution Characterization

ENCLOSURE "C"

COUNTY HMD RECORDS RESPONSE LETTERS

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06063001 Rialto Ral CHJ

COUNTY FIRE DEPARTMENT

OFFICE OF THE FIRE MARSHAL
HAZARDOUS MATERIALS DIVISION
620 South "E" Street • San Bernardino, CA 92415-0153
(909) 386-8401 • Fax (909) 386-8460

COUNTY OF SAN BERNARDINO
PUBLIC AND SUPPORT
SERVICES GROUP

PAT A. DENNEN
Fire Chief
County Fire Warden

July 13, 2006

CHJ Incorporated
P. O. Box 231
Colton, CA 92324-0231

ATTENTION: Ann Laudermilk, Staff Geologist

SUBJECT: **REQUEST FOR RECORDS INFORMATION**

RE: 19494 Country Club Dr.
Rialto, California

This is to confirm that the San Bernardino County Hazardous Materials Division has located records that may pertain to the subject site, as described in your request for records search.

The file(s) listed below are available for your review. Please e-mail this office at eking@sbcfire.org or call the number at the end of this letter to arrange an appointment.

ACTIVE PERMITS:
(Regulatory files for facilities with annual operating permits to maintain underground storage tanks, storage hazardous materials, and/or generate hazardous waste. Files include permits, inspections, reports, test results, correspondence, and related materials. Files will also include any underground tank removal/construction activity records and site remediation/contamination records for facilities still in operation).

No record of active permitted facilities

INACTIVE PERMITS:
(Inactive regulatory files for formerly permitted facilities which maintained underground storage tanks, stored hazardous materials, and/or generated hazardous waste and/or facilities with underground storage tanks removed and/or materials and waste removed. Files will also include any underground tank removal/construction activity records and site remediation/contamination records for facilities no longer operating underground tanks).

El Rancho Verde Country Club 19494 Country Club Dr. Rialto	FA0002884 (EST93029509) Hazardous Material Handler Permit Underground Storage Tank Permit -special categories (recycle/reuse)

PERMITS TO REMOVE/INSTALL/MODIFY UNDERGROUND STORAGE TANKS:

No record of permits to remove/install/modify ugsts

[illegible] H. UFF[illegible]R
County Administrative O[illegible]cer
NOR[illegible]N A. [illegible]NOLD
A[illegible]t County Adm[illegible]ist[illegible]or
Public [illegible]d Support
S[illegible]rvic[illegible] Group

Bo[illegible]d of Sup[illegible]rvi[illegible]ors
BILL POSTMUS ..... First Di[illegible]trict
P[illegible]UL BIAI[illegible]E ..... [illegible]cond Di[illegible]trict
JOS[illegible]E GONZALES ..... F[illegible] Di[illegible]trict
[illegible] HA[illegible]BERGER ..... Third District
G[illegible]Y C. OVITT ..... Fourth District

HAZ MAT INCIDENT RESPONSE TEAM ACTIVITY:

No record of haz mat incident response

SITE REMEDIATION:
(Underground Storage Tank Clean-Up under Local Oversight Program or Hazardous Waste Clean-Up Activity under Local Jurisdiction)(documents may be included in regular active or inactive permit files listed above).

No record of site remediation/clean-up action

Records searched include permit database systems for facilities with permits as hazardous waste generators, hazardous materials handlers, and/or underground storage tanks, including inactive and/or out of business records; logs of permits issued for the removal and/or installation of underground storage tanks; records and databases pertaining to illicit dumping and releases; records of non-permitted facilities; sites undergoing remediation for contaminated soil and/or groundwater; and incidents responded to by the hazardous materials emergency response team

Please e-mail me at eking@sbcfire.org or contact me at the number below for a review appointment or for further clarification.*

ELIZABETH A. KING
Environmental Specialist II
OFM/Hazardous Materials Division
(909) 386-8468 (909) 386-8460 fax
eking@sbcfire/org

*We will copy up to thirty (30) pre-selected pages from a file at a charge $0.25 per page copied. (Be prepared to make this payment at the time of service). If the copies selected exceed thirty (30) pages or if you want a copy of the entire file and it exceeds thirty (30) pages, we will refer you to a private copy service. If you prefer to bring a portable copier on site, you may do so. Please let us know your plans in advance so that accommodations can be made.

Records consist of 1 file, about 40 to 50 pgs. thick.

file

ENVIRONMENTAL HEALTH SERVICES

☑ 385 North Arrowhead Avenue • San Bernardino, CA 92415-0160 • (714) 387-4646
☐ 320 East "D" Street • Ontario, CA 91764 • (714) 391-7570
☐ 15505 Civic Drive • Victorville, CA 92392 • (619) 243-8141
☐ 17830 Arrow Boulevard • Fontana, CA 92335 • (714) 829-6244
☐ 57407 Twentynine Palms Highway • Yucca Valley, CA 92284 • (619) 228-5410
☐ San Bernardino County Vector Control Program
2355 East Fifth Street • San Bernardino, CA 92415-0064 • (714) 383-3200
☐ Environmental Enforcement and Housing
172 West Third Street • San Bernardino, CA 92415-0315 • (714) 387-6512/6515

COUNTY OF SAN BERNARDINO
ENVIRONMENTAL
MANAGEMENT GROUP

PAMELLA BENNETT, R.E.H.S.
Director

Also serving the cities of:

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Apple Valley	Needles
Barstow	Ontario
Big Bear Lake	Rancho Cucamonga
Chino	Redlands
Chino Hills	Rialto
Colton	San Bernardino
Fontana	Twentynine Palms
Grand Terrace	Upland
Hesperia	Victorville
Highland	Yucaipa
Loma Linda	Yucca Valley

February 24, 1993

EL RANCHO VERDE COUNTRY CLUB
19494 COUNTRY CLUB DRIVE
RIALTO, CALIFORNIA 92376

SUBJECT: UNDERGROUND STORAGE TANK CLOSURE FOR EL RANCHO VERDE COUNTRY CLUB, LOCATED AT 19494 COUNTRY CLUB DRIVE, RIALTO CALIFORNIA

The Department has reviewed the subject document dated February 17, 1993 submitted by Seacor for the facility at the subject address. The results indicate that contamination remaining in the excavation is below that which is generally considered a problem and further investigation is not warranted at this time.

It is important to note that this does not constitute a release of liability for contamination remaining on site or contamination not detected. Should site conditions change, the Department may require further investigation and remedial action.

If you have any questions, please call (909) 387-3041.

Catherine B. Richards

CATHERINE B. RICHARDS, R.E.H.S.
ENVIRONMENTAL HEALTH SPECIALIST II
HAZARDOUS MATERIALS MANAGEMENT
SITE REMEDIATION/LOCAL OVERSIGHT PROGRAM

CR:raa

cc: Nadeem Srour, Seacor

06033003 Sycamore Flats Ral CHJ

COUNTY FIRE DEPARTMENT

OFFICE OF THE FIRE MARSHAL
HAZARDOUS MATERIALS DIVISION
620 South "E" Street • San Bernardino, CA 92415-0153
(909) 386-8401 • Fax (909) 386-8460

COUNTY OF SAN BERNARDINO
PUBLIC AND SUPPORT
SERVICES GROUP

PAT A. DENNEN
Fire Chief
County Fire Warden

June 7, 2006

06189-9

CHJ Incorporated
P. O. Box 231
Colton, CA 92324-0231

ATTENTION: Ann Laudermilk, Staff Geologist

SUBJECT: **REQUEST FOR RECORDS INFORMATION**
RE: Assessor Parcel Nos. 0239-031-17 to 22, -35, -36, -49
Sycamore Flat area, California

This is to confirm that the San Bernardino County Hazardous Materials Division has located records that may pertain to the subject site, as described in your request for records search.

The following file(s) are available for your review. Please e-mail this office at eking@sbcfire.org call the number at the end of this letter to arrange an appointment.

ACTIVE PERMITS:
(Regulatory files for facilities with annual operating permits to maintain underground storage tanks, storage hazardous materials, and/or generate hazardous waste. Files include permits, inspections, reports, test results, correspondence, and related materials. Files will also include any underground tank removal/construction activity records and site remediation/contamination records for facilities still in operation).

No record of active permit facilities

INACTIVE PERMITS:
(Inactive regulatory files for formerly permitted facilities which maintained underground storage tanks, stored hazardous materials, and/or generated hazardous waste and/or facilities with underground storage tanks removed and/or materials and waste removed. Files will also include any underground tank removal/construction activity records and site remediation/contamination records for facilities no longer operating underground tanks).

No record of inactive permit facilities

PERMITS TO REMOVE/INSTALL/MODIFY UNDERGROUND STORAGE TANKS:

No record of permits to remove/install/modify ugsts

HAZ MAT INCIDENT RESPONSE TEAM ACTIVITY:

Unknown
Glen Helen Pkwy at Sycamore Flats
Devore

CO0004918 (HMRR98020701BM)
2/7/98
Abandoned drug lab waste

Unknown
Glen Helen On-Ramp, NB I-15
Devore

CO0004145 (HMRR99040202RB)
4/2/99
Abandoned drug lab waste

AF H. UFFER
County Administrative O...r

NOF AN A. ANOLD
As ist nt County Admini rator
Public nd Su ort
S rvic s Group

Bc rd of Sup rvi ors
BILL POST US . . . . . First District
F UL BIAN . . . . . S cond D trict
JOE E GONZALES . . . . . F n District
D N S HA BERGER . . . . . Third District
GARY C. OVITT . . . . . Fourth Di trict

Unknown Glen Helen Pkwy, I-15 Devore	CO0001482 (HMRR00032801GB) 3/28/00 Abandoned drug lab waste
Unknown 300 yds. N/o Glen Helen, Sycamore Cyn. Devore	CO0001623 (HMRR2001123001) 12/30/01 Abandoned waste, asbestos containing material
Unknown 300 yds. N/o Glen Helen, Sycamore Cyn. Devore	CO0002827 (HMRR2002010902) 1/9/02 (12/30/01 incident followup) Abandoned waste, asbestos containing material
Unknown E Sycamore Flats, N/o I-15 Devore	CO0003134 (HMRR2002122901DS) 12/29/02 Drug lab waste
Unknown I-15, Glen Helen Ramp Devore	CO0004105 (HMRR99030901RB) 3/9/99 Illegal dumping on shoulder, inert white material

SITE REMEDIATION:
(Underground Storage Tank Clean-Up under Local Oversight Program or Hazardous Waste Clean-Up Activity under Local Jurisdiction) (documents may be included in regular active or inactive permit files listed above).

No record of site remediation/clean-up activity under local oversight

Records searched include permit database systems for facilities with permits as hazardous waste generators, hazardous materials handlers, and/or underground storage tanks, including inactive and/or out of business records; logs of permits issued for the removal and/or installation of underground storage tanks; records and databases pertaining to illicit dumping and releases; records of non-permitted facilities; sites undergoing remediation for contaminated soil and/or groundwater; and incidents responded to by the hazardous materials emergency response team

Please e-mail me at eking@sbcfire.org or contact me at the number below for a review appointment or for further clarification.*

ELIZABETH A. KING
Environmental Specialist II
OFM/HAZARDOUS MATERIALS DIVISION
(909) 386-8468 (909) 386-8460 FAX
eking@sbcfire.org

*We will copy up to thirty (30) pre-selected pages from a file at a charge $0.25 per page copied. (Be prepared to make this payment at the time of service). If the copies selected exceed thirty (30) pages or if you want a copy of the entire file and it exceeds thirty (30) pages, we will refer you to a private copy service. If you prefer to bring a portable copier on site, you may do so. Please let us know your plans in advance so that accommodations can be made.

Records consist of 7 files, about 30 to 40 pages; please advise if you would like copies sent with invoice for copying charges (okayed to exceed 30 page limit)

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ENCLOSURE "D"

REVIEWED AERIAL PHOTOGRAPHS

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Enclosure "D"
Job No. 08165-9

REVIEWED AERIAL PHOTOGRAPHS

Fairchild, 1930, Black and White Aerial Photograph. Scale: 1" = 666'

Laval, 1938, Black and White Aerial Photograph. Scale: 1" = 666'

U.S. Department of Agriculture, 1938. Black and White Aerial Photographs, Nos. 77, 78, and 79, Flight No. AXL-63, July 9, 1938. Scale 1"=2,000'±

San Bernardino County Flood Control District, 1938, Black and White Aerial Photographs, Flight W-73, Nos. I-3-8 and I-3-9. Scale 1"=1,000'±

San Bernardino County Flood Control District, 1938, Black and White Aerial Photographs, Flight AXL-60, Nos. 86 and 88, July 4, 1938. Scale 1"=1,600'±

San Bernardino County Flood Control District, 1953, Black and white aerial photographs, Nos. 80 through 83, January 31, 1953. Scale 1"=4,000'±

Southwestern, 1953, Black and White Aerial Photograph. Scale: 1" = 666'

San Bernardino County Flood Control District, 1955, Black and White Aerial Photographs, Flight F-34, Nos. 7-25 and 7-26. Scale 1"=1,200'±

San Bernardino County Flood Control District, 1967, Black and White Aerial Photographs, Nos. 6, 7, 8, 9 and 10, October 12, 1967. Scale 1"=1,000'±

San Bernardino County Flood Control District, 1967. Black and White Aerial Photographs, Flight C-132, Nos. 24, 25, and 26, April 17, 1967. Scale 1"=1,000'±

Western, 1968, Black and White Aerial Photograph. Scale: 1" = 666'

San Bernardino County Flood Control District, 1971. Black and White Aerial Photographs, Flight C-132, Nos. 11, 12, and 13, October 08, 1971. Scale 1"=2,000'±

Teledyne, 1977, Black and White Aerial Photograph. Scale: 1" = 666'

San Bernardino County Flood Control District, 1978. Black and White Aerial Photographs, Flight C-279, Nos. 150, 151, 172, and 173, January 21, 1978. Scale 1"=2,000'±

San Bernardino County Flood Control District, 1983, Black and white aerial photographs, Nos. 60 through 63, July 9, 1983. Scale 1"=2,200'±

Enclosure "D"
Job No. 08165-9

REVIEWED AERIAL PHOTOGRAPHS

San Bernardino County Flood Control District, 1986, Black and White Aerial Photographs, Flight C-450, Nos. 151, 170, 171, 172, and 173, February 25, 1986. Scale 1"=2,000'±

USGS, 1990, Black and White Aerial Photograph. Scale: 1" = 666'

USGS, 1995, Black and White Aerial Photograph. Scale: 1" = 666'

San Bernardino County Flood Control District, 1996. Black and White Aerial Photographs, Flight C-528, Nos. 189, 190, 218, 219, 220, and 221, April 20, 1996. Scale 1"=2,000'±

USGS, 2002, Black and White Aerial Photograph. Scale: 1" = 666'

Globexplorer.com, April 1, 2003, Color Aerial Photograph, Magnified to Street Level.

Google Earth, August 8, 2003, Color Aerial Photograph.

ENCLOSURE "E"

REFERENCES

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REFERENCES

California Department of Water Resources, 1977. Hydrologic Data: 1975, Volume V: Southern California, Bulletin No. 130-75.

Daniel B. Stephens & Associates, Incorporated, 2006. Maximum Perchlorate Concentrations in Groundwater Between 2005 and 2006. Map was included within a Perchlorate Facts Sheet on the City of Rialto website.

Environmental Data Resources, 2008. Environmental Records Search, The EDR Data Map Area Study Report, Inquiry Number 2167310.1s, March 17, 2008.

Morton, D.M., and Matti, J.C., 2001. Geologic map of the Devore 7.5-minute quadrangle, Version 1.0 San Bernardino County, California: U.S. Geological Survey Open-File Report 01-173. Scale 1:24,000

Western Municipal Water District, 2007. Cooperative Well Measuring Program Covering the Upper Santa Ana River Watershed, San Jacinto Watershed and Santa Margarita Watershed, Spring 2007.

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Appendix III-M

PHASE I CULTURAL AND PALEONTOLOGICAL ASSESSMENT

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Appendix III-M-A

PCR Services Corporation Phase I Cultural and Paleontological Assessment Lytle Creek Ranch Specific Plan City of Rialto, California March 2008

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Phase I Cultural and Paleontological Assessment

Lytle Creek Ranch Specific Plan

City of Rialto, California

Prepared for:

Lytle Development Company
180 N. Riverview Drive, Suite 260
Anaheim Hills, CA 92408
Tel: 909.381.6007
Contact: Ron Pharris

Prepared by:

PCR Services Corporation
One Venture, Suite 150
Irvine, California 92618
Tel: 949.753.7001
Contact: Marcy Rockman, Ph.D., RPA, Acting Director/Principal Archaeologist

March 2008

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PHASE I CULTURAL AND PALEONTOLOGICAL ASSESSMENT OF THE LYTLE CREEK RANCH SPECIFIC PLAN PROJECT, CITY OF RIALTO, COUNTY OF SAN BERNARDINO, CALIFORNIA

Prepared for:

LYTLE DEVELOPMENT COMPANY
180 N. Riverview Drive, Suite 260
Anaheim Hills, CA 92408
Phone: (909) 381-6007
Contact: Ron Pharris

Prepared by:

PCR SERVICES CORPORATION
One Venture, Suite 150
Irvine, CA 92618
Phone: (949) 753-7001

Amy M. Holmes, RPA
Catherine A. McMahon and
J.D. Stewart, Ph.D.

Project Director: Marcy Rockman, Ph.D., RPA

Devore and San Bernardino North, CA 1966 USGS 7.5' Quadrangles

2,447.3 Acres

Fieldwork Conducted: March 26-29 and April 3, 2007, February 26 and 27, 2008
Report Completed: March 18, 2008

Resources: LC-1H, LC-9H, LC-10H, LC-11H, CA-SBR-1416 (update), CA-SBR-6109H (update), CA-SBR-6589H (update), CA-SBR -6698H (update), CA-SBR-6699H (update), CA-SBR-6700H (update), CA-SBR-6703H (update), CA-SBR-6705H (update), CA-SBR-6706H (update), CA-SBR-6708H (update), CA-SBR-6709H (update), CA-SBR-6872H (update), and CA-SBR-7201H (update)

National Archaeological Data Base (NADB) Keywords: Lytle Creek, Phase I, cultural resources, paleontological resources, archaeological resources

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MANAGEMENT SUMMARY

Lytle Development Company is requesting discretionary approval for the development of the Lytle Creek Ranch Specific Plan, a proposed mixed-use development currently located in the City of Rialto and in unincorporated San Bernardino County, California. Lytle Creek Ranch (Project) will be a 2,447.3-acre master planned community containing residential neighborhoods, active adult housing, elementary and middle schools, mixed-use facilities such as retail, office, and industrial space, an extensive greenbelt and trail system, recreational open space, and undisturbed open space. The Project is subject to the cultural resources requirements of the City of Rialto (City) and the California Environmental Quality Act (CEQA). The City is the CEQA lead agency for the Project and it is preparing the Environmental Impact Report (EIR). The Project will also involve the preparation of a General Plan Amendment.

PCR Services Corporation (PCR) conducted a Phase I cultural and paleontological resources assessment of the above-referenced Project in March and April 2007. The scope of work included a cultural resources records search through the California Historic Resources Information System San Bernardino Archaeological Information Center (CHRIS-SBAIC), a Sacred Lands Search through the Native American Heritage Commission (NAHC), a paleontological resources records search through the San Bernardino County Museum (SBCM), and a pedestrian survey of the Project site.

Results of the cultural resource records search indicated that portions of the Project site have been covered by 13 previous cultural resource investigations. Collectively, these studies have identified the following cultural resources inside or traversing the Project site: one prehistoric archaeological site (CA-SBR-1416), 12 historical-period archaeological sites (CA-SBR-6109H, CA-SBR-6589H, CA-SBR-6698H, CA-SBR-6699H, CA-SBR-6700H, CA-SBR-6703H, CA-SBR-6705H, CA-SBR-6706H, CA-SBR-6708H, CA-SBR-6709H, CA-SBR-6872H, and CA-SBR-7201H), and five cultural resources listed by CHRIS-SBAIC as pending (PSBR-2H, PSBR-33H, PSBR-34H, P1071-23H, and P1072-40H).

PCR archaeologists conducted a pedestrian survey of the Project site on March 26-29 and April 3, 2007. A total of 13 cultural resources were identified including four newly recorded sites (LC-1H, LC-9H, LC-10H, and LC-11H) and nine previously recorded sites (CA-SBR-6698H, CA-SBR-6699H, CA-SBR-6700H, CA-SBR-6705H, CA-SBR-6706H, CA-SBR-6708H, CA-SBR-6709H, CA-SBR-6872H, and CA-SBR-7201H). Four previously recorded archaeological sites could not be relocated (CA-SBR-1416, CA-SBR-6109H, CA-SBR-6589H, and CA-SBR-6703H). None of the CHRIS-SBAIC pending cultural resources were identified.

The NAHC Sacred Lands Search indicated that there are no known or previously recorded Native American cultural resources in the Project site. The results of the paleontological records search through the SBCM indicated that there are no known paleontological localities inside the Project site or within a one-mile radius of the Project site. The paleontological sensitivity of the Project site is considered to be low.

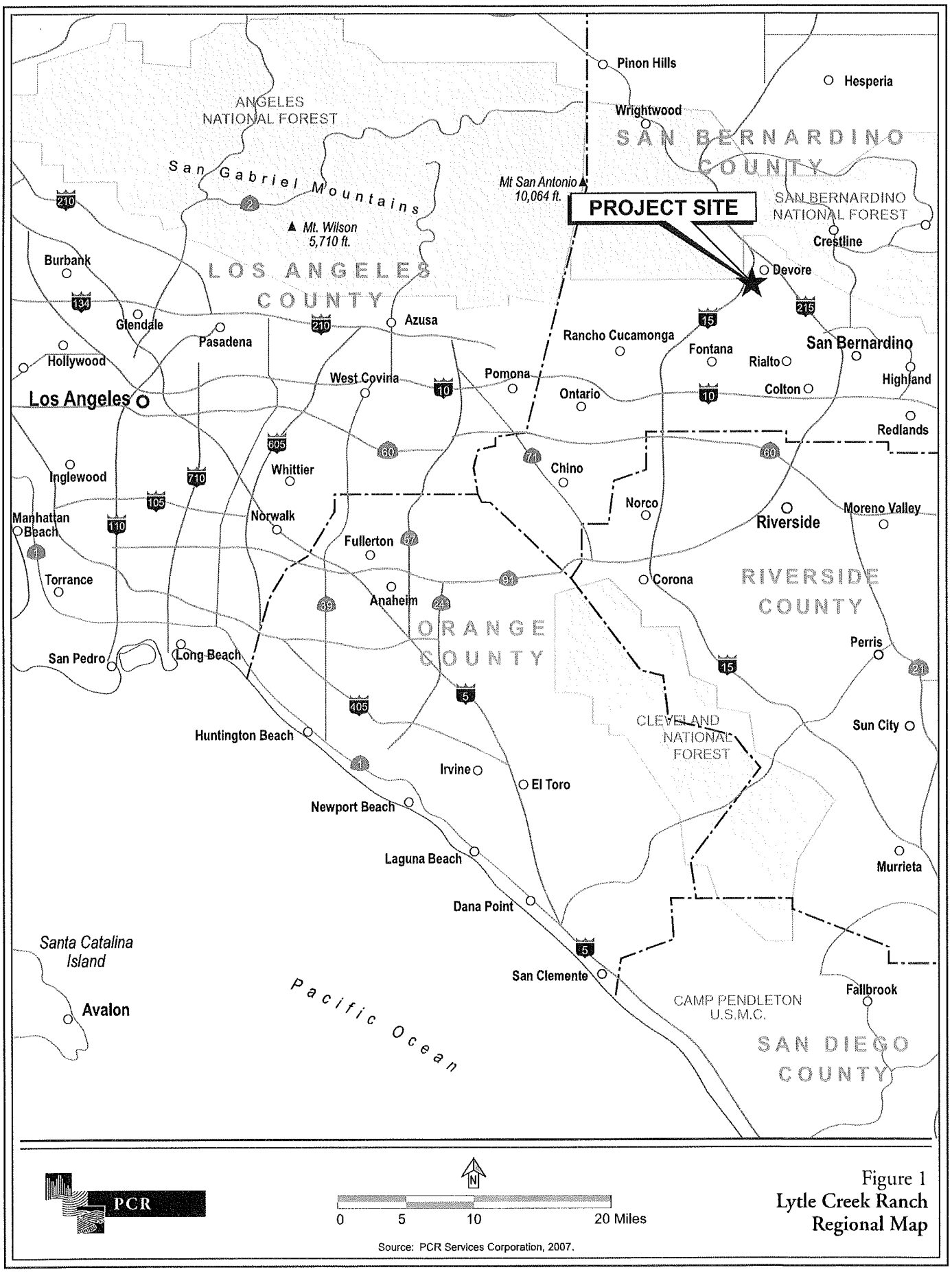
PCR recommends that site CA-SBR-6699H, the Fontana Powerhouse, be avoided as it is listed on the Historic Resource Inventory (HRI) as appearing eligible for the National Register under criterion A and C as an individual property through survey evaluation. The remaining 12 cultural resources identified during survey, including the four newly identified sites and eight previously recorded sites, require evaluation based on current condition, age, associations, research potential, and other appropriate criteria. Therefore, PCR recommends a Phase II investigation be conducted to further research and evaluate these sites for inclusion in the California Register and the National Register. After these resources are evaluated, recommendations can be made for the management of cultural resources with respect to Project development.

Paleontological monitoring is recommended for all excavation and disturbance of Pleistocene-age sediments along the northeast bank of Lytle Creek Wash in the southwestern portion of the Project site known as Neighborhood IV. These sandy sediments have an undetermined sensitivity for paleontological resources and potential impacts to paleontological resources in this portion of the Project site cannot be ruled out. No paleontological work is recommended for other portions of the Project site.

1.0 PROJECT UNDERTAKING AND LOCATION

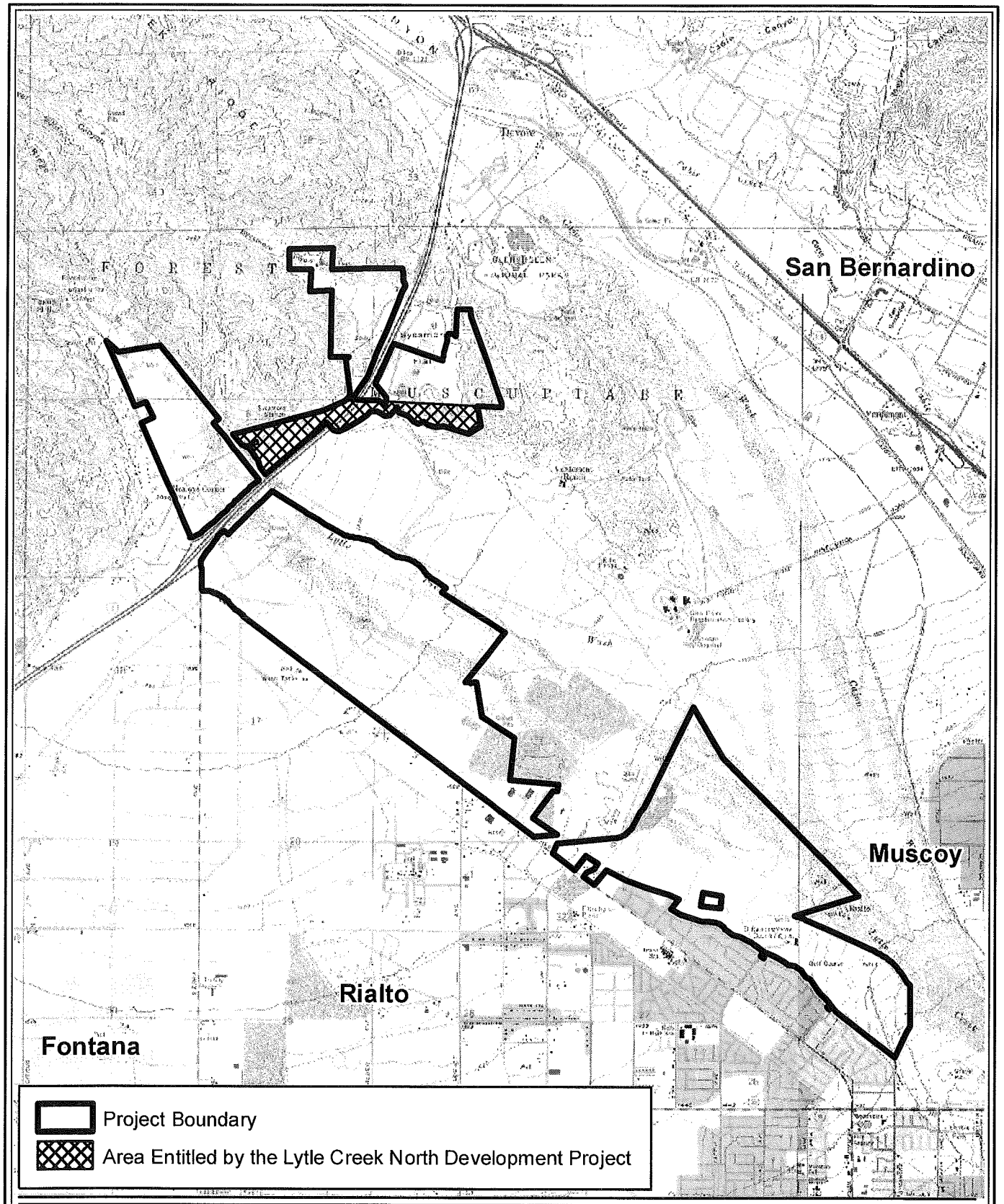
Lytle Development Company is requesting discretionary approval for the development of the Lytle Creek Ranch Specific Plan (Project), a proposed residential and mixed-use development currently located in the City of Rialto (City) and in unincorporated San Bernardino County (County), California (Figure 1, *Regional Map*; on page 3 and Figure 2, *Vicinity Map, on page 4*). The Project is subject to the cultural resources requirements of the City and the California Environmental Quality Act (CEQA). The City is the CEQA lead agency and is preparing an Environmental Impact Report (EIR) for the Project. In addition, the Project will involve the preparation of a General Plan Amendment.

Lytle Creek Ranch will be a 2,447.3-acre master planned community containing residential neighborhoods, active adult housing, elementary and middle schools, mixed-use facilities such as retail, office, and industrial spaces, an extensive greenbelt and trail system, recreational open



Source: PCR Services Corporation, 2007.

Figure 1
Lytle Creek Ranch
Regional Map



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Source: USGS Topographic Series (Devore, Fontana, San Bernardino North and South, CA); PCR Services Corporation, 2007.

Figure 2
Lytle Creek Ranch Vicinity Map

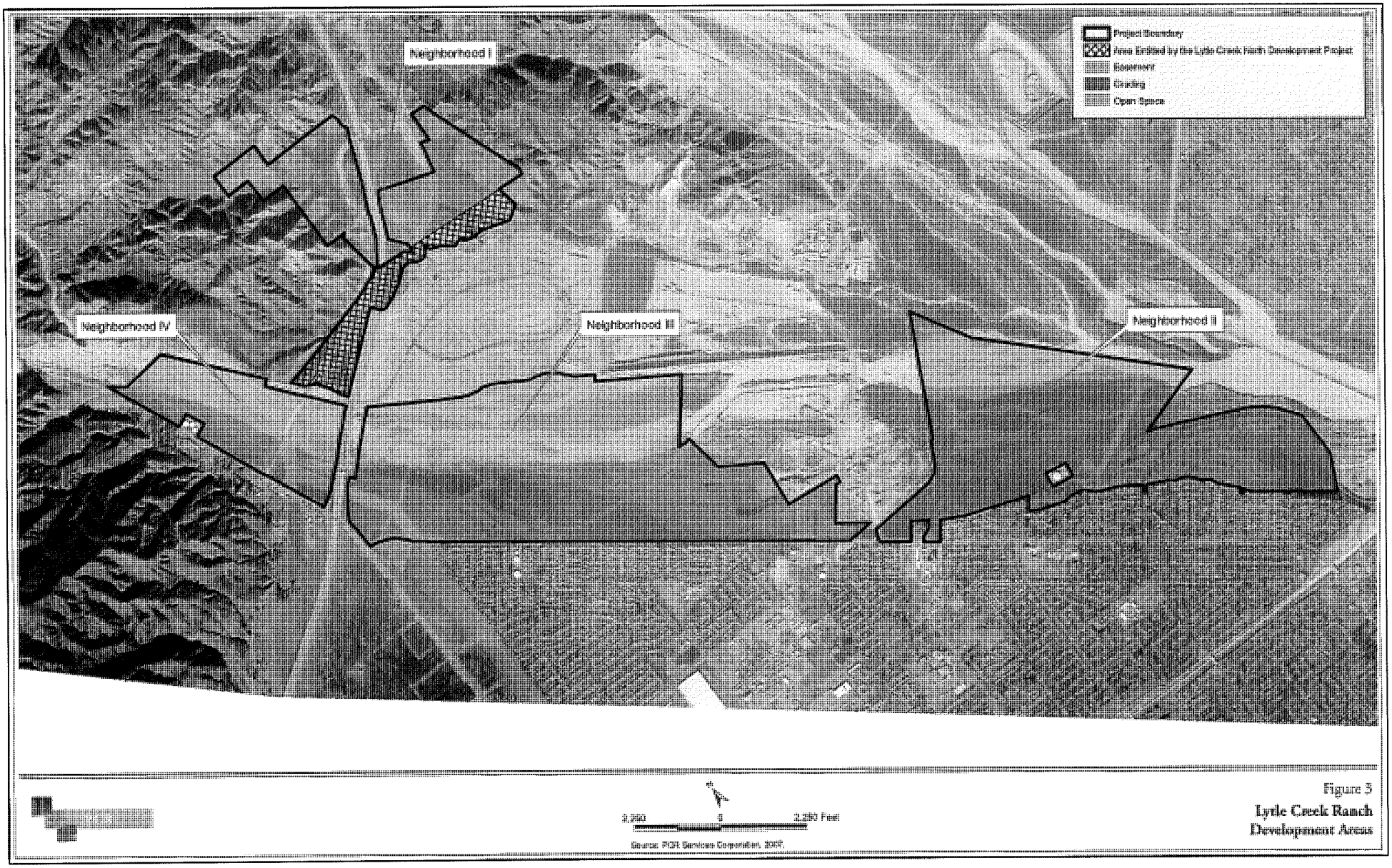

Figure 3
Lyle Creek Ranch Development Areas

significance includes the National Historic Preservation Act (NHPA) of 1966, as amended, CEQA, and the California Register of Historic Resources (California Register), Public Resources Code (PRC) 5024. A description of these laws and regulations follows.

2.1 Federal Level

2.1.1 National Register of Historic Places

First authorized by the Historic Sites Act of 1935, the National Register of Historic Places (National Register) was established by the NHPA of 1966, as "an authoritative guide to be used by Federal, State, and local governments, private groups and citizens to identify the Nation's cultural resources and to indicate what properties should be considered for protection from destruction or impairment."[1] The National Register recognizes properties that are significant at the national, state and local levels.

2.2 State Level

2.2.1 California Register of Historical Resources

The California Office of Historic Preservation (OHP), as an office of the California Department of Parks and Recreation (DPR), implements the policies of the NHPA on a statewide level. The OHP also maintains the California Historic Resources Inventory (HRI). The State Historic Preservation Officer (SHPO) is an appointed official who implements historic preservation programs within the State's jurisdictions.

Created by Assembly Bill 2881 which was signed into law on September 27, 1992, the California Register is "an authoritative listing and guide to be used by state and local agencies, private groups, and citizens in identifying the existing historical resources of the state and to indicate which resources deserve to be protected, to the extent prudent and feasible, from substantial adverse change."[2] The criteria for eligibility for the California Register are based upon National Register criteria.[3] Certain resources are determined by the statute to be

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[1] *Code of Federal Regulations (CFR), 36 § 60.2.*

[2] *California Public Resources Code § 5024.1(a).*

[3] *California Public Resources Code § 5024.1(b).*

automatically included in the California Register, including California properties formally determined eligible for, or listed in, the National Register.[4]

To be eligible for the California Register, a prehistoric or historic property must be significant at the local, state, and/or federal level under one or more of the following criteria:

a. Is associated with events that have made a significant contribution to the broad patterns of California's history and cultural heritage;

b. Is associated with the lives of persons important in our past;

c. Embodies the distinctive characteristics of a type, period, region, or method of construction, or represents the work of an important creative individual, or possesses high artistic values; or

d. Has yielded, or may be likely to yield, information important in prehistory or history.

A resource eligible for the California Register must meet one of the criteria of significance described above and retain enough of its historic character or appearance (integrity) to be recognizable as a historical resource and to convey the reason for its significance. It is possible that a historic resource may not retain sufficient integrity to meet the criteria for listing in the National Register, but it may still be eligible for listing in the California Register.

Additionally, the California Register consists of resources that are listed automatically and those that must be nominated through an application and public hearing process. The California Register automatically includes the following:

- California properties listed on the National Register and those formally Determined Eligible for the National Register.
- California Registered Historical Landmarks from No. 770 onward.
- Those California Points of Historical Interest (PHI) that have been evaluated by the OHP and have been recommended to the State Historical Commission for inclusion on the California Register.

[4] *California Public Resources Code § 5024.1(d).*

Other resources that may be nominated to the California Register include:

- Historical resources with a significance rating of Category 3 through 5.[5]
- Individual historical resources.
- Historical resources contributing to historic districts.
- Historical resources designated or listed as local landmarks, or designated under any local ordinance, such as an historic preservation overlay zone.

2.2.2 California Environmental Quality Act

CEQA is the principal statute governing environmental review of Projects occurring in the state. CEQA requires lead agencies to determine if a proposed Project would have a significant effect on archaeological resources (PRC Sections 21000 *et seq.*). As defined in Section 21083.2 of the PRC a "unique archaeological resource" is an archaeological artifact, object, or site, about which it can be clearly demonstrated that without merely adding to the current body of knowledge, there is a high probability that it meets any of the following criteria:

- Contains information needed to answer important scientific research questions and there is a demonstrable public interest in that information.
- Has a special and particular quality such as being the oldest of its type or the best available example of its type.
- Is directly associated with a scientifically recognized important prehistoric or historic event or person.

In addition, CEQA Section 15064.5 broadens the approach to CEQA by using the term "historical resource" instead of unique archaeological resource. The CEQA Guidelines (Guidelines) recognize that certain historical resources may also have significance. The Guidelines recognize that a historical resource includes: (1) a resource in the California Register; (2) a resource included in a local register of historical resources, as defined in PRC §5020.1 (k) or identified as significant in a historical resource survey meeting the requirements of PRC §5024.1 (g); and (3) any object, building, structure, site, area, place, record,

[5] *Those properties identified as eligible for listing in the National Register, the California Register, and/or a local jurisdiction register.*

or manuscript which a lead agency determines to be historically significant or significant in the architectural, engineering, scientific, economic, agricultural, educational, social, political, military, or cultural annals of California by the lead agency, provided the lead agency's determination is supported by substantial evidence in light of the whole record.

If a lead agency determines that an archaeological site is a historical resource, the provisions of §21084.1 of the PRC and §15064.5 of the Guidelines apply. If an archaeological site does not meet the criteria for a historical resource contained in the Guidelines, then the site is to be treated in accordance with the provisions of PRC §21083, which is as a unique archaeological resource. The Guidelines note that if an archaeological resource is neither a unique archaeological nor a historical resource, the effects of the Project on those resources shall not be considered a significant effect on the environment. (Guidelines §15064.5(c)(4)).

2.2.3 Paleontological Resources

Paleontological resources are also afforded protection by environmental legislation under CEQA. Appendix G (part V) of the Guidelines provides guidance relative to significant impacts on paleontological resources and states, "a Project will normally result in a significant impact on the environment if it will ...disrupt or adversely affect a paleontological resource or site or unique geologic feature, except as part of a scientific study." Section 5097.5 of the PRC specifies that any unauthorized removal of paleontological remains is a misdemeanor. Further, the California Penal Code Section 622.5 sets the penalties for damage or removal of paleontological resources.

2.3 Local Level

The Cultural and Historic Resources Element (Element) within the City's General Plan (1992) states the policies and goals for the identification and protection of cultural resources within the City and its sphere of influence. The Element also stipulates the all cultural resources will be recorded and evaluated. Furthermore, the measures developed to mitigate adverse impacts to such resources will be taken in accordance with CEQA, the National Environmental Quality Act, and/or the NHPA.

The City classifies cultural resources identified within their City limits into one of the following categories: archaeological resources, historic archaeological resources, and historic resources. Archaeological resources are physical properties in the environment resulting from human activities that predated recorded history, or until the Mission Era, circa 1769. These resources are attributed to the Serrano or Gabrielino Indians, who once occupied the region within the City limits and surrounding vicinity. Historical-period archaeological resources are resources that date from the 1769 to the beginning of the 20th century and are generally attributed

to Euro-American settlement of the region. These resources are relatively rare in the Project vicinity. Historic resources refer to resources that date from the beginning of the 20th century to 50 years ago and are attributed to the primary development of the City.

The City has also developed a Historic/Archaeological Resources Sensitivity Map based on the results of previous cultural resource studies that highlights areas where resources are more likely to be encountered than others (Figure 4, *City of Rialto Historical/Archaeological Sensitivity Map, on page 12*). According to the map, portions of the Neighborhoods II, III, and IV of the Project site are located within a high sensitivity zone for prehistoric archaeological resources.

3.0 ENVIRONMENTAL SETTING

The majority of the Project site is located within the floodplain of Lytle Creek Wash, a large intermittent stream which originates in the eastern San Gabriel Mountains northwest of the Project site. Neighborhood I is located on distal alluvial fan deposits derived from the San Gabriel Mountains, which are composed of predominantly Mesozoic granite rocks (California Division of Mines and Geology 1966) (Figure 5, *Site Photographs 1, on page 13*). The San Andreas Fault passes east of the San Gabriel Mountains through the Cajon Pass (Harden 1998: Figure 14-36). The Project site supports numerous plant communities and/or associations. These include but are not limited to scrub, chaparral, riparian, and grassland plant communities. These plant communities provide habitat for a variety of reptiles, amphibians, and mammals. Mammals observed or otherwise detected within the area include the desert cottontail, California ground squirrel, San Diego black-tailed jackrabbit, coyote, mule deer, bobcat, and multiple species of mice and rats. A number of other species are expected to be resident within the region and may occasionally utilize the study area to forage or for cover (Nelson and Erickson 2007). Topography is generally flat throughout the Project site, with elevations ranging from 1400 to 2400 feet above mean sea level (see Figure 2).

Existing conditions within the Project site include undeveloped land and the El Rancho Verde Golf Course. Residential development exists immediately off-site to the southwest of Riverside Avenue within the City. Several County facilities are located just off-site to the east, including Glen Helen Regional Park, Verdemont Ranch, Glen Helen Rehabilitation Facility; a sheriff's training facility, and an off-road vehicle recreation area. Disturbances to the Project site include Lytle Creek Wash flood events, two-track roads, and wildfires. In October 2003, the Project site was affected by the Padua and Grand Prix Fires which merged in the vicinity (Kohler 2003). Sections of the Lytle Creek North Planned Development Project adjacent to Neighborhood I have been graded and prepared for development (see Figure 3).

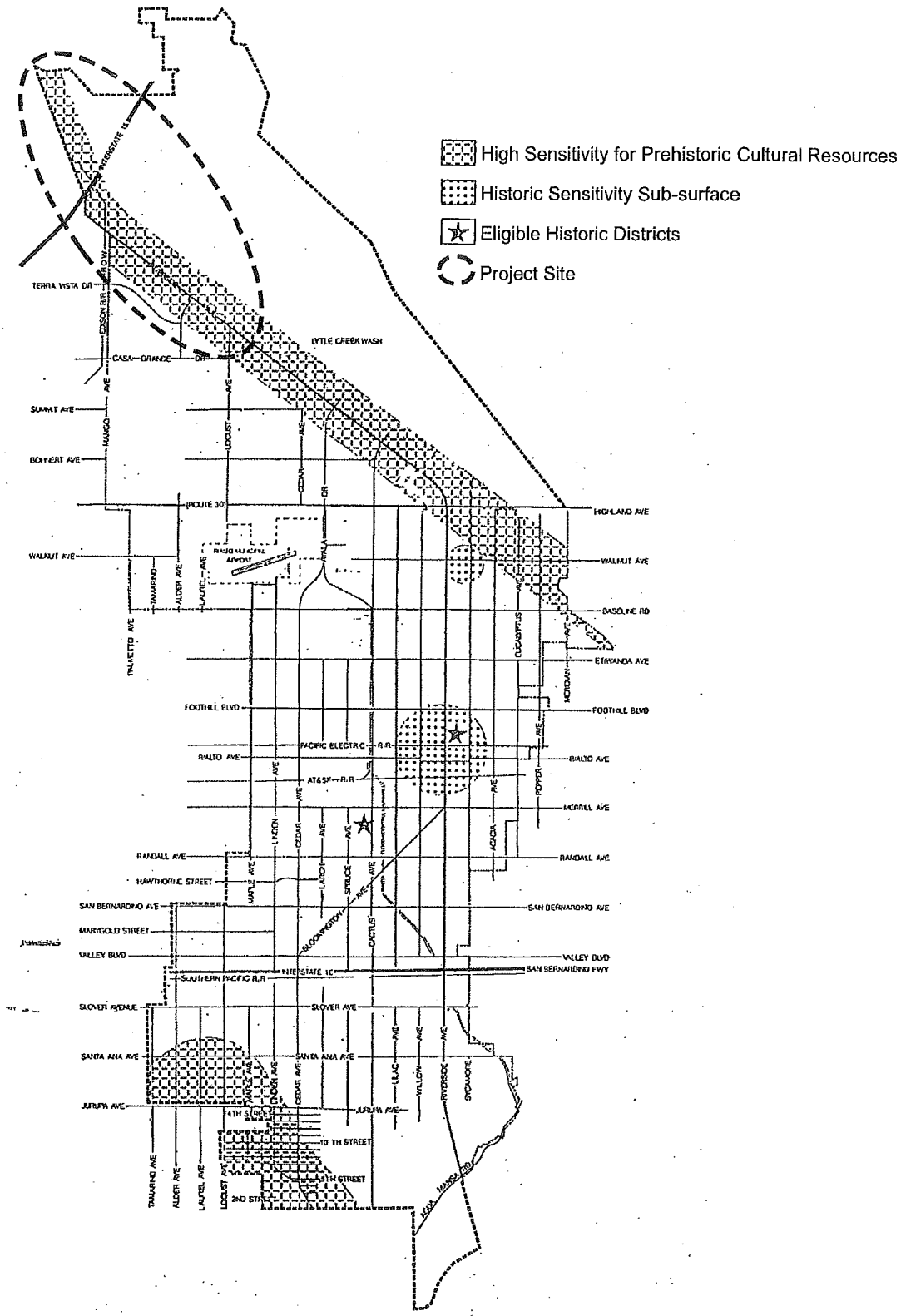

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Figure 4
Lytle Creek Ranch
City of Rialto Historic/Archaeological Resources Sensitivity Map

Source: City of Rialto General Plan, 1992.

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Photograph 1: Overview of project to north.

Photograph 2: Cutbank exposure to west.

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Figure 5
Lytle Creek Ranch
Site Photographs

Source: PCR Services Corporation, 2007.

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4.0 CULTURAL CONTEXT

Prehistory is most easily discussed chronologically, in terms of environmental change and recognized cultural developments. Several chronologies have been proposed for inland Southern California, the most widely accepted of which is Wallace's four-part Horizon format (1955), which was later updated and revised by Claude Warren (1968). The advantages and weaknesses of Southern California chronological sequences have been reviewed by Warren (in Moratto 1984), Chartkoff and Chartkoff (1984), and Heizer (1978). The following discussion is based on Warren's (1968) sequence, but the time frames have been adjusted to reflect more recent archaeological findings, interpretations, and advances in radiocarbon dating.

4.1 Paleoindian Period (ca. 13,000-11,000 years before present [YBP])

Little is known of Paleoindian peoples in inland southern California, and the cultural history of this period follows that of North America in general. Recent discoveries in the Americas have challenged the theory that the first Americans migrated from Siberia, following a route from the Bering Strait into Canada and the Northwest Coast some time after the Wisconsin Ice Sheet receded (ca. 14,000 YBP), and before the Bering Land Bridge was submerged (ca. 12,000 YBP). A coastal migration route somewhat before that time is also possible. The timing, manner, and location of this crossing are a matter of debate among archaeologists, but the initial migration probably occurred as the Laurentide Ice Sheet melted along the Alaskan Coast and interior Yukon. One of the earliest radiocarbon dates from a Paleoindian Period site containing human remains in Southern California comes from the Arlington Springs Woman site on Santa Rosa Island. These human remains date to at least 9,500 YBP (Morris and Erlandson 1993). Lifeways during the Paleoindian Period were characterized by highly mobile hunting and gathering. Prey included megafauna, such as mammoth, and technology included a distinctive flaked stone toolkit that has been identified across much of North America and into Central America. Their diet likely contained some plant foods, but the Paleoindian toolkit recovered archaeologically does not include many tools that have been identified as designed specifically for plant processing.

To date, no Paleoindian Period sites have been identified in inland southern California. An example of the earliest dated sites is CA-RIV-2798/H located on the shores of Lake Elsinore, which has been dated to approximately 8,400 YBP (Grenda 1997).

The megafauna that appear to have been the focus of Paleoindian lifeways went extinct during a warming trend that began approximately 10,000 YBP, and both the extinction and climatic change (which included warmer temperatures in desert valleys and reduced precipitation in mountain areas) were factors in widespread cultural change. Subsistence and social practices

continued to be organized around hunting and gathering, but the resource base was expanded to include a wider range of plant and game resources. Technological traditions also became more localized and included tools specifically for the processing of plants and other materials. This constellation of characteristics has been given the name Archaic and it was the most enduring of cultural adaptations to the North American environment.

4.2 Archaic Period (ca. 11,000-3,500 YBP)

The earliest Archaic Period lifeways in inland southern California have been given the name San Dieguito tradition, after the San Diego area where it was first identified and studied (Warren 1968). Characteristic artifacts include stemmed projectile points, crescents and leaf-shaped knives. These suggest continued subsistence practices focused on large game, although not on the megafauna of the earlier Paleoindian Period. Milling equipment appears in the archaeological record at approximately 7,500 YBP (Moratto 1984:158). The La Jolla Complex (7,500–3,000 YBP) is characterized by artifact assemblages with basin millingstones and unshaped manos, projectile points, flexed cairn burials, and cogged stones. The transition from San Dieguito tradition to La Jolla lifeways appears to have been an adaptation to drying of the climate after 8,000 YBP, which may have stimulated movements of desert peoples to the coastal regions, bringing millingstone technology with them. Groups in the coastal regions included mollusks in their diet, while inland groups relied on wild-seed gathering and acorn collecting.

4.3 Late Prehistoric Period (ca. 3,500 YBP-A.D. 1769)

Environmental changes around 4,000–3,000 YBP may have underlain a cultural shift to more land-based gathering practices. This period was characterized by the increasing importance of acorn processing, which supplemented the resources from hunting and gathering. The Late Prehistoric Period of the San Bernardino Mountain and eastern San Gabriel Mountains area has been defined by work at the Sayles site, CA-SBR-421, by Kowta (1969). Artifact assemblages characteristic of the Sayles site include percussion-flaked scraper planes, cores, plano-convex scrapers, choppers, and hammerstones. This type of assemblage, referred to as the Sayles Complex, has been dated to approximately 3,000-1,000 YBP. The Sayles Complex is similar to Late Prehistoric assemblages found along the coast, but lacks mortars and pestles. The absence of mortars and pestles may be due to population or technological changes introduced to the San Bernardino Mountain area along with Uto-Aztecan languages, the so-called "Shoshonean Wedge", by about 1,500 YBP.

4.4 Historic Context

The Project site is located within a large section of the historic Rancho Muscupiabe (Muscupiabe), which is named after a nearby Serrano village called *Muscupiabit*. Muscupiabe

encompassed approximately one square league (approximately 4,500 acres) of northwestern San Bernardino Valley (L.D. King 2001). In 1843, Governor Manuel Micheltorena gave the Muscupiabe to Michael White, a European settler (Kielbasa 1997). Muscupiabe was abandoned by 1845 because it could not be defended against the local Native Americans. In 1870, the United States Land Commission conducted a survey of Muscupiabe and expanded it to approximately 30,000 acres. The survey was conducted as a result of a dispute over the water rights to Lytle Creek (L.D. King 2001). In 1851, Captain Andrew Lytle led the Mormon Battalion and Mormon settlers to the San Bernardino area. Lytle Creek Wash was named after Captain Lytle. These first Mormon settlers camped at Sycamore Grove, is now California Historical Landmark (CHL) number 573, located within the Glen Helen Regional Park (see Figure 2).

Lytle Creek Wash has a long history of water capture and conveyance and has been the subject of many water rights disputes. In the mid-to-late 1800s, three ditches were constructed to transport water. These ditches included the Rancheria Ditch, the Old Town Ditch, and the Lloyd Ditch (L.D. King 2001: 4.10-5). At this time, settlers living on Muscupiabe lands fought with the rancho owners over water rights. The Lytle Creek Water Company was formed by 1881 to manage water rights. Soon thereafter, real estate investors changed its name to Semi-Tropic Land and Water Company. It went bankrupt anyway by 1896. Thereafter, numerous companies held the water rights to Lytle Creek Wash. In 1932, the Fontana Union Water Company constructed a series of concrete and stacked-rock water control features located in and around Lytle Creek Wash (Van Wormer and Langenwalter 1990). These flood control features were constructed as part of the Lytle Creek Flood Control Project and were likely damaged or destroyed during major floods in March of1938 (Dice et al. 2004).

Other uses of the Project vicinity in recent times include the development of vineyards. The Klein/Elenna Brothers Ranch was located in the Sycamore Flat area (see Figure 2). The Ranch was occupied by vintners from the 1920s to the 1970s (Leonard 1979). This area was graded in 2005 and is currently being developed as part of the Lytle Creek North Planned Development Project (Garcia and Marken 2005).

5.0 ETHNOGRAPHIC CONTEXT

The Project site is located on the boundary between Serrano and Gabrielino territories, and was likely used by both groups (Bean and Smith 1978a: Figure 1 and Bean and Smith 1978b: Figure 1). Both groups are discussed briefly below.

5.1 Serrano

The term Serrano refers to both an ethnic group and a group of languages in the Takic family including Serrano and Kitanemuk, and possibly Vanyume and Tataviam. The Serrano lived in an area that extended from Cajon Pass at the western end of the San Bernardino Mountains, east to Twentynine Palms, north to Victorville, and south to the Yucaipa Valley. This area contains a range of very different topographies, including the San Bernardino Mountains and flat valley areas. The Serrano subsisted on plant and animal resources in both the mountain and desert life zones. This included hunting animals such as mountain goats, deer and rabbits; and collecting plant foods such as grass seeds, acorns, piñon nuts, bulbs, roots, berries, and mesquite pods (Bean and Smith 1978b).

Serrano villages were typically located in the mountain foothills. Water availability appears to have been a major determining factor in the placement of the villages. According to the CHRIS-SBAIC, a Serrano village called *Santisima Trinidad* (pending site number P1072-25) is said to have been located in the vicinity of Sycamore Grove; this village has not been located by archaeologists (L.D. King 2001:4.10-6). Other known Serrano villages in the region include *Guapiabit* and *Muscupiabit* near the Cajon Pass. The Serrano's first contact with the Spanish is thought to have been in 1771 when Mission San Gabriel was established or in 1772 during Pedro Fages's forays into Serrano territory (Bean and Smith 1978b:573). In 1819 an *asistencia* (an outpost for cattle activities) of the Mission San Gabriel was constructed near present day Redlands (San Bernardino County Museum 2006). Many Serrano people were forced to live on mission grounds until missions were secularized in 1834. Today, many Serrano lived on the Morongo and San Manuel Indian reservations in San Bernardino County (Bean and Smith 1978b:573).

5.2 Gabrielino

Named after the San Gabriel Mission, the Gabrielino occupied sections of Los Angeles, Orange, and San Bernardino Counties (Bean and Smith 1978a). Gabrielino was one of several Cupan languages in the Takic family which belongs to the Uto-Aztecan linguistic stock. Gabrielino territory included the Los Angeles Basin, the watersheds of the Los Angeles, San Gabriel, and Santa Ana Rivers, intermittent streams in the Santa Monica and Santa Ana Mountains, the coast from Aliso Creek in the south to Topanga Creek in the north, and the islands of San Nicolas, Santa Catalina, and San Clemente. Similar to the Serrano, the Gabrielino subsisted on a variety of resources in several ecological zones. Acorns, sage, and yucca were gathered throughout the inland areas, whereas shellfish, fish, and a variety of plants and animals were exploited within the marshes and along the coast. Deer and various kinds of small mammals were hunted on an opportunistic basis.

The settlement patterns of the Gabrielino and other inland groups were similar and they often interacted through marriage, trade and warfare. The seasonal availability of water and floral and faunal resources influenced seasonal migration rounds with more permanent villages and base camps being occupied primarily during winter and spring months. In the summer months, the village populations divided into smaller units that occupied seasonal food procurement areas. The more permanent settlements tended to be near major waterways and food sources and various secular and sacred activities, such as food production and storage and tool manufacturing, were conducted at these areas (Bean and Smith 1978a).

6.0 METHODS

6.1 Cultural Resources Records Search

On March 21, 2007, PCR archaeologist Catherine A. McMahon conducted a cultural resource records search at the CHRIS-SBAIC at the SBCM in Redlands, California. This record search included a review of all recorded cultural resources within the Project site and within a half-mile radius of the Project site and associated cultural resource reports. Several additional lists of previously identified cultural resources also were checked, including the PHI, the CHL, the California Register, the National Register, the HRI, and historic USGS topographic maps of the area.

6.2 Sacred Lands Search and Native America Consultation

On March 19, 2007, PCR commissioned a Sacred Lands Search of the Project site through the NAHC. As per NAHC recommendations, PCR conducted follow-up consultation with the Native American individuals and groups identified by the NAHC as having affiliation with the Project site. Follow-up consultation was in the form of a letter sent via certified mail that indicated the location of the Project site and general nature of the Project and requested any information that the groups or individuals are able to share about Native American resources that might be affected by the Project.

6.3 Pedestrian Survey

On March 26-29, April 3, 2007 and February 26 and 27, 2008, PCR archaeologists Mitch Marken, Amy Holmes, Catherine McMahon, Matt Gonzalez, Michael Vader, Chris Powell, Fatima Vidal, and Kyle Garcia surveyed the Project site. The majority of the Project site was surveyed with pedestrian transects spaced 15-20 m between surveyors. In some areas, where surface visibility was above 80 percent the transect intervals were extended to 25-50 m. All natural exposures, such as cutbanks, were inspected for cultural resources (Figure 5, *Site*

Photographs 2). Detailed field notes and digital photos were taken throughout the survey. All new archaeological sites were documented using DPR forms and the procedure outlined by the OHP (1995). Previously recorded sites were assessed with respect to previous site descriptions. Changes in site conditions, components, and boundaries, if any, were also recorded on DPR forms.

Several areas of the Project site were not surveyed for several reasons (Figure 6, *Survey Coverage and Surface Visibility Map,* on page 20). In Neighborhood I, these areas included two sections totaling 116.62 acres that had been previously entitled under the Lytle Creek North Planned Development Project (Dice et al. 2004; Van Wormer and Langenwalter 1994) and the steep slopes along the northern, southern, and eastern margins of the Neighborhood. In Neighborhood II, these areas included the developed sections of the golf course and ponded areas. Unsurveyed areas in Neighborhood III included the Cemex plant located at 3221 N Riverside Avenue and its associated quarry pits, and the Fontana Powerhouse. In Neighborhood IV, unsurveyed areas included a fenced enclosure containing three large water tanks along the southern margin and an area with a steep slope along the northern margin of the Project site.

6.4 Paleontological Resources Records Search

On March 15, 2007, PCR commissioned a paleontological records search through the SBCM. This records search entailed an examination of geologic maps and fossil locality records in order to determine the paleontological sensitivity of the Project site.

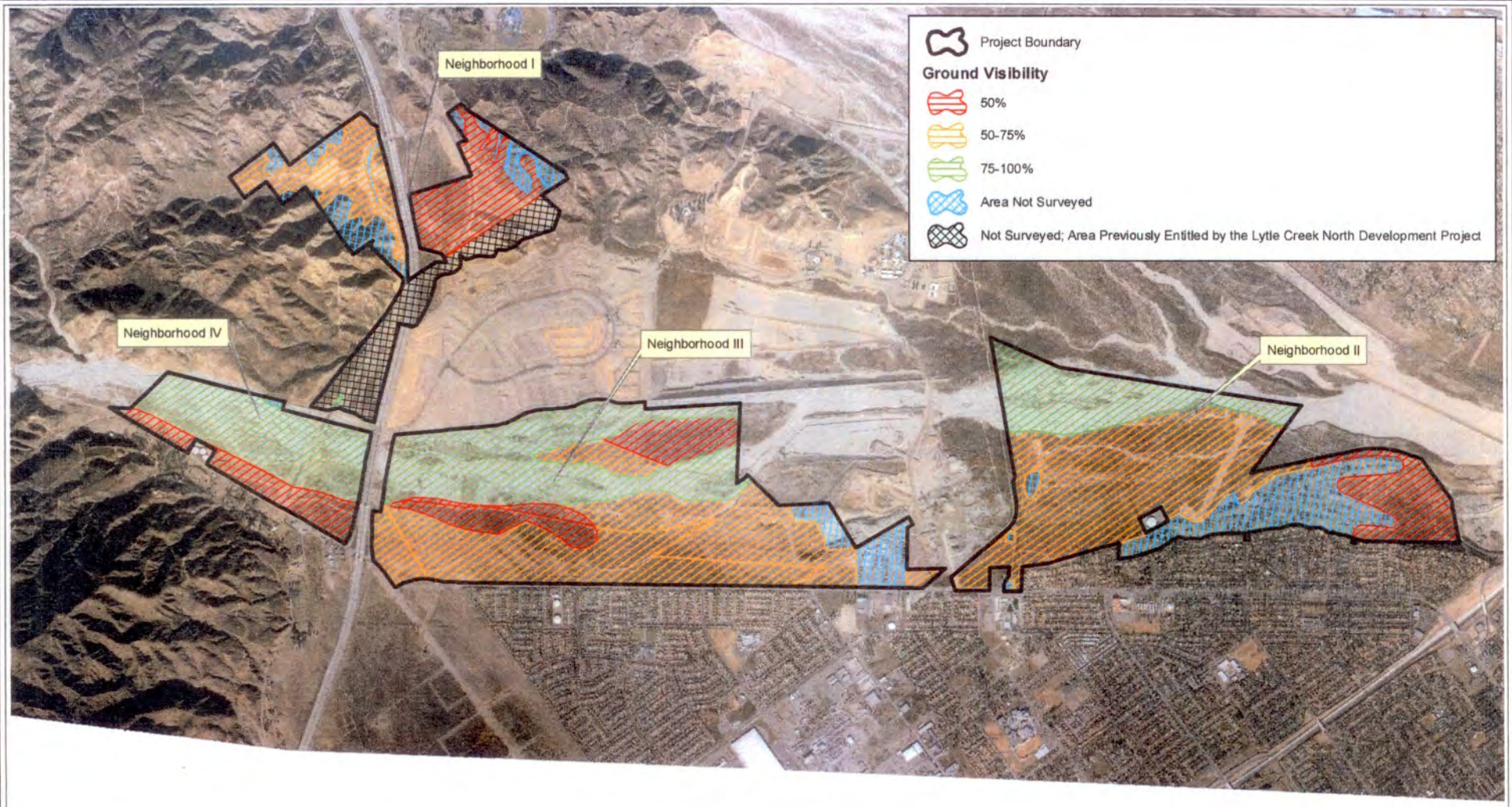
7.0 RESULTS

7.1 Cultural Resources Records Search

On March 21, 2007, PCR conducted a cultural resource records search at the CHRIS-SBAIC at the SBCM in Redlands, California. This record search included a review of all recorded cultural resources with the Project site and within a half-mile radius of the Project site and associated cultural resource reports. The CHRIS-SBAIC bibliography and HRI are provided in Appendix B.

7.1.1 Cultural Resource Reports

The results of the cultural resource records search indicate that 13 previous investigations have covered all or included portions of the Project site. An additional 37 archaeological investigations have been conducted within a half-mile radius of the Project site. All 50 projects are listed in Table 1 on page 21. These projects were conducted throughout the 1970s, 1980s,



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Source: PCR Services Corporation, 2007.

Figure 6
Lytle Creek Ranch
Survey Coverage and Surface Visibility Map

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Table 1

Cultural Resource Studies in the Project Site and Within a Half-Mile Radius of the Project Site

Year	Report #	Description	Location*	Resources
1973	1060697	Schuiling, Walter C., Environmental Impact Archaeological Survey: Seymour Flat Development	Neighborhood I	None
1975	1060258	San Bernardino County Museum Association, Archaeological Impact Report for Matick Corporation with a Review for U.S. Forest Service: Archaeological Investigations Concerning the Area Around Nealey's Corner	West	None
1975	1060258	San Bernardino County Museum Association, Archaeological Impact Report for Matick Corporation with a Review for U.S. Forest Service: Archaeological Investigations Concerning the Area Around Nealey's Corner	West	None
1976	1060377	Heran, Joseph E., Archaeological Historical Resources Assessment of Tentative Tract 9001-Located Above El Rancho Verde Golf Course, Rialto Area	South	None
1977	1060488	Heran, Joseph E., Archaeological Historical Resources Assessment of 14.6 Acres M/L Rialto Bench	South	None
1977	1060498	Hearn, Joseph E., Lytle Creek Road and Grapeview Canyon	Northwest	None
1977	1060559	Heran, Joseph E., Archaeological Historical Resources Assessment of Tentative Tract 10161 in Rialto	South	None
1978	1060636	Heran, Joseph E., Archaeological Historical Resources Assessment of Tract No. 10244, El Rancho Verde Area, Rialto	Neighborhood II	None
1978	1063536	Hess, Al., Land Exchange: John Dumouchelle	North	None
1981	1061169	Smith, Gerald A., Robert Reynolds, and Michael K. Lerch, Cultural Resources Assessment of the Proposed San Bernardino Valley Municipal Water District Project for Two Thousand Feet of Pipe and Construction of a Pressure Reducing Structure, Rialto, California	South	None
1982	1061307	Sampson, Michael, An Archaeological Reconnaissance of the Texas Hill Chaparral Management Project, San Bernardino County, California	Northwest	Unknown
1983	1061407	Ancic, Jr., John Charles, Historical Brief on Grapeland, Sierra Heights Development	South	Unknown
1985	1061501	Mason, Roger D., Cultural Resource Survey Report for the Etiwanda Pipeline and Power Plant EIR	South	CA-SBR-P1084-1H; CA-SBR-P1072-9H; CA-SBR-P1072-10H

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Cultural Resource Studies within a half-mile Radius of the Project Site

Year	Report #	Description	Location*	Resources
1986	1061566	Brock, James, John F. Elliott, Benjamin Resnick, and William Sawyer, Santa Ana River Upstream Alternatives, Cultural Resources Survey	Neighborhood IV	59 sites
1986	1061578	Foster, Daniel G., Vegetation and Watershed Management, Archaeological Review, Glen Helen II VMP Project, San Bernardino Ranger Unit	Neighborhood III	None
1987	1061751	de Barros, Philip, Cultural Resources Survey and Assessment of Tentative Tract 13639, Northwest Rialto Specific Plan, City of Rialto, San Bernardino County, California	South	CA-SBR-6109H; CA-SBR-6110H; CA-SBR-6111H; CA-SBR-6112H
1988	1061823	Swanson, Mark T., Cultural Resources Survey of Sycamore Flat, a 310-Acre Tract Southwest of Devore, San Bernardino County, California	Neighborhood I	None
1989	1061847	Schneider, Joan S., A Report of the Archaeological Monitoring of Brush Removal Operations on Tract 13780, of Master Tract 13639, Known as Las Colinas, City of Rialto, County of San Bernardino, California	South	CA-SBR-6111H
1989	1061961	Haenszel, Arda M., The Lost Rancheria in Cajon Pass	Northeast	CA-SBR-93; CA-SBR-425; CA-SBR-P1072-25
1989	1062043	Sutton, Paula A., Archaeological Survey Report for the Proposed Foothill Freeway, Los Angeles and San Bernardino Counties, California	South	7 sites
1989	1062527	Hammond, Stephen R., Historic Property Survey Report for the Proposed Foothill Freeway	South	8 sites
1989	1062530	Gallup, Aaron A., Bonnie W. Parks, Denise O'Connor, and Stephen D. Mikesell, Historical Architectural Survey Report and Historic Resource Evaluation Report for a Proposed Highway on New Alignment	South	6 sites
1990	1062066	Van Wormer, Stephen and Paul E. Langenwalter II, Lytle Creek Wash Archaeological Survey	All Neighborhoods	14 sites
1991	1062416	Parker, Cole and Carmen A. Weber, Lytle Creek Wash Cultural Resource Survey	Northeast	CA-SBR-6903H

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Cultural Resource Studies within a half-mile Radius of the Project Site

Year	Report #	Description	Location*	Resources
1991	1062795	Hampson, R. Paul, James J. Schmidt,, and June A. Schmidt, Cultural Resource Investigation: Cajon Pipeline Project	In between Neighborhood IV & III	41 sites
1991	1062853	Foster, John M., James J. Schmidt, Carmen A. Weber, Gwendolyn R. Romani, and Roberta S. Greenwood, Cultural Resource Investigation: Inland Feeder Project MWD of Southern CA	Neighborhood II	40 sites
1992	1062621	Alexandrowicz, J. Steven et al., Cultural and Paleontological Resources Investigations within the North Fontana Infrastructure Area, City of Fontana, San Bernardino County, California	West	86 sites
1992	1062684	Brown, Joan C. and Tim Gregory, Appendix A: Historic Resource Evaluation, Revised	Neighborhood II	CA-SBR-7201H
1992	1062713	Mlazovsky, Marilyn, Archaeological Reconnaissance Report: Sycamore Station Garbage Disposal	Northwest	None
1992	1062767	Hogan, Michael, Archaeological Monitoring Report Glen Helen Park Amphitheater Near Devore in San Bernardino County, California	Northeast	Unknown
1993	1062881	de Barros, Philip, Cultural Resources Inventory and Evaluation of the Lytle Creek Hydroelectric Project, FERC Project #1932	Northwest	6 sites
1995	1063538	White, Laurie and Robert S. White, Cultural Resources Investigation for the 3000 +/- Acre City of Rialto Airport Area Specific Plan, North Rialto, CA	South	8 sites
1995	1063539	Love, Bruce, Identification and Evaluation of Historic Properties: Segments of Bakersfield-Rialto Fiberoptic Line within the SBNF, San Bernardino County, CA	North	17 sites
1997	1063651	Strudwick, Ivan and Deborah McLean, Second Supplemental Historic Property Survey Report for the Proposed SR 30 Freeway Project, Los Angeles & San Bernardino Counties, CA	South	CA-SBR-8866H
1998	1063541	Brechbiel, Brant, Cultural Resources Record Search and Survey Report for a Pacific Bell Mobile Service Telecommunications Facility: CM 032-01, Near Rialto, CA	In between Neighborhood I & III	None
1998	1063543	Brechbiel, Brant, Cultural Resources Record Search and Literature Review for a Pacific Bell Mobile Service Telecommunications Facility: CM 025-21, City of Rialto, CA	South	N/A
2000	1063530	Love, Bruce, Comcast Cable Fiberoptic Line, Lytle Creek, SBNF	Northwest	5 sites

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Cultural Resource Studies within a half-mile Radius of the Project Site

Year	Report #	Description	Location*	Resources
2000	1064015	Duke, Curt, Cultural Resource Assessment for AT&T Wireless Facility #C958.1, County of San Bernardino, CA	Neighborhood III	None
2002	1064012	Duhdal, Miriam, Historical/Archaeological Report: West San Bernardino County Water District Zones 6&7 Reservoir & Waterline Improvements & Installation In & Near the City of Fontana, San Bernardino County, CA	West	5 sites
2003	1064013	Dietler, Sara and Sherri Gust, Terra Vista Drive Roadway Extension Project, City of Fontana, San Bernardino County, CA	South	CA-SBR-10878H
2003	1064204	Michael Brandman Associates, Phase 1 Survey Results for Bechtel- AT&T Telecommunications Facility Candidate 950023022A (SCE Sierra), Northeast corner of Interstate 15 and Sierra Avenue, Rialto, San Bernardino County, California	Neighborhood III	Unknown
2004	1064205	Dice, Michael, Carrie Wills, and Peter Messick, Extended Cultural Resource Survey and Architecture Evaluation of Site CA-SBR-6706H within the Project Footprint of the Lytle Creek North Tentative Tract Map (Map #15900), County of San Bernardino, California	Neighborhood I	CA-SBR-6706H
2004	1064555	Dice, Michael, An Archaeological and Paleontological Resource Evaluation of Tentative Tract #16445, Located South of Riverside Avenue/Sierra Avenue, City of Fontana, California	South	CA-SBR-6110H; CA-SBR-6111H; CA-SBR-10878H
2005	1064550	Tang, Bai, Historical/Archaeological Resources Survey Report, Lytle Creek Turnout Remodel, In and Near the City of Rialto, San Bernardino County, California	Neighborhood II	CA-SBR-6706H
2005	1064734	Michael Brandman Associates, Cultural Resources Records Search and Site Visit Results for Nextel Telecommunications Facility Candidate CA5764 (Rialto North), 1925 North Riverside Avenue, San Bernardino, San Bernardino County, California 92376	South	Unknown
2005	1065087	Michael Brandman Associates, Cultural Resources Records Search and Site Visit Results for Cingular Telecommunications Facility Candidate ES-002-01 (Arrowhead Septic), 3344 North Locust Avenue, Rialto, San Bernardino County, California	South	Unknown
2005	1065091	Marken, Mitch, 1.5-Acre Archaeological Survey for Lytle Creek Land and Resources	Northwest/on Neighborhood I boundary	Unknown

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Cultural Resource Studies within a half-mile Radius of the Project Site

Year	Report #	Description	Location*	Resources
2005	1065094	Pollock, Katherine H. and Michael K. Lerch, Deteriorated Pole Replacement Project, Archaeological Survey of Twelve Pole Locations on the Mettler 12kV, Gust 12kV, and Cuddleback 12kV Transmission Lines, Kern County and the Casmalia 12kV Transmission Line, San Bernardino County, California	North	Unknown
2005	n/a	Garcia, Kyle H. and Mitch Marken, Archaeological Monitoring at the Klein/Ellena Brothers Ranch Complex for the Lytle Creek North Planned Development Project, San Bernardino County, California	Neighborhood I	1 historic debris pile and three historic isolates (no CHRIS numbers provided)
2006	n/a	PCR Services Corporation, Results of a Cultural and Paleontological Resource Assessment of the Proposed 9-Acre Lytle Creek Retention Basins Project	Southeast of Neighborhood I	none

* *Relative to Project Site*

Source: CHRIS-SBAIC

1990s, and in the first half of the 2000s. Although most of these studies are not considered current under OHP guidelines due to the fact that they were conducted more than five years ago, the number of investigations and their extensive coverage suggests that the distribution of currently known and recorded archaeological sites is a reliable basis from which to assess the archaeological sensitivity of the Project site.

The full extent of the Project site was included in a larger survey conducted by Stephen Van Wormer and Paul E. Langenwalter II in 1990 (Van Wormer and Langenwalter 1990). Several smaller surveys have covered portions of the Project site. Neighborhood I has been partially surveyed on three separate occasions: in 1973 (Schuiling 1973), 1988 (Swanson 1988), and 2004 (Dice et al. 2004). Neighborhood II has been partially surveyed by three separate investigations: in 1978 (Heran 1978), 1991 (Foster et al. 1991), and 1992 (Brown and Gregory 1992). Portions of Neighborhoods II and III were surveyed in 1987 (de Barros 1987). Neighborhood III has been partially surveyed on three separate occasions: in 1986 (Foster 1986), 2000 (Duke 2000), and 2003 (Michael Brandman Associates 2003). Neighborhood IV has been partially surveyed on two separate occasions: in 1971 (Reynolds 1971) and 1986 (Brock et al. 1986).

7.1.2 Cultural Resources

At total of 18 cultural resources have been previously identified within the Project site. These resources include one prehistoric archaeological site (CA-SBR-1416), 12 historical-period archaeological sites (CA-SBR-6109H, -6589H, -6698H, -6699H, -6700H, -6703H, -6705H, -6706H, -6708H, -6709H, -6872H, and -7201H), and five cultural resources listed by CHRIS-SBAIC as pending (PSBR-2H, PSBR-33H, PSBR-34H, P1071-23H, and P1072-40H). The distribution of these resources by previous project and Project site Neighborhood is given in Table 2 on page 27. A brief overview of the previous documentation of these resources follows here.

CA-SBR-1416

Site CA-SBR-1416 was recorded by Reynolds in 1971 as a scatter of metates and handstones that had been partially destroyed by flooding. Langenwalter made an attempt to relocate the site in 1989 but was unsuccessful. Van Wormer and Langenwalter (1990) determined that the recorded location of CA-SBR-1416 had been disturbed by grading related to road work and possible flood control activities and that artificial fill had been placed in the vicinity of the site. Van Wormer and Langenwalter (1990) concluded that site CA-SBR-1416 was most likely buried or destroyed. Based on prior documentation, Van Wormer and Langenwalter (1990:18) concluded that the CA-SBR-1416 could be an important resource under

Table 2

Cultural Resource Properties in the Project Site and Within a Half-Mile Radius of the Project Site

Resource No.	Description	Location*	Status	Initially Recorded By	Date
Sites Within Project Site					
CA-SBR-1416	Prehistoric artifact scatter	Neighborhood IV	Unevaluated	R.E. Renolds; Paul E. Langenwalter II	1971;1989
CA-SBR-6109H	"Old Zanja" banked earthen irrigation ditch	Neighborhood II & III	Unevaluated	Philip de Barros & Neil Rhodes	1987
CA-SBR-6589H	Grapeland Irrigation main canal	Neighborhood IV	Unevaluated	Jeanette A. McKenna	1990
CA-SBR-6698H	A series of ditches which form a spreading ground	Neighborhood II	Potentially eligible	Paul E. Langenwalter II	1989
CA-SBR-6699H	Fontana Powerhouse and related buildings	Neighborhood II	Appears eligible for NR	Paul E. Langenwalter II	1989
CA-SBR-6700H	"Sandbox" filtration building	Neighborhood II	Not eligible	Paul E. Langenwalter II	1989
CA-SBR-6703H	Diversion ditches and walls	Neighborhood IV	Potentially eligible	Stephen R. Van Wormer	1989
CA-SBR-6705H	A double weir	Neighborhood III	Potentially eligible	Paul E. Langenwalter II	1989
CA-SBR-6706H	A series of ditches which form a spreading ground	Neighborhood III	Potentially eligible; Ineligible for NR	Paul E. Langenwalter II; Dice et al.	1989; 2004
CA-SBR-6708H	A series of ditches which form a spreading ground	Neighborhood II	Potentially eligible	Stephen R. Van Wormer	1989
CA-SBR-6709H	Two concrete piers, a diversion weir and a low wall	Neighborhood II	Unevaluated	Paul E. Langenwalter II	1989
CA-SBR-6872H	Concrete structures	Neighborhood II	Unevaluated	Greenwood & Associates	1990
CA-SBR-7201H	Concrete structures	Neighborhood II	Unevaluated	Tim Gregory	1992
CA-PSBR-2H	Cajon Pass Road	Neighborhood I & IV	Unevaluated	Site Pending- Not Recorded	n/a
CA-PSBR-33H	Rialto Canal	Neighborhood II & IV	Unevaluated	Site Pending- Not Recorded	n/a
CA-PSBR-34H	Old Town Ditch	Neighborhood II	Unevaluated	Site Pending- Not Recorded	n/a
CA-SBR-P1071-23H	Lord Ditch	Neighborhood II	Unevaluated	Site Pending- Not Recorded	n/a
CA-SBR-P1072-40H	Canaigre Co. Ditch	Neighborhood III	Unevaluated	Site Pending- Not Recorded	n/a

Table 2 (Continued)

Cultural Resource Properties in the Project Site and Within a Half-Mile Radius of the Project Site

Resource No.	Description	Location*	Status	Initially Recorded By	Date
Sites Within a Half-Mile Radius of the Project Site					
CA-SBR-1420	Prehistoric campsite	South	Unevaluated		
CA-SBR-5528H	Powerhouse and associated remains	Northwest	Unevaluated	Jeff Dickman	1985
CA-SBR-6110H	Stone and mortar ditch	South	Unevaluated	Philip de Barros & Neil Rhodes	1987
CA-SBR-6111H	Grapeland Irrigation ditch system	South	Unevaluated	Philip de Barros & Neil Rhodes	1987
CA-SBR-6702H	Abandoned irrigation ditch	Northwest	Potentially eligible	Paul E. Langenwalter II	1989
CA-SBR-6704H	Concrete diversion weir	Northwest	Potentially eligible	Paul E. Langenwalter II	1989
CA-SBR-6707H	A double weir	Northeast	Potentially eligible	Paul E. Langenwalter II	1989
CA-SBR-6903H	Multiple irrigation features	Southeast	Unevaluated	Cole Parker & Carmen Weber	1991
CA-SBR-7694H	A pair of transmission lines	West	Listed on NR	S. Hogan-Conrad	2004
CA-SBR-8857H	Power line	Northwest	Unevaluated	Philip de Barros & Joel Paulson	1997
CA-SBR-8866H	Historic trash scatter	Southeast	Unevaluated	Deborah McLean & Ivan H. Strudwick	1997
CA-SBR-10878H	A rock and plaster trough	South	Unevaluated	Sara Dietler & Steve Van Wormer	2003
CA-SBR-12156H	Lytle Creek Road	South	Unevaluated	Roger Hatheway	2005
CA-SBR-P1071-9H	Boloman Box- Weir	South	Unevaluated	Site Pending- Not Recorded	n/a
CA-SBR-P1071-15H	Brooke School	South	Unevaluated	Site Pending- Not Recorded	n/a
CA-SBR-P1071-16H	Micallef House	Southeast	Unevaluated	Site Pending- Not Recorded	n/a
CA-SBR-P1072-14H	Lytle Creek Water Conduit System	North	Unevaluated	Site Pending- Not Recorded	n/a
CA-SBR-P1072-21H	Texas Hill Mining District	West	Unevaluated	Site Pending- Not Recorded	n/a
CA-SBR-P1072-22H	Fontana Union Water Company	West	Unevaluated	Site Pending- Not Recorded	n/a

Table 2 (Continued)

Cultural Resource Properties in the Project Site and Within a Half-Mile Radius of the Project Site

Resource No.	Description	Location*	Status	Initially Recorded By	Date
CA-SBR-P1072-25H	Santisima Trinidad	Northeast	Unevaluated	Site Pending- Not Recorded	n/a
CA-SBR-P1072-37H	Glenn Helen Ditch	North	Unevaluated	Site Pending- Not Recorded	n/a
CA-SBR-P1072-38H	Perdew Ditch	West	Unevaluated	Site Pending- Not Recorded	n/a
CA-SBR-P1072-43H	Rock Art Site	West	Unevaluated	Site Pending- Not Recorded	n/a
CPHI-116	Grapeland	Southwest	Listed as PHI	John Anacic	1987

* *Relative to Project Site*

Source: CHRIS-SBAIC

CEQA if buried components of the site were encountered during ground-disturbing activities and recommended monitoring of excavation in the recorded vicinity of the site.

CA-SBR-6109H

Site CA-SBR-6109H was recorded by De Barros in 1987 as a banked earthen ditch built during the mid-19th century known as the "Old Zanja". The ditch was described as being approximately 3.8 m wide, 1 m wide at the bottom and 60-70 centimeters (cm) deep. Two small rock piles were also identified adjacent to the ditch on the western end. The site was recorded as crossing through a small portion of the western boundary of Neighborhood II portion of the Project site and continuing northwest into Neighborhood III. Based on information provided in the DPR site record, CA-SBR-6109H appears to be unevaluated (de Barros 1987).

CA-SBR-6589H

Site CA-SBR-6589H was recorded by Jeanette McKenna in 1990 as the Grapeland Irrigation District main canal. The northernmost extension of canal, CA-SBR-6589H, traverses the northwestern corner of Neighborhood IV. The main canal is broken in some areas and there has been placement of modern pipelines. Based on information provided in the DPR site record, CA-SBR-6589H appears to be unevaluated (McKenna 1990).

CA-SBR-6698H

Site CA-SBR-6698H was recorded by Langenwalter in 1989 and identified by Van Wormer and Langenwalter (1990:14) as a portion of the remains of the 1932 Fontana Union Water Company Spreading Grounds (Fontana Spreading Grounds) constructed during the Lytle Creek Flood Control Project. The site consists of a series of ditches and stacked rock walls that form a spreading ground over an approximately 364-acre area in Neighborhoods III and IV. Some of the ditches are rock-lined and have depths as deep as approximately 3-10 ft. The ditches and rock walls form a spreading ground approximately 364 acres in size. Van Wormer and Langenwalter (1990:17) recommended that the collection of sites representing the Fontana Spreading Grounds be considered an important resource under CEQA Criterion B (Appendix K lettering) based on its engineering criteria and may be eligible to the National Register based on its associations with work relief programs in the 1930s.

CA-SBR-6699H

Archaeological site CA-SBR-6699H was recorded by Langenwalter in 1989 as the Fontana Powerhouse and its grounds, outbuildings, intake, penstock, and outflow conduits. The Fontana Powerhouse is a stucco building which was constructed in 1917. The conduit carried

water between the Fontana Powerhouse and Power House Number One in Lytle Creek Wash (Van Wormer and Langenwalter 1990). The penstock was recorded as being oriented northwest from the Fontana Powerhouse parallel to Riverside Avenue extending northwest and terminating beyond Neighborhood IV near Texas Hill. By 1990, the outbuildings had been removed by Southern California Edison (Langenwalter 1989a). Van Wormer and Langenwalter (1990:13) recommended that the Fontana Powerhouse facility be considered an important resource under CEQA Criterion A (Appendix K lettering) because it played an important role in the development of the area. They also suggested that the site may be eligible to the National Register, and recommended that the site be avoided, and that any potential impacts be discussed with its operator, Southern California Edison. The HRI (dated March 17, 2006) lists the Fontana Powerhouse as appearing eligible for the National Register under criterion A and C as an individual property through survey evaluation as of April 22, 1997.

CA-SBR-6700H

Site CA-SBR-6700H was recorded by Van Wormer and Langenwalter in 1990 as a sandbox filtration building with a subsidiary gauging house in Neighborhood III. It is located approximately 75 m south of CA-SBR–6699H and was a sandbox filtration building with a subsidiary gauging house. Built in 1917, the sandbox filtered water which was diverted from the Fontana Powerhouse (Langenwalter 1989b). The sandbox was in operation when Van Wormer recorded it in 1989. Van Wormer and Langenwalter (1990:13) recommended that the site not be considered a historical resource due to its "recent age."

CA-SBR-6703H

Site CA-SBR-6703H was recorded by Van Wormer in 1989 and identified by Van Wormer and Langenwalter in 1990 as a portion of the remains of the Fontana Spreading Grounds. The site was described as a series of diversion ditches and walls consisting of piled cobble burins and stacked rock walls (Van Wormer and Langenwalter 1990). Van Wormer and Langenwalter (1990:17) recommended that the collection of sites representing the Fontana Spreading Grounds be considered an important resource under CEQA Criterion B (Appendix K lettering) based on its engineering criteria and may be eligible to the National Register based on its associations with work relief programs in the 1930s.

CA-SBR-6705H

Site CA-SBR-6705H was recorded by Langenwalter in 1989 as two concrete weirs separated by a grout and boulder spillway, located on the north and south sides of Lytle Creek Wash, and identified by Van Wormer and Langenwalter (1990) as part of the Fontana Spreading Grounds. Van Wormer and Langenwalter (1990:17) recommended that the collection of sites

representing the Fontana Spreading Grounds be considered an important resource under CEQA Criterion B (Appendix K lettering) based on its engineering criteria and may be eligible to the National Register based on its associations with work relief programs in the 1930s.

CA-SBR-6706H

Site CA-SBR-6706H was recorded by Langenwalter in 1989 as a complex of earthen ditches and stacked rock water diversion and control features (Langenwalter 1989c) and identified by Van Wormer and Langenwalter (1990:14) as part of the Fontana Spreading Grounds. Van Wormer and Langenwalter (1990:17) recommended that the collection of sites representing the Fontana Spreading Grounds be considered an important resource under CEQA Criterion B (Appendix K lettering) based on its engineering criteria and may be eligible to the National Register based on its associations with work relief programs in the 1930s.

In 2004, Michael Brandman and Associates (MBA) conducted an Extended Phase I investigation of CA-SBR-6706H, located in the proposed Lytle Creek North Planned Development Project (i.e., immediately south of Neighborhood I) (Dice et al. 2004). This investigation was conducted at the request of the County of San Bernardino since the proposed development would destroy the site, which was at that time classified as a historic resource under CEQA. MBA's Extended Phase I investigation included field reconnaissance, archival research (including review of aerial photographs), and re-evaluation of CA-SBR-6706H. MBA confirmed the Van Wormer and Langenwalter (1990) finding that the flood control features were constructed in 1932 by the Lytle Creek Water Conservation Association as part of the Lytle Flood Control Project, also known as the Fontana Spreading Grounds. MBA noted that the flood control features had been damaged by floods in March of 1938. Therefore, MBA recommended that CA-SBR-6706H not be considered eligible for the California Register or the National Register due the lack of site integrity and because the site has lost its original function (Dice et al. 2004:21). MBA also stated that, due to the fact that the original ground surface had been modified by the construction of the flood control features in 1932, there was a low chance that buried cultural resources would be encountered during construction. MBA estimated that the archaeological sensitivity of the area surrounding the site to be low and did not recommend construction monitoring by a qualified archaeologist.

CA-SBR-6708H

Site CA-SBR-6708H was recorded by Van Wormer in 1989 as the remains of the Lytle Creek Land and Improvement Company Spreading Ground. It consists of a spreading ground ditch system, which includes the remains of a diversion box and stacked rock diversion features which were used to channel outflow water from the Fontana Powerhouse (Van Wormer 1989; Van Wormer and Langenwalter 1990). The ditches are unlined and approximately two feet deep,

and the spreading grounds extended several hundred meters southeast of the diversion box. The diversion box was composed of wood and steel; Van Wormer and Langenwalter (1990:14) noted that the diversion box was falling apart and that there was metal refuse in the vicinity of the ditch system, but that the pieces of the box remained in association with each other. The dates of operation are of the spreading ground were not precisely determined, but oral history information collected by Van Wormer and Langenwalter from Ozzie Wilson indicated that the site may have been in use in 1947, and likely began before that date and continued to sometime after, as Mr. Wilson indicated that the spreading grounds were repaired annually after seasonal floods (Van Wormer and Langenwalter 1990:14).

On the CA-SBR-6708H site record, Van Wormer (1989) noted that "heavy brush cover makes field evaluation difficult." Van Wormer and Langenwalter (1990:14) recommended that CA-SBR-6708H be considered an important resource under CEQA Criterion A (Appendix K lettering) due to its role in the water development in the region and that detailed mapping be conducted if the site will be affected by development.

CA-SBR-6709H

Site CA-SBR-6709H was recorded by Langenwalter in 1989 as two concrete machinery mounts, a diversion weir, and a concrete masonry wall (Langenwalter 1989d). Van Wormer and Langenwalter (1990:13) identified the site as a diversion box for the Fontana Power House, but noted that specific purpose of the diversion weir or box and associated features and their dates of use could not be determined. Van Wormer and Langenwalter (1990:13) recommended additional research to determine site age, function, and significance prior to impacts from development, and detailed recording if the site is determined to be historically significant.

CA-SBR-6872H

Site CA-SBR-6872H was recorded by Foster and others in 1991, in the south central portion of Neighborhood II (Foster et. al. 1991). The site consists of five loci (A through E), all of which are historic concrete structures distributed widely across an area of approximately thirteen acres. Loci A and B are a paired set of concrete structures that functioned as either flood control gates or water diversion devices. Locus C is similar to Loci A and B in that it consists of two concrete structures similar in size that also may have functioned as either flood control gates or water diversion devices. Locus D was recorded as a 100-inch tall, 4-inch diameter standpipe composed of 2-foot sections which are mortared together. Locus E consisted of a concrete retaining wall, two large foundations, a concrete ramp, small concrete piers, a power pole, and additional low walls which are half buried. The foundation of Locus E had a small inscription reading, "Victory 1944," which was written apparently inscribed in wet cement (Texier et al. 1990). Site CA-SBR-6872H has not been evaluated.

CA-SBR-7201H

Site CA-SBR-7201H was recorded by Brown and Gregory in 1992 as a group of historic concrete and iron structures, near the southeast boundary of Neighborhood II. The structures appear to be the foundations of two buildings, structures likely related to water-handling, and a wooden floor, all dating to between 1910 and 1920 (Brown and Gregory 1992). Site CA-SBR-7201H was not evaluated.

7.1.3 Pending Cultural Resources

There are five cultural resources listed by CHRIS-SBAIC as pending resources within the Project site. These include PSBR-2H, PSBR-33H, PSBR-34H, P1071-23H, and P1072-40H. Pending resources are sites or other resources about which there is some historical or ethnographic information, but not enough location or field information to fully record and document them. The five pending sites in the Project site have all been identified and partially recorded based on information from the publication *Diversions of Tributaries Upstream from Cucamonga Creek* (Scott 1976). This publication was received by CHRIS-SBAIC, and details the five pending resources that to date have not been identified in the field by an archaeologist. Following here is a brief listing of available information about these pending sites:

- Pending site PSBR-2H is a wagon trail known as the Cucamonga/Cajon Pass Road dating to the 1840s. It is thought to have traversed Neighborhoods I and IV of the Project site northeast-southwest along the approximate route of what is today Interstate-15.

- PSBR-33H is a linear feature described as the "Rialto Canal" that runs parallel to Lytle Creek Road and Riverside Avenue along the southwest boundaries of Neighborhoods II through IV.

- PSBR-34H, a linear feature described as the "Old Town Ditch" that intersects the eastern boundary of Neighborhood II, continues east through its southern portion, and exits at the western boundary.

- P1071-23H is a linear feature described as the "Lord Ditch" that intersects the southern boundary of Neighborhood II, continues northwest, and terminates at PBSR-34H.

- P1072-40H is a linear feature described as the "Canaigre Co. Ditch" located in the northern portion of Neighborhood III.

A total of 24 cultural resources were identified within a half-mile radius of the Project site. These include one prehistoric site (CA-SBR-1420), 12 historic sites (CA-SBR-5528H, CA-SBR-6110H, CA-SBR-6111H, CA-SBR-6702H, CA-SBR-6704H, CA-SBR-6707H, CA-SBR-6903H, CA-SBR-7694H, CA-SBR-8857H, CA-SBR-8866H, CA-SBR-10878H, and CA-SBR-12156H), 10 pending historic resources (CA-SBR-P1071-9H, CA-SBR-P1071-15H, CA-SBR-P1071-16H, CA-SBR-P1072-14H, CA-SBR-P1072-21H, CA-SBR-P1072-22H, CA-SBR-P1072-25H, CA-SBR-P1072-37H, CA-SBR-P1072-38H, and CA-SBR-P1072-43H), and a PHI site (CPHI-116). The types of sites seen within the half-mile radius of the Project site are more varied than the sites located within the Project site, but also dominated by historical-period resources. Twelve of the 22 pending and recorded historic sites are water development sites, similar to the Project site. There are also several power-related sites (CA-SBR-5528H, CA-SBR-7694H, and CA-SBR-8857H), a rock art site (CA-SBR-P1072-43H), the Santisima Trinidad site (CA-SBR-P1072-25H), a residence (CA-SBR-P1071-16H), a historic trash scatter (CA-SBR-8866H), a mining district (CA-SBR-P1072-21H), a road (CA-SBR-12156H), and a school (CA-SBR-P1071-15H).

7.2 Sacred Lands Search and Native America Consultation

The NAHC Sacred Lands File search indicated that there are no known and previously recorded Native American cultural resources in the Project site. As of the date of this report, no responses to PCR's follow-up consultation have been received. If responses are received following submission of this report, PCR will notify Lytle Development Company and the City. A copy of the NAHC's contact list of Native American individuals and organizations affiliated with the Project vicinity is included in Appendix C.

7.3 Pedestrian Survey

PCR conducted a pedestrian survey of the Project site on March 26-29 and April 3, 2007 and February 26 and 27, 2008. The surface visibility throughout the Project site was good (50 to 100 percent) (see Figure 6).

A total of 13 cultural resources were identified in the Project site. These include four newly recorded sites (LC-1H, LC-9H, LC-10H, and LC-11H) and nine previously recorded sites (CA-SBR-6698H, CA-SBR-6699H, CA-SBR-6700H, CA-SBR-6705H, CA-SBR-6706H, CA-SBR-6708H, CA-SBR-6709H, CA-SBR-6872H, and CA-SBR-7201H). Four previously recorded archaeological sites could not be relocated (CA-SBR-1416, -6109H, -6589H, and -6703H). None of the CHRIS-SBAIC pending cultural resources were identified. Table 3 on page 36 summarizes the status of the previously recorded resources within the Project site. A description of the resources identified in the Project site is given below. A map with the locations of cultural resources identified in the Project site and DPR forms for newly identified

Table 3

Status of Previously Recorded Cultural Resources in the Project Site

Resource No.	Description	Relocated	Location
CA-SBR-1416	Prehistoric artifact scatter	No	Neighborhood IV
CA-SBR-6109H	Banked earthen irrigation ditch, "Old Zanja"	No	Neighborhood II & III
CA-SBR-6589H	Grapeland Irrigation main canal	No	Neighborhood IV
CA-SBR-6698H	A series of ditches which form a spreading ground	Yes	Neighborhood II
CA-SBR-6699H	Fontana Powerhouse	Yes	Neighborhood II
CA-SBR-6700H	"Sandbox" filtration building	Yes	Neighborhood II
CA-SBR-6703H	Diversion ditches and walls	No	Neighborhood IV
CA-SBR-6705H	A double weir	Yes	Neighborhood III
CA-SBR-6706H	Fontana Union Water Company Spreading Grounds	Yes	Neighborhood III
CA-SBR-6708H	Lytle Creek Land and Improvement Company Spreading Ground	Yes	Neighborhood III
CA-SBR-6709H	Two concrete piers, a diversion weir and a low wall	Yes	Neighborhood II
CA-SBR-6872H	Concrete structures	Yes	Neighborhood II
CA-SBR-7201H	Concrete structures	Yes	Neighborhood II

Source: PCR Services Corporation 2007.

sites and previously recorded sites for which boundary changes were made are provided in Appendix D.

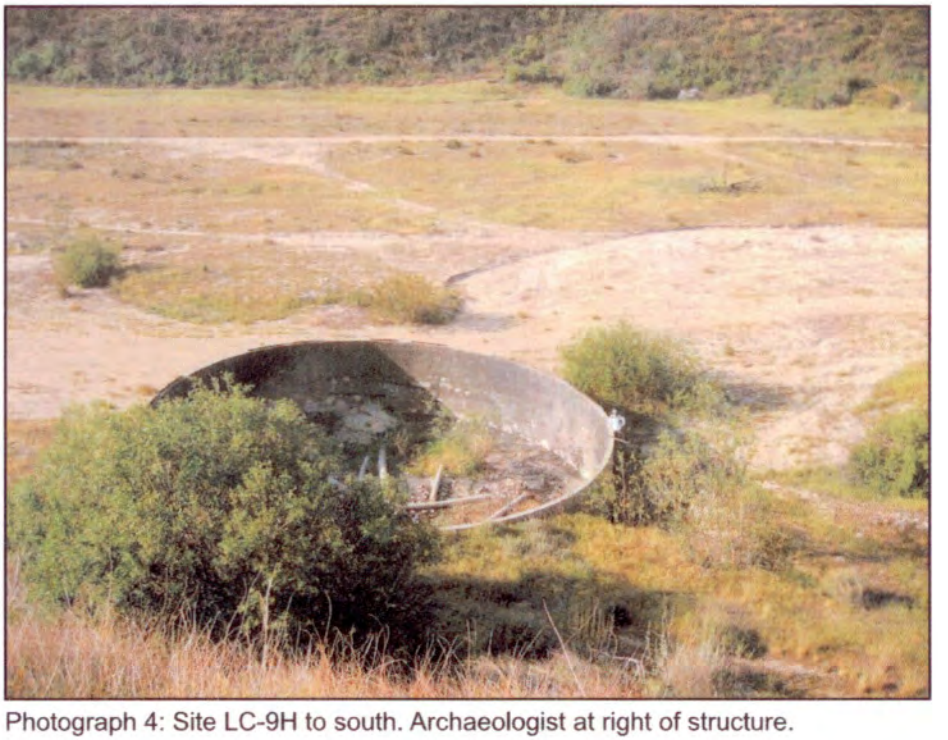
LC-1H

Site LC-1H is a rectangular concrete feature located in Neighborhood VI (see Appendix D). The feature measures 7 x 16 x 3 ft. and is oriented northeast-southwest (Figure 7, *Site Photograph 3,* on page 37). There are seven bent rebar spaced 1 ft. 7 in. apart and a 3 x 2 ft. metal opening on top of the feature. The concrete contains local aggregate. Construction date of the feature is unknown. Extensive growth of orange lichen suggests the feature is an older construction. The concrete is cracked in a few areas and the cracks are filled with silicone caulking; this could be a recent improvement. Although there are some cracks in the concrete, the feature largely intact. A small seven inch metal drainage pipe is located 5 ft. south of the feature, and a modern Fontana Water District building F-42 is located 48 ft. northeast of the feature. Overall, site LC-1 is in fair condition.

LC-9H

LC-9H is a large, round concrete tank and retention pond located in Neighborhood I (see Appendix D). Construction date of the tank and pond is unknown. The tank is 30 ft. in

Photograph 3: Site LC-1H to northwest.



Photograph 4: Site LC-9H to south. Archaeologist at right of structure.

PCR

Figure 7
Lytle Creek Ranch
Site Photographs

Source: PCR Services Corporation, 2007.

Photograph 5: Site LC-10H to north.

Photograph 6: Site LC-11H to northeast.

PCR

Figure 8
Lytle Creek Ranch
Site Photographs

Source: PCR Services Corporation, 2007.

diameter, and the walls are 12 ft. high and 8 in. thick (Figure 7, *Site Photographs 4*). It was constructed on layered brick and concrete laid in an upward spiraling fashion. The roof of the tank has burned and collapsed and it is now inside the tank. Inside the tank are large concrete columns that supported the roof. The tank is located on a south-facing slope and the northern portion of the tank is partially set into the slope. Located upslope to the north is a water retention pond that measures 131.2 ft. in diameter and 65.6 ft. deep; a metal pipe located halfway up its western wall connects the retention pond and the tank. Both the interior and exterior walls of the tank have been defaced by modern spray paint graffiti. Overall, the site is in fair to poor condition.

LC-10H

LC-10H is an octagon-shaped concrete feature located in Neighborhood III (see Appendix D). Construction date of the feature is unknown (Figure 8, *Site Photographs 5,* on page 39). The outside diameter of the structure measures 12 ft. 2 in. There is an opening in the center of the structure that has a depth of 6 ft. 3 in. and a diameter of 9 ft. 4 in. A concrete slab extends southwest from the top of the feature. Underneath the walls of the structure are hanging metal drums which may have originally been base supports or columns set on the ground surface; erosion has removed sediments from beneath the metal drums. Overall, the site is in fair to poor condition.

LC-11H

LC-11H is an earthen ditch segment located in Neighborhood IV (see Appendix D). It measures 193.2 ft. long and 9.8 ft. wide and 2 ft. high (Figure 8, *Site Photographs 6*). Cobbles are stacked on top of the walls of the ditch. The ditch may be part of a ditch system that was constructed in the late nineteenth century prior to the digging of the Rialto Canal, which was in use 1888-1940. Additional research is needed to determine if the ditch was part of a larger ditch system. The ditch has been disturbed by flooding and is in fair condition.

CA-SBR-1416

Site CA-SBR-1416 was most recently recorded in 1990 by Van Wormer and Langenwalter as a prehistoric artifact scatter in Neighborhood IV. The previously recorded location of the site is shown on the map in Appendix D. Van Wormer and Langenwalter (1990) determined that the recorded location of CA-SBR-1416 was substantially disturbed by grading related to road work and possible flood control activities. Site CA-SBR-1416 was not relocated by PCR archaeologists during the survey. It is likely that the site has been destroyed or buried as described by Van Wormer and Langenwalter (1990).

CA-SBR-6109H

Site CA-SBR-6109H was initially recorded in 1987 by Philip de Barros and Neil Rhodes as a banked earthen irrigation ditch known as the Old Zanja that crossed through Neighborhoods II and III. The previously recorded location of the site is shown on the map in Appendix D. The site was not relocated by PCR archaeologists during the survey. It is likely that the site has been destroyed by erosion related to flooding and recent wildfires.

CA-SBR-6589H

Site CA-SBR-6589H was initially recorded in 1990 by McKenna as the Grapeland Irrigation District main canal in Neighborhood IV. CHRIS-SBAIC records show that only a small segment of the canal was previously recorded in the Neighborhood IV area. The previously recorded extent of the site is shown on the map in Appendix D. The site was not relocated by PCR archaeologists during the survey. It is likely that the site has been destroyed by erosion related to flooding and recent wildfires.

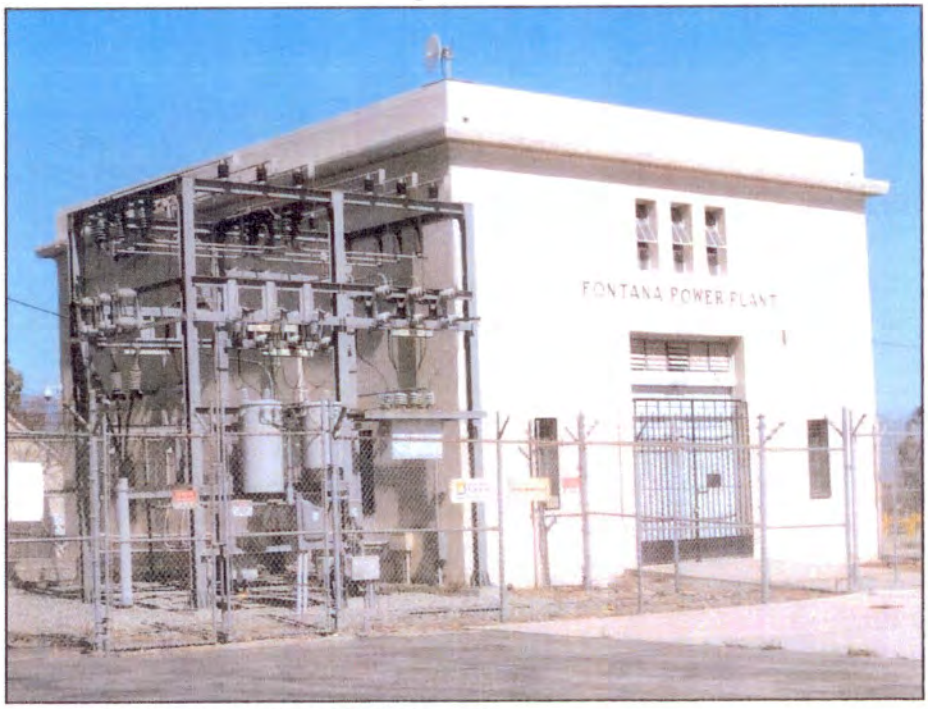
CA-SBR-6698H

Site CA-SBR-6698H was recorded in 1990 by Van Wormer and Langenwalter as two groupings of ditches, some rock lined and approximately 3-10 ft. deep, which together formed a spreading ground over an approximately 364-acre area. Both portions of site, separated by the current I-15 corridor, were relocated by PCR and found to be in similar condition, although the site has been disturbed by wildfires and flooding since 1990. Several intact piled-rock walls remain (Figure 9, *Site Photographs 7,* on page 41), although many have been disarticulated and destroyed. Overall, the site is in fair to poor condition. The boundary of the northern portion of the site was modified to cover a narrower area that extends farther to the northwest.

CA-SBR-6699H

Site 6699H was recorded in 1990 by Van Wormer and Langenwalter as the Fontana Powerhouse and its grounds, intake, penstock, and outflow conduits in Neighborhood II (see Appendix D). The original site form indicates that, although the outbuildings, intake, penstock, and outflow conduits were included in the site, the standing or above-ground portions had been removed prior to the site recording (Van Wormer 1989a). The Fontana Powerhouse facility was evaluated and determined that it appeared eligible for the National Register under Criterion A because it played an important role in the development of the area (Van Wormer and Langenwalter 1990). It has been recommended that the site be avoided, and that any potential impacts be discussed with its operator, Southern California Edison. The HRI (dated

Photograph 7: Site CA-SBR-6698H to north.



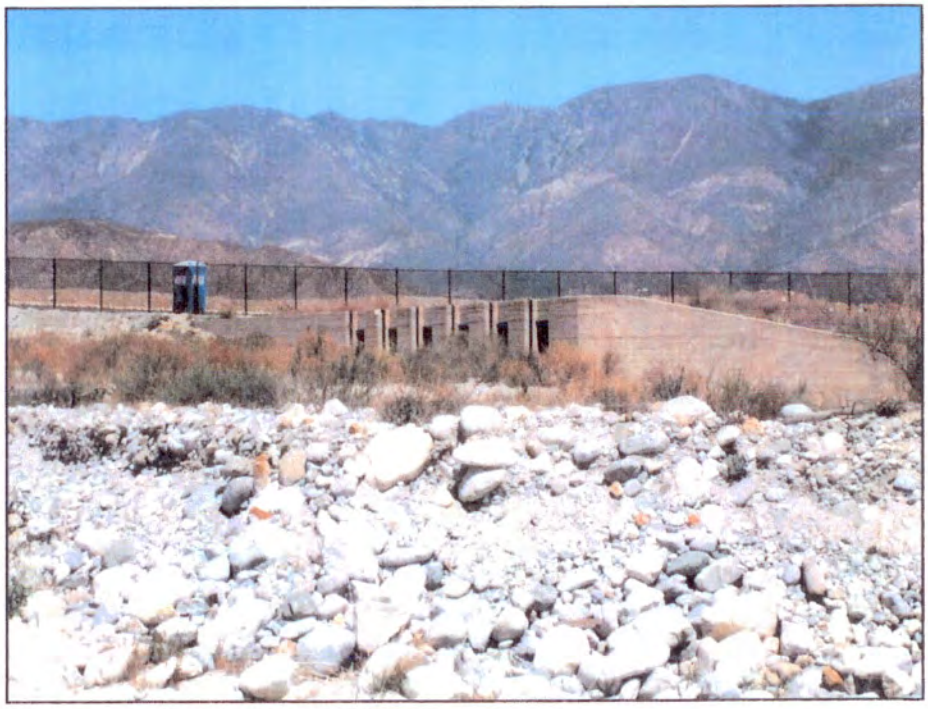
Photograph 8: Site CA-SBR-6699H to north.

PCR

Figure 9
Lytle Creek Ranch
Site Photographs

Source: PCR Services Corporation, 2007.

Photograph 9: Site CA-SBR-6700H to northeast.



Photograph 10: Site CA-SBR-6705H to northeast.

PCR

Figure 10
Lytle Creek Ranch
Site Photographs

Source: PCR Services Corporation, 2007.

March 17, 2006) lists the Fontana Powerhouse as appearing eligible for the National Register under criteria A and C as an individual property through survey evaluation as of April 22, 1997.

PCR relocated the Fontana Powerhouse. No traces of the outbuildings, intake, penstock, and outflow conduits were located. The Fontana Powerhouse is in operation and is regulated by Southern California Edison (Figure 9, *Site Photographs 8*); due to this fact the grounds were not accessible. It appears to be in good condition. The original site recording indicated the site location with a dot. PCR defined a boundary for the site based on the extant structure of the Powerhouse and adjacent fenced grounds.

CA-SBR-6700H

Site CA-SBR-6700H was initially recorded by Van Wormer and Langenwalter in 1990 as a sandbox filtration building with a subsidiary gauging house related to the Fontana Powerhouse built in 1917 in Neighborhood III.

PCR relocated the site in the previously recorded location approximately 75 m south of the Fontana Powerhouse (CA-SBR-6699H) (see Appendix D). It is regulated by Southern California Edison. Due to this fact, the grounds were fenced off and not accessible. Although the sandbox was fenced off, PCR archaeologists were able to accurately assess the site condition. The site consists of the collapsed remains the sandbox filtration building. The site is in poor condition as it has collapsed since the previous recording in 1990 and is no longer in operation (Figure 10, *Site Photographs 9,* on page 43). The site boundary remains the same.

CA-SBR-6703H

Site CA-SBR-6703H was initially recorded by Van Wormer and Langenwalter in 1990 as a portion of the remains of the Fontana Spreading Grounds in Neighborhood IV. The site was described as a series of diversion ditches and walls consisting of piled cobble burins and stacked rock walls (Van Wormer and Langenwalter 1990). The previously recorded location of the site is shown on the map in Appendix D. The site was not relocated by PCR archaeologists during the survey. The site may have been destroyed by road grading.

CA-SBR-6705H

Site CA-SBR-6705H was initially recorded by as Van Wormer and Langenwalter in 1990 as two concrete weirs, with a grout and boulder spillway in between, located on the north and south sides of Lytle Creek Wash. PCR relocated the site (see Appendix D). Overall, the site is the same as described by Van Wormer and Langenwalter (1990). The concrete weirs have been covered by spray paint graffiti. The spillway between the two concrete weirs has been improved

with concrete and boulders. The only disturbance indicated on the original site record is flood damage. Therefore it is possible that the graffiti and spillway repairs have been added since the original site recording in 1990. The site is in fair condition. Major disturbances are graffiti and remaining flood damage (Figure 10, *Site Photographs 10*). The site boundary remains the same.

CA-SBR-6706H

Site CA-SBR-6706H was initially recorded by Van Wormer and Langenwalter in 1990 and consists of earthen ditches and stacked-rock water diversion and control features and re-identified in 2004 by MBA (Dice et al. 2004:21).

PCR relocated the southern extension of site CA-SBR-6706H. This part of the site is located in the eastern section of Neighborhood III northeast of Lytle Creek Wash (see Appendix D). PCR identified stacked rock diversion walls and ditches which were part of the 1932 Fontana Spreading Grounds (Van Wormer and Langenwalter 1990). The site has been disturbed by wildfire, flooding, and overgrown vegetation. Although many of the stacked rock diversion walls are still relatively intact, many have been destroyed and reduced to rubble. Therefore the site is considered to be in fair to poor condition. The site boundaries within the Project site remained the same; site boundaries for the area outside the Project site were not evaluated.

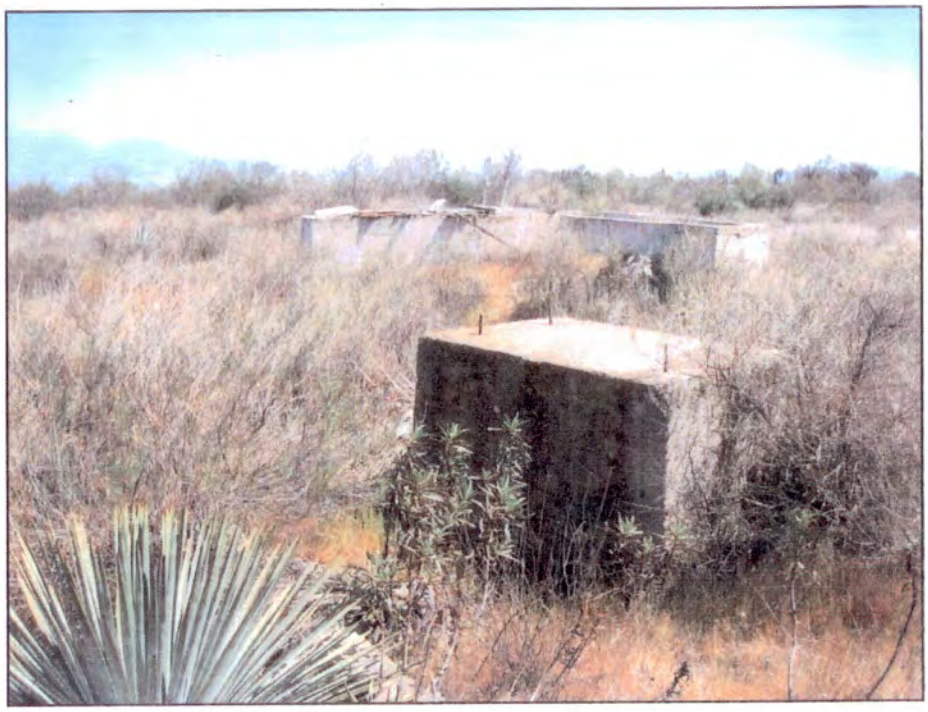
CA-SBR-6708H

Site CA-SBR-6708H was initially recorded by Van Wormer and Langenwalter in 1990 as the remains of the Lytle Creek Land and Improvement Company Spreading Ground, consisting of the remains of a diversion box and stacked rock diversion features.

PCR relocated the spreading grounds comprised of ditches and stacked rock diversion walls (see Appendix D). The remains of the diversion box were not identified. The stacked rock diversion walls were in poor condition and many were completely disarticulated. The site is in poor condition from flooding and overgrown vegetation. The site boundary remains the same.

CA-SBR-6709H

Site CA-SBR-6709H was initially recorded by Van Wormer and Langenwalter in 1990 as two concrete machinery mounts, a diversion weir, and a concrete masonry wall. PCR relocated the site and re-identified all of the previously recorded features (see Appendix D). Features include two concrete machinery mounts, a diversion weir, and a concrete masonry wall (Figure 11, *Site Photographs 11,* on page 45). The site is disturbed by spray paint graffiti and it appears that that diversion weir has been used recently as a social gathering place as there is a sheet of



Photograph 11: Site CA-SBR-6709H to north.

Photograph 12: Site CA-SBR-6872H to east.

PCR

Figure 11
Lytle Creek Ranch
Site Photographs

Source: PCR Services Corporation, 2007.

Photograph 13: Site CA-SBR-7201H to north.

PCR

Figure 12
Lytle Creek Ranch
Site Photographs

Source: PCR Services Corporation, 2007.

modern trash throughout the site. The site is in fair to poor condition; the structures are still standing but have been disturbed by vandalism. The site boundary remains the same.

CA-SBR-6872H

Site CA-SBR-6872H was originally identified by Foster and others (1991) in the south central portion of Neighborhood II as five loci (A through E) containing historical-period concrete structures widely distributed across an area of approximately thirteen acres. PCR relocated the site and all five loci (see Appendix D). All of the concrete structures remain intact and standing (Figure 11, *Site Photographs 12*). All have been disturbed by spray paint graffiti and modern trash. No artifacts were observed in association with these concrete structures. The site is in fair to poor condition. The original site boundary does not appear to have included Loci D or E. PCR extended the site boundary to the north to include Loci D and E and contracted the site boundary in the south to reflect the re-identified distribution of Loci A, B, and C.

CA-SBR-7201H

CA-SBR-7201H was initially recorded by Brown and Gregory in 1992 as a group of historical-period concrete and iron structures representing two buildings, water-handling structures, and a wooden floor built between 1910 and 1920 located near the southeast boundary of Neighborhood II.

PCR relocated the site and all of the previously recorded features (see Appendix D). PCR identified all of the features that were previously recorded. The remains of the possible water-handling features and wooden floor are shown in Figure 12, *Site Photograph 13,* on page 47. The concrete of the concrete and iron structures is cracked and has been vandalized by spray paint graffiti. Overall, the site is in fair to poor condition. The site boundary remains the same.

7.3.1 Pending Sites

None of the five cultural resources listed by CHRIS-SBAIC as pending resources, including PSBR-2H, PSBR-33H, PSBR-34H, P1071-23H, and P1072-40H, were identified on the ground during survey.

7.4 Paleontological Resources Records Search

The results of the paleontological records search revealed that there are no paleontological localities within the Project site, or within a one-mile radius of the Project site. A copy of the record search results letter provided by SBCM is included in Appendix E. Fossil proboscidean remains have been found approximately three miles east of the Project site.

Bortungo and Spittler (1986) identified the sediments within the Project site as young Quaternary fan deposits and older Quaternary fan deposits, of Holocene and Pleistocene-Holocene boundary age, respectively. Morton and Matti (2001) categorized these same sediments as several types of Holocene fan and alluvial deposits. The only exception is a limited area on the northeast bank of Lytle Creek Wash, west of Interstate-15, which was characterized as Qof (older fan deposits) of Pleistocene age. It is also suggested by Eric Scott of SBCM that Pleistocene sediments might underlie some of the Holocene sediments throughout the project area (see Appendix E). The Holocene sediments have a low sensitivity for paleontological resources. The paleontological sensitivity of the older Pleistocene sediments is undetermined in this area, but they could contain paleontological resources.

8.0 RECOMMENDATIONS

8.1 Cultural Resources

This investigation has identified 22 cultural resources within the Project site. Of these 22 resources, 13 were identified on the ground during survey. Four previously recorded sites and five pending resources were not relocated during survey. All of the sites identified or relocated during survey date to the late nineteenth to mid- twentieth centuries. Most of the sites are the remains of water control features, including ditches, weirs, and other diversion-type features. Two sites are related to electric power distribution. Following here is a summary of recommendations with respect to future work and treatment of these sites and the prehistoric archaeological sensitivity of the Project site. A list of recommendations by site is presented in Table 4 on page 49.

One of the sites relocated in the Project site, CA-SBR-6699H, the Fontana Powerhouse, has been previously evaluated as an important resource under CEQA criteria A and C and is listed on the HRI as appearing eligible to the National Register. The previous recommendation for this site is avoidance and consultation with Southern California Edison prior to any impacts, as the Powerhouse is still in use. PCR concurs with this recommendation.

PCR recommends Phase II evaluation of the remaining 12 sites identified during survey. Phase II evaluation consists of research and documentation of sites sufficient to evaluate sites against CEQA resource criteria and the eligibility criteria of the California and National Registers. Determination of the site significance according to these criteria will allow development of appropriate management and treatment measures with respect to proposed development. Following here is site-specific support for this recommendation:

- Four sites, including CA-SBR-6698H, CA-SBR-6703H, CA-SBR-6705H, and CA-SBR-6706H, were identified by Van Wormer and Langenwalter (1990) as portions of the Fontana Spreading Grounds constructed in 1932 by the Lytle Creek Water

Table 4

Recommended Further Work

Resource No.	Description	Location*	Survey Status	Evaluation Status	Recommended Further Work
LC-1H	Rectangular concrete feature	Neighborhood IV	New Site	Unevaluated	Evaluate
LC-9H	Concrete tank and retention pond	Neighborhood I	New Site	Unevaluated	Evaluate
LC-10H	Octagon-shaped concrete feature	Neighborhood III	New Site	Unevaluated	Evaluate
LC-11H	Earthen historic ditch segment	Neighborhood IV	New Site	Unevaluated	Evaluate
CA-SBR-1416	Prehistoric artifact scatter	Neighborhood IV	Not Relocated	Unevaluated	See Recommendation for Monitoring
CA-SBR-6109H	"Old Zanja" banked earthen irrigation ditch	Neighborhood II & III	Not Relocated	Unevaluated	None
CA-SBR-6589H	Grapeland Irrigation main canal	Neighborhood IV	Not Relocated	Unevaluated	None
CA-SBR-6698H	Series of ditches which form a spreading ground	Neighborhood II	Relocated	Potentially eligible	Re-evaluate
CA-SBR-6699H	Fontana Powerhouse	Neighborhood II	Relocated	Appears eligible for NR	None
CA-SBR-6700H	"Sandbox" filtration building	Neighborhood II	Relocated	Not eligible	Re-evaluate
CA-SBR-6703H	Diversion ditches and walls	Neighborhood IV	Not Relocated	Potentially eligible	None
CA-SBR-6705H	A double weir	Neighborhood III	Relocated	Potentially eligible	Re-evaluate
CA-SBR-6706H	A series of ditches which form a spreading ground	Neighborhood III	Relocated	Not significant due to recent age	Re-evaluate
CA-SBR-6708H	A series of ditches which form a spreading ground	Neighborhood II	Relocated	Unevaluated	Re-evaluate
CA-SBR-6709H	Two concrete piers, a diversion weir and a low wall	Neighborhood II	Relocated	Unevaluated	Re-evaluate
CA-SBR-6872H	Concrete structures	Neighborhood II	Relocated	Unevaluated	Re-evaluate
CA-SBR-7201H	Concrete structures	Neighborhood II	Relocated	Unevaluated	Re-evaluate

Source: PCR Services Corporation 2007

- Conservation Association as part of the Lytle Flood Control Project. PCR relocated three of these sites, CA-SBR-6698H, CA-SBR-6705H, and CA-SBR-6706H, and did not relocate CA-SBR-6703H. Van Wormer and Langenwalter recommended that the group of sites representing the Fontana Spreading Grounds be considered an important resource under CEQA Criterion B (Appendix K lettering) based on engineering criteria and may be eligible to the National Register based on association with work relief programs in the 1930s. Site CA-SBR-6706H was re-evaluated individually in 2004. Dice et al. 2004:21) recommended that the site not be considered eligible for the California Register or the National Register due the lack of site integrity and because the site has lost its original function. As the original evaluation was based on a collection of sites with the remains and associations of the Fontana Spreading Grounds and the current Project site includes a similar collection of sites, PCR recommends that the three relocated sites of the Fontana Spreading Grounds sites be re-assessed together with respect to characteristics such as integrity, components, and associations.
- Site CA-SBR-6708H is the remains of the Lytle Creek Land Improvement Company Spreading Grounds. Van Wormer and Langenwalter (1990:14) recommended that the site be considered an important resource under CEQA Criterion A (Appendix K lettering) due to its role in the water development in the region and recommended detailed mapping be conducted if the site will be affected by development. PCR recommends evaluation of the site with respect the California and National Registers.
- Site CA-SBR-6700H is a sandbox filtration building associated with CA-SBR-6699H, the Fontana Powerhouse. The original site form indicates that the building was built in 1917 (Van Wormer 1989b), but Van Wormer and Langenwalter (1990:13) recommended that the site was not historically significant due to its recent age. The age of the site is currently well over the standard 45 to 50 year threshold for evaluation set by both the California and National Registers. As well, the site appears to be associated with the Fontana Powerhouse, which has been determined to be an important resource that appears eligible to the National Register. PCR recommends re-evaluation of CA-SBR-6700H in terms of its integrity, components, and association with the Fontana Powerhouse.
- The remaining seven sites identified during survey, including newly identified sites LC-1, LC-9, LC-10, and LC-11, and previously recorded site CA-6709H, CA-SBR-6872, and CA-SBR7201H, have not been previously evaluated. PCR recommends Phase II evaluation of these sites with respect to CEQA criteria and the criteria of the California and National Registers.

Historical period sites CA-SBR-6109H, CA-SBR-6589H, CA-SBR-6703H were not relocated during survey. No recommendations are made for treatment of these sites.

Previously recorded prehistoric period site CA-SBR-1416 was not relocated during the survey. As suggested by previous investigators, it is probable that the site has been destroyed or buried by modern development. Available evidence indicates that the Project site retains some sensitivity with respect to prehistoric cultural resources. The Project site is composed of Holocene alluvium and colluvium that has the potential to contain prehistoric archaeological resources. In recognition of this, the City has mapped the area immediately northeast of Riverside Avenue and Lytle Creek Road and around Lytle Creek Wash to be sensitive for prehistoric archaeological resources (see Figure 4). These areas also tended to have low visibility due to vegetation cover during survey (see Figure 6). The following measures are recommended to ensure that any buried prehistoric resources in the Project site are identified and evaluated:

CULT-1 A qualified archaeologist (archaeologist) shall be retained and approved by the City to monitor any clearing of vegetation and excavation up to five feet beneath the present ground surface within the areas the City has identified as sensitive for prehistoric archaeological resources. If cultural resources are identified, the archaeologist shall be allowed to temporarily divert or redirect grading or excavation activities in the vicinity of the find (within 25 feet) in order to make an evaluation of the find and determine appropriate treatment. If the find is determined to be potentially significant, an archaeologist at the Principal Investigator level, in consultation with the City and, if the find is prehistoric in nature, appropriate Native American representatives determined through consultation with the NAHC, shall develop a treatment plan. The qualified archaeologist shall prepare a final report about the monitoring to be filed with the applicant, the City, and the CHRIS-SBAIC, as required by the OHP. The report shall include documentation and interpretation of resources recovered, if any. Interpretation will include evaluation of eligibility of any identified resources with respect to the National Register and California Register. If appropriate, the report shall also include all specialists' reports as appendices. The City shall designate an appropriate curation facility for any collected resources.

CULT-2 Any accidental discovery of cultural resources during Project development shall be evaluated by a qualified archaeologist. If the find is determined to be potentially significant, the archaeologist, in consultation with City and the appropriate Native American group, will develop a treatment plan. All work adjacent to the unanticipated discovery (within 25 feet) shall cease until the archaeologist has evaluated the discovery, or the treatment plan has been implemented.

CULT-3 If human remains are unearthed, State Health and Safety Code Section 7050.5 requires that no further disturbance shall occur until the County Coroner has made the necessary findings as to origin and disposition pursuant to PRC

Section 5097.98. If the remains are determined to be of Native American descent, the coroner has 24 hours to notify the Native American Heritage Commission (NAHC). The NAHC will then identify the person(s) thought to be the Most Likely Descendent of the deceased Native American, who will then help determine what course of action should be taken in dealing with the remains.

8.2 Paleontological Resources

No paleontological resources have been recorded in the Project site and surface sediments through much the Project site are Holocene in age and therefore have low potential to contain paleontological resources. Older Pleistocene-aged sediments have been mapped along the along the northeast bank of Lytle Creek Wash in the southwestern portion of the Project site known as Neighborhood IV. The paleontological sensitivity of these Pleistocene sediments is undetermined in this area, but they are of sufficient age to contain paleontological resources. The following measure is recommended to ensure that paleontological resources are identified and evaluated if they are encountered by ground-disturbing activities during the proposed development:

PALEO-1 All excavation of native sediments in the area mapped as Qof shall be monitored for paleontological resources by a qualified vertebrate paleontologist. In all other areas of the Project site, the qualified vertebrate paleontologist shall consult geotechnical findings and shall determine if underlying sediments could be sensitive for paleontological resources. The vertebrate paleontologist will develop a paleontological monitoring program that is consistent with the provisions of the CEQA and the proposed guidelines of the Society of Vertebrate Paleontology. The program will include plans for monitoring for paleontological resources in relation to the grading plans, recovery of any identified resources, a curation agreement with an accredited paleontological repository to house the specimens, preparation of any recovered specimens for the purposes of identification and permanent preservation, identification and curation of specimens, and preparation of a report of findings. The paleontologist must have a written curation agreement in hand prior to the initiation of mitigation activities. If sediments are encountered that appear appropriate for preserving vertebrate microfossils, samples of sediment should be screen washed and checked for fossils. In those areas where vertebrate microfossils are detected, it may be necessary to remove a bulk sample and store it elsewhere for later fossil recovery.

9.0 CERTIFICATION

CERTIFICATION: I hereby certify that the statements furnished above and in the attached exhibits present the data and information required for this archaeological report, and that the facts, statements, and information presented are true and correct to the best of my knowledge and belief.

DATE: March 17, 2008

SIGNED: Marcy Rockman

Marcy Rockman, Ph.D.
Acting Director/Principal Archaeologist
PCR Services Corporation

10.0 REFERENCES CITED

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APPENDIX A: PERSONNEL QUALIFICATIONS

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Mitchell Marken, Ph.D., ASSOCIATE PRINCIPAL, DIRECTOR OF CULTURAL RESOURCES MANAGEMENT

Education

- Ph.D., Archaeology, University of St. Andrews, Scotland, 1991
- Dpl., Archaeology and Ethnology, Maritime Studies, University of St. Andrews, Scotland, 1985

Continuing Education

- Riverside County Archaeology and Cultural Sensitivity Training Program, 2007
- Section 106 Compliance Training (GSA Interagency Training Center)
- FERC Environmental Compliance Training

Professional Affiliations

- Society for American Archaeology

Expertise

Mitchell Marken has over 18 years of archaeological and management experience in the environmental field. His experience includes project management, field supervision, environmental monitoring, cultural resource planning, report writing, quality assurance of regulatory reports, project evaluation, underwater survey, site mitigation, excavation, artifact analysis, mapping, research design, team training, coordination with state and federal agencies, permit acquisition and public speaking. Since 1990, he has managed large-scale Cultural Resource and Environmental projects for public utility companies, mining companies and private developers throughout Western U.S.

Dr. Marken has completed environmental compliance training with the Federal Energy Regulatory Commission (FERC), and Section 106 compliance training from the Advisory Council on Historic Preservation. He has worked internationally and for state governments concerning the preservation and exploration of underwater sites including shipwrecks. He has published a University Press of Florida book entitled "Pottery from Spanish Shipwrecks: 1500 - 1800," and is featured in a U.S. public school textbook entitled "Lessons in Character" published by the Young People's Press for middle school students.

Experience

Archaeology/Paleontology: Dr. Marken has worked with State Historic Preservation Office and information centers throughout the Western U.S. for record searches and surveys on projects ranging from cellular towers to extensive multi-state linear corridors. Other projects include site inventories and test excavation for the U.S. Army Corps of Engineers (ACOE), and the U.S. National Guard in Northern and Southern California and San Francisco County Department of Public Works, and construction monitoring for the U.S. Coast Guard at various radio tower sites in California.

In addition to fieldwork, Dr. Marken coordinated and worked with regulatory agencies in impact analysis and mitigation planning, on the development of Programmatic Agreements and Memorandums of Understanding including the U.S. Navy for Treasure Island, the U.S. Army in Hawaii and the Department of Defense at Lawrence Livermore National Laboratory. He has also been active in facilitating Native American consultation and worked with California Tribes on educating local agencies with regards to burials, and with Santa Cruz County regarding mitigation of sea wall armoring on paleontological resources.

In addition to his California experience, Dr. Marken was also the principal author of Minnesota's Submerged Cultural Resources Plan. The plan is used as a guideline for the preservation of underwater sites in the Great Lakes and inland water bodies.

CEQA/NEPA Compliance: Dr. Marken has worked on various projects for National Environmental Policy Act (NEPA), National Historic Preservation Act and California Environmental Quality Act (CEQA) compliance throughout the United States for the U.S. Coast Guard, the U.S. Army, the U.S. Navy, and the ACOE. He has also performed third party review for California State Lands for fiber optic cable construction both on land and for submerged projects. In addition, he wrote and compiled the necessary background information and impact analysis on all Coast Guard owned ships and stations for the Deepwater Project Environmental Impact Statement for the U.S. Coast Guard.

Dr. Marken's NEPA experience also includes the preparation of sensitive and controversial documents relating to a large-scale Army transformation project on the islands of Hawaii for the U.S. Army including an additional training base on Oahu, and military housing conversion projects in Hawaii and California.

Marcy Rockman, Ph.D., PRINCIPAL ARCHAEOLOGIST

Education

- Ph.D., Anthropology, University of Arizona, Tucson, Arizona, 2003
- M.A., Anthropology, University of Arizona, Tucson, Arizona, 1995
- B. Sc., Geology, (Magna cum Laude), College of William and Mary, Williamsburg, Virginia, 1993

Continuing Education

- Riverside County Archaeology and Cultural Sensitivity Training Program, 2007
- CEQA, Cultural Resources, UCLA Extension,2006
- SB 18 Consultation, 2005
- Section 106, Principles and Practice, SRI Foundation, 2004

Professional Affiliations

- Society for American Archaeology Government Affairs Committee
- Society for American Archaeology
- Society for Historical Archaeology
- Archaeological Institute of America
- Research Associate, Cotsen Institute of Archaeology, University of California, Los Angeles

Expertise

Marcy Rockman has 14 years of experience in the fields of anthropology and archaeology. Her broad education and professional experience has given her a unique perspective and insight into the history of landscapes and natural resource use, environmental and historical archaeological excavations, geological investigations, mapping and evaluation, archaeology and public policy, and Old World prehistory.

Dr. Rockman is an experienced teacher and has authored or co-authored seven articles for scientific journals and books published domestically and abroad. These publications have included title s such as "Landscape Learning in Relation to Evolutionary Theory" and "Colonization of Unfamiliar Landscapes: Archaeology of Adaptation." Dr. Rockman has more than five years of undergraduate teaching experience including classroom, laboratory, and field instruction.

Experience

Dr. Rockman has extensive research experience in the fields of archaeology and geography. Her international work includes surveyed and test excavations at Late Bronze Age and Early Iron Age settlements in Armenia, a geophysical survey of Roman sites in the Tiber Valley in Italy, and survey and modeling of Late Paleolithic flint use in England and France.

Her field work includes projects in cooperation with the U.S. Army Corps of Engineers, the U.S. Air Force, and local governments. She developed a Geographic Information Systems (GIS)-based landscape use model of archaeological survey data for the Barry M. Goldwater Air Force Range and directed fieldwork and major report preparation for several excavation projects in southern California. She co-authored innovative four-field anthropological studies of ethnicity and group affiliation for repatriation projects pursuant to the Native American Grave Protection and Repatriation Act (NAGPRA). Other technical specialities include historical context development and lithic source analysis. Her regional experience includes a wide range of construction and land management projects across the Western United States including locations in Arizona, Colorado, Utah, Texas and Wyoming, as well as California.

Presentations: Dr. Rockman has presented her research at over 20 scientific conferences in the U.S., Canada, England, and Puerto Rico, and frequently presents her ongoing research in public lectures through the University of California, Los Angeles.

J.D. Stewart, Ph.D., PRINCIPAL PALEONTOLOGIST

Education

- Ph.D., Systematics & Ecology, University of Kansas, Lawrence, Kansas, 1984
- M.A., Systematics and Ecology, University of Kansas, Lawrence, Kansas, 1979
- B.A. Degree, Biology, University of Kansas, Lawrence, Kansas, 1974

Professional Affiliations

- Society of Vertebrate Paleontology
- Research Associate, Natural History Museum of Los Angeles County

Expertise

J. D. Stewart has 30 years of experience in the field of paleontology. He has authored or co-authored 33 peer-reviewed articles for scientific journals and books. Within these, he has authored or co-authored descriptions of three new genera and three new species.

He is a recognized authority on fossil fishes of Cretaceous rocks of North America and Cenozoic rocks of the western coast of North America. As a result, Dr. Stewart is often called upon to identify paleontological and archaeological specimens. He has served as expert witness for the U.S. Department of Justice.

Experience

Dr. Stewart has extensive experience finding and excavating fossils for county, state, and provincial institutions. His field work includes projects in cooperation with the U.S. Bureau of Land Management, U.S. Army Corps of Engineers, U.S. Navy, U. S. Department of Energy, and California State Parks. The Bureau of Land Management's national website features one of his excavations from 2003. He has monitored construction activity in numerous counties and municipalities. In addition to fieldwork, he has experience in the supervision of preparators, curatorial assistants, and excavators. He also has extensive experience preparing fossils, and has processed and recovered thousands of vertebrate microfossils.

Dr. Stewart has authored and co-authored many paleontological assessment documents and California Environmental Quality Act-mandated monitoring and mitigation reports. He was the in-house curator for several major exhibits at the Natural History Museum of Los Angeles County, and helped develop two exhibits that toured the nation.

His project experience includes paleontological monitoring of the construction of Path 15, an 80-mile, high-voltage transmission line in the San Joaquin Valley. Dr. Stewart's team located an extensive bonebed in Middle Miocene sediments, dating back approximately 15 million years. In addition, Dr. Stewart and his team discovered over 1,200 vertebrate fossils, retrieved an extensive sampling and preserved the site for future research. As a result of his diligent analysis, the project schedule was maintained and there were no delays in construction.

Dr. Stewart conducted Phase I and II paleontological assessments at the Heritage Fields Great Park in Orange County, California where he and his team discovered significant portions of a Miocene-aged (5-8 million years ago) whale fossil. The fossil excavation will bring to light additional information that will allow reconstruction of the paleoenvironment of the Irvine region.

Amy M. Holmes, RPA, SENIOR ARCHAEOLOGIST

Education

- M.A., Anthropology, Washington State University, Pullman, Washington, 1998
- B.A., Anthropology, Texas A&M University, College Station, Texas, 1995

Permits/Certifications

- Registered Professional Archaeologist, 2000
- Red Cross CPR/First Aid, 2005

Continuing Education

- Riverside County Archaeology and Cultural Sensitivity Training Program, 2007
- Leading and Motivating Employees, UCLA Extension, 2006
- CEQA and Cultural Resources, UCLA Extension, 2006
- Project Manager Training, Earth Tech, Inc., 2004
- Working with California Office of Historic Preservation, SCA workshop, 2004
- Defensive Driving Refresher course, Earth Tech, 2004
- HAZWOPER 40-hour Hazardous waste workers' and 24-hour First Responder-Operations Level, ETAC, 2004
- Technical Writing Workshop for CRM Professionals, SRI Institute, 2000

Professional Affiliations

- Society for American Archaeology

Expertise

Amy Holmes is a Register of Professional Archaeologists (RPA)-certified archaeologist with 13 years of experience in archaeology and cultural resource management. Ms. Holmes meets the U.S. Secretary of Interior's Standards for an Archaeologist. She specializes in geoarchaeology and has a working knowledge of how geology, soil morphology, and geomorphology relate to archaeological contexts.

Experience

Ms. Holmes has worked as an archaeologist and/or geoarchaeologist throughout the western United States. The majority of her field work experience has occurred in Texas, California, Arizona, and Nevada. She holds current permits with the Nevada Bureau of Land Management, California Bureau of Land Management, and the State of Nevada. Ms. Holmes has experience working with both federal and state cultural resource laws including Section 106 of the National Historic Preservation Act, the National Environmental Policy Act, and the California Environmental Quality Act.

Ms. Holmes has experience working for city and county municipalities; state agencies such as the Texas Department of Transportation and Caltrans; and for federal agencies such as the US Forest Service, Bureau of Land Management, and the US Army Corps of Engineers. Ms. Holmes also has experience working on military instillations. Her private sector experience includes extensive experience working for private land developers in California.

Ms. Holmes functions as Irvine Practice Leader, deputy Project Manager, Principal Investigator, and Field Director. Her responsibilities include supervising the archaeological technicians, directing fieldwork, participating in Native American consultation, and preparing technical documents.

Catherine McMahon, ARCHAEOLOGICAL TECHNICIAN

Education

- B.A., Archaeology, College of Wooster, Wooster, Ohio, 2006

Continuing Education

- Riverside County Archaeology and Cultural Sensitivity Training Program, 2007

Professional Affiliations

- Archaeological Institute of America
- Society of American Archaeology

Expertise

Catherine McMahon has four years of academic, laboratory and research experience in the field of archaeology. Her relevant coursework includes archaeological methods, physical anthropology and Geographic Information Systems (GIS). Her specialization is in culture contact analysis.

Ms. McMahon spent a year studying the Celtic Invasion Theory in Ireland, in order to determine whether or not a Celtic Invasion of Ireland ever occurred. In combination with this she completed a 100 page thesis, and presented her results at a Society of American Anthropology meeting in 2006. In addition, she has experience in field survey, processing and recording collections and excavation.

Experience

Ms. McMahon has conducted a number of Phase I surveys during her employment with PCR. Her project experience includes the archaeological investigation of 10,000 acres of the 19,000-acre La Osa Ranch development in Pinal County, Arizona; a 2,300-acre residential development in Rialto; a 950-acre project site in Riverside County; a 240-acre project site in Chula Vista, and multiple small projects throughout Riverside and Orange counties.

She has preformed archaeological and paleontological monitoring at multiple project sites in Orange County. Ms McMahon has conducted dozens of records searches at the South Central Coastal Information Center at California State Fullerton and the San Bernardino Archaeological Information Center. In addition to her local experience, she has field experience in Illinois, Ohio, and Cyprus.

As a laboratory assistant she was responsible for processing artifacts; management, instruction and supervision of undergraduate students working in the archaeology laboratory; and assisting in formatting several publications. While working as a research intern she researched archaeological survey sites throughout Greece and input data using Mapping and GIS (MAGIS).

She has presented two papers at Central States Anthropological Society Meetings entitled Celtic Ideal and Patterns in the Wooster Cemetery. Most recently she has presented a poster entitled *The Celtic Invasion of Ireland: Myth or Fact?* and a paper entitled *Correlations Between Yoni Features and The Luiseño Girls' Ceremony in Western Riverside County, California* at the Society for American Archaeology meetings.

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APPENDIX B: CULTURAL RESOURCE RECORDS SEARCH RESULTS

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Document No.: 1060258 Unpublished Report
SAN BERNARDINO COUNTY MUSEUM ASSOCIATION

1975 ARCHAEOLOGICAL IMPACT REPORT FOR MATICK CORPORATION WITH A REVIEW FOR U.S. FOREST SERVICE: ARCHAEOLOGICAL INVESTIGATIONS CONCERNING THE AREA AROUND NEALEY'S CORNER. SAN BERNARDINO COUNTY MUSEUM ASSOCIATION. SUBMITTED TO MATICH CORPORATION AND U.S. FOREST SERVICE. UNPUBLISHED REPORT ON FILE AT S.B. CO. MUSEUM, 2024 ORANGE TREE LANE, REDLANDS, CA 92374.

Last Update: 11/21/1988 Cataloged by: WRO-CA-03 on 11/21/1988
Keywords: PREHISTORIC (1), ARCHAEOLOGICAL RECONNAISSANCE REPORT (1), INTERMONTANE VALLEY (4), SAN BERNARDINO VALLEY (4), TRANSVERSE RANGES (4), SAN GABRIEL MOUNTAINS (4), USGS DEVORE 7.5' QUAD (4), NO RESOURCES (4), 75-6.1 (7)

Document No.: 1060377 Unpublished Report
HEARN, JOSEPH E.

1976 ARCHAEOLOGICAL - HISTORICAL RESOURCES ASSESSMENT OF TENTATIVE TRACT 9001 - LOCATED ABOVE EL RANCHO VERDE GOLF COURSE, RIALTO AREA. SAN BERNARDINO COUNTY MUSEUM ASSOCIATION. SUBMITTED TO LOCKWOOD ENGINEERING AND SURVEYING COMPANY, INC. UNPUBLISHED REPORT ON FILE AT S.B. CO. MUSEUM, 2024 ORANGE TREE LANE, REDLANDS, CA 92374.

Last Update: 12/02/1988 Cataloged by: WRO-CA-03 on 12/02/1988
Keywords: PREHISTORIC (1), HISTORIC (1), ARCHAEOLOGICAL RECONNAISSANCE REPORT (1), INTERMONTANE VALLEY (4), SAN BERNARDINO VALLEY (4), USGS DEVORE 7.5' QUAD (4), NO RESOURCES (4), 76-8.1 (7)

Document No.: 1060488 Unpublished Report
HEARN, JOSEPH E.

1977 ARCHAEOLOGICAL - HISTORICAL RESOURCES ASSESSMENT OF 14.6 ACRES M/L RIALTO BENCH. SAN BERNARDINO COUNTY MUSEUM ASSOCIATION. SUBMITTED TO JOE DIIORIO. UNPUBLISHED REPORT ON FILE AT S.B. CO. MUSEUM, 2024 ORANGE TREE LANE, REDLANDS, CA 92374.

Last Update: 12/09/1988 Cataloged by: WRO-CA-03 on 12/09/1988
Keywords: PREHISTORIC (1), HISTORIC (1), ARCHAEOLOGICAL RECONNAISSANCE REPORT (1), INTERMONTANE VALLEY (4), SAN BERNARDINO VALLEY (4), USGS DEVORE 7.5' QUAD (4), NO RESOURCES (4), 77-4.6 (7)

Document No.: 1060498 Unpublished Report
HEARN, JOSEPH E.

1977 LYTLE CREEK ROAD AND GRAPEVINE CANYON. SAN BERNARDINO COUNTY MUSEUM ASSOCIATION. SUBMITTED TO SAN BERNARDINO COUNTY TRANSPORTATION DEPARTMENT. UNPUBLISHED REPORT ON FILE AT S.B. CO. MUSEUM, 2024 ORANGE TREE LANE, REDLANDS, CA 92374.

Last Update: 12/09/1988 Cataloged by: WRO-CA-03 on 12/09/1988
Keywords: PREHISTORIC (1), HISTORIC (1), ARCHAEOLOGICAL RECONNAISSANCE REPORT (1), TRANSVERSE RANGES (4), SAN GABRIEL MOUNTAINS (4), USGS DEVORE 7.5' QUAD (4), NO RESOURCES (4), 77-5.8 (7)

Document No.: 1060559 Unpublished Report
HEARN, JOSEPH E.

1977 ARCHAEOLOGICAL - HISTORICAL RESOURCES ASSESSMENT OF TENTATIVE TRACT 10161 IN RIALTO. SAN BERNARDINO COUNTY MUSEUM ASSOCIATION. SUBMITTED TO MCCUTCHAN AND ASSOCIATES, INC. UNPUBLISHED REPORT ON FILE AT S.B. CO. MUSEUM, 2024 ORANGE TREE LANE, REDLANDS, CA 92374.

Last Update: 12/19/1988 Cataloged by: WRO-CA-03 on 12/19/1988
Keywords: PREHISTORIC (1), HISTORIC (1), ARCHAEOLOGICAL RECONNAISSANCE REPORT (1), INTERMONTANE VALLEY (4), SAN BERNARDINO VALLEY (4), USGS DEVORE 7.5' QUAD (4), NO RESOURCES (4), 77-10.1 (7)

Document No.: 1060636 Unpublished Report
HEARN, JOSEPH E.

1978 ARCHAEOLOGICAL - HISTORICAL RESOURCES ASSESSMENT OF TRACT NO. 10244, EL RANCHO VERDE AREA, RIALTO. SAN BERNARDINO COUNTY MUSEUM ASSOCIATION. SUBMITTED TO PRELUDE DEVELOPMENT COMPANY. UNPUBLISHED REPORT ON FILE AT S.B. CO. MUSEUM, 2024 ORANGE TREE LANE, REDLANDS, CA 92374.

Last Update: 12/22/1988 Cataloged by: WRO-CA-03 on 12/22/1988
Keywords: PREHISTORIC (1), HISTORIC (1), ARCHAEOLOGICAL RECONNAISSANCE REPORT (1), INTERMONTANE VALLEY (4), SAN BERNARDINO VALLEY (4), USGS SAN BERNARDINO NORTH 7.5' QUAD (4), NO RESOURCES (4), 78-4.11 (7)

Document No.: 1060697 Unpublished Report
SCHUILING, WALTER C.

1973 ENVIRONMENTAL IMPACT ARCHAEOLOGICAL SURVEY: SEYMOUR FLAT DEVELOPMENT. SAN BERNARDINO COUNTY MUSEUM ASSOCIATION. SUBMITTED TO LIND AND HILLERUD. UNPUBLISHED REPORT ON FILE AT S.B. CO. MUSEUM, 2024 ORANGE TREE LANE, REDLANDS, CA 92374.

Last Update: 12/27/1988 Cataloged by: WRO-CA-03 on 12/27/1988
Keywords: PREHISTORIC (1), HISTORIC (1), ARCHAEOLOGICAL RECONNAISSANCE REPORT (1), TRANSVERSE RANGES (4), SAN BERNARDINO MOUNTAINS (4), USGS KELLER PEAK 7.5' QUAD (4), NO RESOURCES (4), 78-11.1A (7)

Document No.: 1061169 Unpublished Report
SMITH, GERALD A., ROBERT REYNOLDS, AND MICHAEL K. LERCH

1981 CULTURAL RESOURCES ASSESSMENT OF THE PROPOSED SAN BERNARDINO VALLEY MUNICIPAL WATER DISTRICT PROJECT FOR TWO THOUSAND FEET OF PIPE AND CONSTRUCTION OF A PRESSURE REDUCING STRUCTURE, RIALTO, CALIFORNIA. SAN BERNARDINO COUNTY MUSEUM ASSOCIATION. SUBMITTED TO SAN BERNARDINO VALLEY MUNICIPAL WATER DISTRICT. UNPUBLISHED REPORT ON FILE AT S.B. CO. MUSEUM, 2024 ORANGE TREE LANE, REDLANDS, CA 92374.

Last Update: 03/13/1989 Cataloged by: WRO-CA-03 on 03/13/1989
Keywords: PREHISTORIC (1), HISTORIC (1), ARCHAEOLOGICAL RECONNAISSANCE REPORT (1), INTERMONTANE VALLEY (4), SAN BERNARDINO VALLEY (4), USGS DEVORE 7.5' QUAD (4), NO RESOURCES (4), 81-7.13 (7)

Document No.: 1061307 Unpublished Report

SAMPSON, MICHAEL

1982 AN ARCHAEOLOGICAL RECONNAISSANCE OF THE TEXAS HILL CHAPARRAL MANAGEMENT PROJECT, SAN BERNARDINO COUNTY, CALIFORNIA. MICHAEL SAMPSON. SUBMITTED TO CALIFORNIA DEPARTMENT OF FORESTRY - SACRAMENTO OFFICE. UNPUBLISHED REPORT ON FILE AT S.B. CO. MUSEUM, 2024 ORANGE TREE LANE, REDLANDS, CA 92374.

Last Update: 04/14/1989 Cataloged by: WRO-CA-03 on 04/14/1989
Keywords: PREHISTORIC (1), HISTORIC (1), ARCHAEOLOGICAL RECONNAISSANCE REPORT (1), HOMESTEADING SITES (1), MINING SITES (1), TRANSVERSE RANGES (4), SAN GABRIEL MOUNTAINS (4), USGS DEVORE 7.5' QUAD (4), RESOURCE NUMBERS UNKNOWN (4), 82-9.5 (7)

Document No.: 1061407 Unpublished Report
ANICIC, JR., JOHN CHARLES

1983 HISTORICAL BRIEF ON GRAPELAND, SIERRA HEIGHTS DEVELOPMENT. FONTANA HISTORICAL SOCIETY. SUBMITTED TO FONTANA PLANNING DEPARTMENT. UNPUBLISHED REPORT ON FILE AT S.B. CO. MUSEUM, 2024 ORANGE TREE LANE, REDLANDS, CA 92374.

Last Update: 05/01/1989 Cataloged by: WRO-CA-03 on 05/01/1989
Keywords: HISTORIC (1), CULTURAL HISTORY (1), WATER DITCHES (1), RESIDENCE SITES (1), INTERMONTANE VALLEY (4), SAN BERNARDINO VALLEY (4), USGS DEVORE 7.5' QUAD (4), RESOURCE NUMBERS UNKNOWN (4), 83-9.3 (7)

Document No.: 1061501 Unpublished Report
MASON, ROGER D.

1985 CULTURAL RESOURCE SURVEY REPORT FOR THE ETIWANDA PIPELINE AND POWER PLANT EIR. SCIENTIFIC RESOURCES SURVEYS, INC. SUBMITTED TO METROPOLITAN WATER DISTRICT. UNPUBLISHED REPORT ON FILE AT S.B. CO. MUSEUM, 2024 ORANGE TREE LANE, REDLANDS, CA 92374.

Last Update: 05/26/1989 Cataloged by: WRO-CA-03 on 05/26/1989
Keywords: PREHISTORIC (1), HISTORIC (1), ARCHAEOLOGICAL RECONNAISSANCE REPORT (1), FARMING SITES (1), HOMESTEADING SITES (1), WATER RESERVOIRS (1), INTERMONTANE VALLEY (4), SAN BERNARDINO VALLEY (4), USGS DEVORE 7.5' QUAD (4), USGS CUCAMONGA PEAK 7.5' QUAD (4), USGS GUASTI 7.5' QUAD (4), USGS FONTANA 7.5' QUAD (4), P1084-1-H (4), P1072-9-H (4), P1072-10-H (4), 85-7.6 (7)

Document No.: 1061566 Unpublished Report
BROCK, JAMES, JOHN F. ELLIOTT, BENJAMIN RESNICK, AND WILLIAM A. SAWYER

1986 SANTA ANA RIVER UPSTREAM ALTERNATIVES, CULTURAL RESOURCES SURVEY. ECOS MANAGEMENT CRITERIA, INC. SUBMITTED TO U.S. ARMY CORPS OF ENGINEERS. CONTRACT NO. DACW09-85-C-0027. UNPUBLISHED REPORT ON FILE AT S.B. CO. MUSEUM, 2024 ORANGE TREE LANE, REDLANDS, CA 92374.

Last Update: 06/12/1989 Cataloged by: WRO-CA-03 on 06/12/1989
Keywords: PREHISTORIC (1), HISTORIC (1), ARCHAEOLOGICAL RECONNAISSANCE REPORT (1), REFUSE DISPOSAL SITE (1), HYDROELECTRIC POWERHOUSES (1), AQUEDUCTS (1), FLUMES (1), TUNNELS (1), RESERVOIRS (1), ROADS (1), BRIDGES (1), STONE WALLS (1), CONSTRUCTION CAMPSITES (1), BUILDING FOUNDATIONS

(1), HOT SPRINGS SITES (1), RESIDENTIAL STRUCTURES (1), LITHIC SCATTERS (1), BEDROCK SLICKS (1), CEMETERY (1), WATER DAMS (1), CANALS (1), WELLS (1), ELECTRICAL TRANSMISSION LINES (1), RANGER STATION (1), HOMESTEADING SITES (1), CCC CAMPS (1), MINING SITES (1), RANCHING SITES (1), SANDSTONE QUARRY (1), IRRIGATION SITES (1), RAILROADING SITES (1), CAMPSITE (1), FARMING SITES (1), TRAILS (1), TINNED CANS (3), GLASS BOTTLES (3), CERAMICS (3), BRICKS (3), METAL HARDWARE (3), FLAKED LITHICS (3), JASPER (3), QUARTZITE (3), OBSIDIAN (3), GROUND STONE (3), GRANITE (3), BASALT (3), QUARTZ (3), CHERT (3), SCHIST (3), TRANSVERSE RANGES (4), SAN BERNARDINO MOUNTAINS (4), INTERMONTANE VALLEY (4), SAN BERNARDINO VALLEY (4), USGS YUCAIPA 7.5' QUAD (4), USGS KELLER PEAK 7.5' QUAD (4), USGS REDLANDS 7.5' QUAD (4), USGS BIG BEAR LAKE 7.5' QUAD (4), USGS DEVORE 7.5' QUAD (4), CA-SBR-5499H (4), CA-SBR-6005H (4), CA-SBR-5500H (4), CA-SBR-5501H (4), CA-SBR-5502H (4), CA-SBR-5508H (4), CA-SBR-5504 (4), CA-SBR-5450 (4), CA-SBR-5449 (4), CA-SBR-5505H (4), CA-SBR-5510H (4), CA-SBR-5511H (4), CA-SBR-5528H (4), CA-SBR-5506H (4), CA-SBR-5507H (4), CA-SBR-5526H (4), CA-SBR-5509H (4), CA-SBR-6000H (4), CA-SBR-6001H (4), CA-SBR-6002H (4), CA-SBR-5527H (4), CA-SBR-5448 (4), CA-SBR-2323 (4), CA-RIV-2639 (4), P1064-31-H (4), P1064-32-H (4), P1064-14-H (4), P1064-15-H (4), P1064-16-H (4), P1064-17-H (4), P1064-19-H (4), P1064-20-H (4), P1064-21-H (4), P1064-23-H (4), P1064-33-H (4), P1064-30-H (4), P1064-29-H (4), P1064-28-H (4), P1064-6-H (4), P1064-7-H (4), P1064-8-H (4), P1064-9-H (4), P1064-10-H (4), P1061-2-H (4), PSBR-8-H (4), PSBR-36-H (4), PSBR-11-H (4), PSBR-22-H (4), PSBR-9-H (4), P1072-13/H (4), P1072-14-H (4), P1072-15-H (4), P1072-16-H (4), P1072-17-H (4), P1072-18-H (4), P1072-19-H (4), P1072-20-H (4), P1072-21-H (4), P1072-22-H (4), 86-5.3A-C (7)

Document No.: 1061578 Unpublished Report
FOSTER, DANIEL G.

1986 VEGETATION AND WATERSHED MANAGEMENT, ARCHEOLOGICAL REVIEW, GLEN HELEN II VMP PROJECT, SAN BERNARDINO RANGER UNIT. DANIEL G. FOSTER. SUBMITTED TO CALIFORNIA DEPARTMENT OF FORESTRY. UNPUBLISHED REPORT ON FILE AT S.B. CO. MUSEUM, 2024 ORANGE TREE LANE, REDLANDS, CA 92374.

Last Update: 06/12/1989 Cataloged by: WRO-CA-03 on 06/12/1989
Keywords: PREHISTORIC (1), ARCHAEOLOGICAL RECONNAISSANCE REPORT (1), INTERMONTANE VALLEY (4), SAN BERNARDINO VALLEY (4), USGS DEVORE 7.5' QUAD (4), NO RESOURCES (4), 86-7.6 (7)

Document No.: 1061751 Unpublished Report
DE BARROS, PHILIP

1987 CULTURAL RESOURCES SURVEY AND ASSESSMENT OF TENTATIVE TRACT 13639, NORTHWEST RIALTO SPECIFIC PLAN, CITY OF RIALTO, SAN BERNARDINO COUNTY, CALIFORNIA. PHILIP DE BARROS. SUBMITTED TO THE JOHNSON CORPORATION. UNPUBLISHED REPORT ON FILE AT S.B. CO. MUSEUM, 2024 ORANGE TREE LANE, REDLANDS, CA 92374.

Last Update: 06/29/1989 Cataloged by: WRO-CA-03 on 06/29/1989
Keywords: PREHISTORIC (1), HISTORIC (1), ARCHAEOLOGICAL RECONNAISSANCE REPORT (1), WATER DITCHES (1), HOMESTEADING SITE (1), INTERMONTANE VALLEY (4), SAN BERNARDINO VALLEY (4), USGS DEVORE 7.5' QUAD (4), CA-SBR-6109H (4), CA-SBR-6110H (4), CA-SBR-6111H (4), CA-SBR-6112H (4), 87-12.3 (7)

Document No.: 1061823 Unpublished Report
SWANSON, MARK T.

1988 CULTURAL RESOURCES SURVEY OF SYCAMORE FLAT, A 310-ACRE TRACT SOUTHWEST OF DEVORE, SAN BERNARDINO COUNTY, CALIFORNIA. RESEARCH ASSOCIATES. SUBMITTED TO URBAN ENVIRONS. UNPUBLISHED REPORT ON FILE AT S.B. CO. MUSEUM, 2024 ORANGE TREE LANE, REDLANDS, CA 92374.

Last Update: 06/30/1989 Cataloged by: WRO-CA-03 on 06/30/1989
Keywords: PREHISTORIC (1), HISTORIC (1), ARCHAEOLOGICAL RECONNAISSANCE REPORT (1), INTERMONTANE VALLEY (4), SAN BERNARDINO VALLEY (4), USGS DEVORE 7.5' QUAD (4), NO RESOURCES (4), 88-8.1 (7)

Document No.: 1061847 Unpublished Report
SCHNEIDER, JOAN S.

1989 A REPORT OF THE ARCHAEOLOGICAL MONITORING OF BRUSH-REMOVAL OPERATIONS ON TRACT 13780, OF MASTER TRACT 13639, KNOWN AS LAS COLINAS, CITY OF RIALTO, COUNTY OF SAN BERNARDINO, CALIFORNIA. JOAN S. SCHNEIDER. SUBMITTED TO LEWIS HOMES MANAGEMENT CORPORATION. UNPUBLISHED REPORT ON FILE AT S.B. CO. MUSEUM, 2024 ORANGE TREE LANE, REDLANDS, CA 92374.

Last Update: 06/30/1989 Cataloged by: WRO-CA-03 on 06/30/1989
Keywords: HISTORIC (1), ARCHAEOLOGICAL MONITORING (1), WATER DITCHES (1), STONE FOUNDATIONS (1), INTERMONTANE VALLEY (4), SAN BERNARDINO VALLEY (4), USGS DEVORE 7.5' QUAD (4), CA-SBR-6111H (4), 89-1.1 (7)

Document No.: 1061961 Journal Article
HAENSZEL, ARDA M.

1989 THE LOST RANCHERIA IN CAJON PASS. ASA JOURNAL, 12(2):56-61.

Last Update: 12/07/1989 Cataloged by: WRO-CA-03 on 12/07/1989
Keywords: PREHISTORIC (1), HISTORIC (1), CULTURAL HISTORY (1), INTERMONTANE VALLEY (4), SAN BERNARDINO VALLEY (4), CAJON CANYON (4), TRANSVERSE RANGES (4), SAN BERNARDINO MOUNTAINS (4), SAN GABRIEL MOUNTAINS (4), SUMMIT VALLEY (4), MOJAVE RIVER (4), CA-SBR-93 (4), CA-SBR-425 (4), P1072-25 (4), USGS DEVORE 7.5' QUAD (4), USGS CAJON 7.5' QUAD (4), USGS SILVERWOOD LAKE 7.5' QUAD (4), 88-0.3 (7)

Document No.: 1062043 Unpublished Report
SUTTON, PAULA A.

1989 ARCHAEOLOGICAL SURVEY REPORT FOR THE PROPOSED FOOTHILL FREEWAY, LOS ANGELES AND SAN BERNARDINO COUNTIES, CALIFORNIA. PAULA A. SUTTON. SUBMITTED TO CALIFORNIA DEPARTMENT OF TRANSPORTATION. UNPUBLISHED REPORT ON FILE AT S.B. CO. MUSEUM, 2024 ORANGE TREE LANE, REDLANDS, CA 92374.

Last Update: 10/04/1990 Cataloged by: WRO-CA-03 on 10/04/1990
Keywords: PREHISTORIC (1), HISTORIC (1), ARCHAEOLOGICAL RECONNAISSANCE REPORT (1), HABITATION SITES (1), COMMERCIAL SITE (1), INDUSTRIAL SITE (1), RESERVOIR SITE (1), HISTORIC REFUSE (3), INTERMONTAINE VALLEY (4), SAN BERNARDINO VALLEY (4), CA-SBR-6250H (4), CA-SBR-6251H (4), CA-SBR-6252H (4), CA-SBR-6253H (4), CA-SBR-6254H (4), CA-SBR-6255H (4), CA-SBR-6328H (4), USGS MT. BALDY 7.5' QUAD (4), USGS CUCAMONGA PEAK 7.5' QUAD (4), USGS DEVORE 7.5' QUAD (4), USGS SAN BERNARDINO NORTH 7.5' QUAD (4), USGS ONTARIO 7.5' QUAD (4), 89-11.7 (7)

Document No : 1062066 Unpublished Report
VAN WORMER, STEPHEN, AND PAUL E. LANGENWALTER II

1990 LYTLE CREEK WASH ARCHAEOLOGICAL SURVEY. ARCHAEOLOGICAL RESOURCE MANAGEMENT CORP. SUBMITTED TO LYTLE CREEK LAND & RESOURCES, INC. UNPUBLISHED REPORT ON FILE AT S.B. CO. MUSEUM, 2024 ORANGE TREE LANE, REDLANDS, CA 92374.

Last Update: 10/09/1990 Cataloged by: WRO-CA-03 on 10/09/1990
Keywords: PREHISTORIC (1), HISTORIC (1), ARCHAEOLOGICAL RECONNAISSANCE REPORT (1), IRRIGATION DITCHES (1), SPREADING GROUNDS (1), HYDROELECTRIC FACILITY (1), STONE ALIGNMENT (1), INTERMONTAINE VALLEY (4), SAN BERNARDINO VALLEY (4), CA-SBR-6698H (4), CA-SBR-6699H (4), CA-SBR-6700H (4), CA-SBR-6701H (4), CA-SBR-6702H (4), CA-SBR-6703H (4), CA-SBR-6704H (4), CA-SBR-6705H (4), CA-SBR-6706H (4), CA-SBR-6707H (4), CA-SBR-6708H (4), CA-SBR-6709H (4), CA-SBR-1416 (4), P1072-44-H (4), USGS DEVORE 7.5' QUAD (4), 90-1.13 (7)

Document No.: 1062416 Unpublished Report
PARKER, COLE AND CARMEN A. WEBER

1991 LYTLE CREEK WASH CULTURAL RESOURCES SURVEY. CHAMBERS GROUP. SUBMITTED TO CALMAT. UNPUBLISHED REPORT ON FILE AT S.B. CO. MUSEUM, 2024 ORANGE TREE LANE, REDLANDS, CA 92374.

Last Update: 05/20/1992 Cataloged by: WRO-CA-03 on 05/20/1992
Keywords: PREHISTORIC (1), HISTORIC (1), ARCHAEOLOGICAL SURVEY REPORT (1), WATER TRANSPORTATION SITE (1), INTERMONTANE VALLEY (4), SAN BERNARDINO VALLEY (4), LYTLE CREEK (4), CA-SBR-6903H (4), USGS SAN BERNARDINO NORTH 7.5' QUAD (4), 91-5.5 (7)

Document No.: 1062527 Unpublished Report
HAMMOND, STEPHEN R.

1989 HISTORIC PROPERTY SURVEY REPORT FOR THE PROPOSED FOOTHILL FREEWAY. STEPHEN HAMMOND SUBMITTED TO CALIFORNIA DEPARTMENT OF TRANSPORTATION - SAN BERNARDINO. UNPUBLISHED REPORT ON FILE AT S.B. CO. MUSEUM, 2024 ORANGE TREE LANE, REDLANDS, CA 92374.

Last Update: 05/22/1992 Cataloged by: WRO-CA-03 on 05/22/1992
Keywords: PREHISTORIC (1), HISTORIC (1), ARCHAEOLOGICAL RECONNAISSANCE REPORT (1), RESIDENTIAL SITES (1), COMMERCIAL SITES (1), WATER STORAGE SITES (1), WINDBREAKS (1), RESIDENTIAL STRUCTURES (1), FOOD PROCESSING SITE (1), INTERMONTANE VALLEY (4), SAN BERNARDINO VALLEY (4), CA-LAN-402 (4), CA-SBR-6250H (4), CA-SBR-6251H (4), CA-SBR-6252H (4), CA-SBR-6253H (4), CA-SBR-6254H (4), CA-SBR-6255H (4), CA-SBR-6329H (4), USGS ONTARIO 7.5' QUAD (4), USGS MT. BALDY 7.5' QUAD (4), USGS CUCAMONGA PEAK 7.5' QUAD (4), USGS DEVORE 7.5' QUAD (4), USGS SAN BERNARDINO NORTH 7.5' QUAD (4), 89-12.12 (7)

Document No.: 1062530 Unpublished Report
GALLUP, AARON A., BONNIE W. PARKS, DENISE O'CONNOR, AND STEPHEN D. MIKESELL

1989 HISTORICAL ARCHITECTURAL SURVEY REPORT AND HISTORIC RESOURCE EVALUATION REPORT FOR A PROPOSED HIGHWAY ON NEW ALIGNMENT. HARVEY SAWYER. SUBMITTED TO CALIFORNIA DEPARTMENT OF TRANSPORTATION.

UNPUBLISHED REPORT ON FILE AT S.B. CO. MUSEUM, 2024 ORANGE TREE LANE, REDLANDS, CA 92374.

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Keywords: HISTORIC (1), HISTORIC STRUCTURES RECONNAISSANCE REPORT (1), HISTORIC STRUCTURES EVALUATION REPORT (1), RESIDENTIAL STRUCTURES (1), ROAD (1), RESERVOIRS (1), COMMERCIAL STRUCTURES (1), INTERMONTANE VALLEY (4), SAN BERNARDINO VALLEY (4), PSBR-49H (4), P1082-3H (4), P1082-8H (4), P1082-11H (4), P1082-20H (4), P1081-20H (4), USGS ONTARIO 7.5' QUAD (4), USGS MT. BALDY 7.5' QUAD (4), USGS CUCAMONGA PEAK 7.5' QUAD (4), USGS DEVORE 7.5' QUAD (4), USGS SAN BERNARDINO NORTH 7.5' QUAD (4), 89-3.12 (7)

Document No.: 1062621 Unpublished Report
ALEXANDROWICZ, J. STEVEN, ANNE Q. DUFFIELD-STOLL, JEANETTE A. MCKENNA, SUSAN R. ALEXANDROWICZ, ARTHUR A. KUHNER, AND ERIC SCOTT

1992 CULTURAL AND PALEONTOLOGICAL RESOURCES INVESTIGATIONS WITHIN THE NORTH FONTANA INFRASTRUCTURE AREA, CITY OF FONTANA, SAN BERNARDINO COUNTY, CALIFORNIA. ARCHAEOLOGICAL CONSULTING SERVICES. SUBMITTED TO CITY OF FONTANA. UNPUBLISHED REPORT ON FILE AT S.B. CO. MUSEUM, 2024 ORANGE TREE LANE, REDLANDS, CA 92374.

Last Update: 01/14/1993 Cataloged by: WRO-CA-03 on 12/30/1992
Keywords: PREHISTORIC (1), HISTORIC (1), ARCHAEOLOGICAL RECONNAISSANCE REPORT (1), CULTURE HISTORY (1), HOMESTEADING SITES (1), RESIDENTIAL SITES (1), FARMING SITES (1), ROADS (1), WATER TRANSPORTATION SITES (1), FOOD PROCESSING SITES (1), CAMPSITES (1), MINING SITES (1), POWER TRANSMISSION SITES (1), RANCHING SITES (1), GROUND STONE (3), FLAKED LITHICS (3), INTERMONTANE VALLEY (4), SAN BERNARDINO VALLEY (4), CA-SBR-4296 (4), CA-SBR-6815/H (4), CA-SBR-6816/H (4), CA-SBR-6110H (4), CA-SBR-6111H (4), CA-SBR-6251H (4), CA-SBR-6583H (4), CA-SBR-6584H (4), CA-SBR-6585H (4), CA-SBR-6586H (4), CA-SBR-6587H (4), CA-SBR-6588H (4), CA-SBR-6589H (4), CA-SBR-6807H (4), CA-SBR-6808H (4), CA-SBR-6809H (4), CA-SBR-6810H (4), CA-SBR-6811H (4), CA-SBR-6812H (4), CA-SBR-6813H (4), CA-SBR-6814H (4), CA-SBR-6815H (4), CA-SBR-6816H (4), PSBR-2H (4), PSBR-36H (4), PSBR-37H (4), P1072-8H (4), P1072-10H (4), P1072-22H (4), P1072-26H (4), P1072-32H (4), P1072-34H (4), P1072-36H (4), P1072-38H (4), P1072-48H (4), P1072-49H (4), P1072-50H (4), P1072-51H (4), P1072-55H (4), P1072-64H (4), P1072-65H (4), P1072-66H (4), P1072-67H (4), P1072-68H (4), P1072-69H (4), P1072-70H (4), P1072-71H (4), P1072-72H (4), P1072-73H (4), P1072-74H (4), P1072-75H (4), P1072-76H (4), P1072-77H (4), P1072-78H (4), P1072-79H (4), P1072-80H (4), P1072-81H (4), P1072-82H (4), P1072-83H (4), P1072-84H (4), P1072-85H (4), P1072-86H (4), P1072-87H (4), P1072-88H (4), P1072-89H (4), P1072-90H (4), P1072-91H (4), P1072-92H (4), P1072-93H (4), P1072-94H (4), P1072-95H (4), P1072-96H (4), P1072-97H (4), P1072-98H (4), P1072-99H (4), P1072-100H (4), P1073-4H (4), P1073-5H (4), P1073-6H (4), P1073-7H (4), P1073-8H (4), P1073-9H (4), P1073-10H (4), P1073-34H (4), P1073-35H (4), USGS DEVORE 7.5' QUAD (4), USGS FONTANA 7.5' QUAD (4), USGS GUASTI 7.5' QUAD (4), USGS CUCAMONGA PEAK 7.5' QUAD (4), 92-2.20A-B (7)

Document No.: 1062684 Unpublished Report
BROWN, JOAN C. AND TIM GREGORY

1992 APPENDIX A: HISTORIC RESOURCE EVALUATION, REVISED. RMW PALEO ASSOCIATES. SUBMITTED TO NITTO AMERICA CO. UNPUBLISHED REPORT ON FILE AT S.B. CO. MUSEUM, 2024 ORANGE TREE LANE, REDLANDS, CA 92374.

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Keywords: PREHISTORIC (1), HISTORIC (1), ARCHAEOLOGICAL RECONNAISSANCE REPORT (1), WATER TRANSPORTATION SITE (1), PUMPHOUSE (1), CONCRETE WATER PIPE (3), INTERMONTANE VALLEY (4), SAN BERNARDINO VALLEY (4), CA-SBR-7201H (4), USGS SAN BERNARDINO NORTH 7.5' QUAD (4), 92-10.3 (7)

Document No.: 1062713 Unpublished Report
MLAZOVSKY, MARILYN

1992 ARCHAEOLOGICAL RECONNAISSANCE REPORT: SYCAMORE STATION GARBAGE DISPOSAL. SAN BERNARDINO NATIONAL FOREST. SUBMITTED TO FOREST SERVICE. CONTRACT NO. 05-12-CA-67. UNPUBLISHED REPORT ON FILE AT S.B. CO. MUSEUM, 2024 ORANGE TREE LANE, REDLANDS, CA 92374.

Last Update: 06/17/1993 Cataloged by: WRO-CA-03 on 06/17/1993
Keywords: ARCHAEOLOGICAL RECONNAISSANCE REPORT (1), TRANSVERSE RANGES (4), NO RESOURCES (4), USGS DEVORE 7.5' QUAD (4)

Document No.: 1062767 Unpublished Report
HOGAN, MICHAEL

1992 ARCHAEOLOGICAL MONITORING REPORT GLEN HELEN PARK AMPHITHEATER NEAR DEVORE IN SAN BERNARDINO COUNTY, CA. ARD. SUBMITTED TO COUNTY OF SAN BERNARDINO. UNPUBLISHED REPORT ON FILE AT S.B. CO. MUSEUM, 2024 ORANGE TREE LANE, REDLANDS, CA 92374.

Last Update: 10/19/1993 Cataloged by: WRO-CA-03 on 10/19/1993
Keywords: ARCHAEOLOGICAL MONITORING REPORT (1), CHALCEDONY (3), PROJECTILE POINT (3), 40 ACRES (4), SAN GABRIEL MOUNTAINS (4), TRANSVERSE RANGES (4), USGS DEVORE 7.5' QUAD (4)

Document No.: 1062795 Unpublished Report
HAMPSON, R. PAUL, JAMES J. SCHMIDT, AND JUNE A. SCHMIDT

1991 CULTURAL RESOURCE INVESTIGATION: CAJON PIPELINE PROJECT. GREENWOOD & ASSOCIATES. SUBMITTED TO EIP ASSOCIATES. UNPUBLISHED REPORT ON FILE AT S.B. CO. MUSEUM, 2024 ORANGE TREE LANE, REDLANDS, CA 92374.

Last Update: 12/29/1993 Cataloged by: WRO-CA-03 on 12/29/1993
Keywords: ARCHAEOLOGICAL RECONNAISSANCE REPORT (1), LITHIC SCATTER (1), LITHIC REDUCTION SITE (1), HABITATION SITE (1), HUNTING BLIND (1), POWER TRANSMISSION LINE (1), ROAD (1), WATER TRANSPORTATION SITE (1), BRIDGE (1), WELL (1), WALL (1), MINING SITE (1), OBSIDIAN (3), FLAKED LITHICS (3), GROUNDSTONE (3), HAMMERSTONE (3), BASALT (3), RHYOLITE (3), FAUNAL REMAINS (3), QUARTZITE (3), TINNED CANS (3), GLASS (3), CERAMICS (3), METAL HARDWARE (3), WOOD (3), CAMPSITE (1), RAILROAD (1), REFUSE DISPOSAL SITE (1), LITHIC QUARRY (1), MOJAVE DESERT (4), CAJON CANYON (4), HARPER LAKE (4), TWELVE GAUGE LAKE (4), SAN BERNARDINO MOUNTAINS (4), SAN GABRIEL MOUNTAINS (4), TRANSVERSE RANGES (4), 130 MILES (4), CA-SBR-5361 (4), CA-SBR-5362 (4), CA-SBR-5568 (4), CA-SBR-4411H (4), CA-SBR-4418H (4), CA-SBR-4271H (4), CA-SBR-4268H (4), CA-SBR-4252H (4), CA-SBR-2910H (4), CA-SBR-6793H (4), CA-SBR-4272H (4), CA-SBR-4255H (4), CA-SBR-4253H (4), CA-SBR-7076 (4), CA-SBR-7077 (4), CA-SBR-7078 (4), CA-SBR-7079 (4), CA-SBR-7080 (4), CA-SBR-7081 (4), CA-SBR-7082 (4), CA-SBR-7084H (4), CA-SBR-7085 (4), CA-SBR-7086 (4), CA-SBR-7087 (4), CA-SBR-7088 (4), CA-SBR-7089 (4), CA-SBR-7090H (4), CA-SBR-7091H (4), CA-SBR-7092 (4), CA-SBR-7093H (4), CA-SBR-7094H (4), CA-SBR-7095H (4), CA-SBR-7096H (4),

P1333-12H (4), P1833-2 (4), P1833-3H (4), PSBR-2H (4), PSBR-3H (4), PSBR-5H (4), CHL-577 (4), CPHI-12 (4), USGS ADELANTO 7.5' QUAD (4), USGS ASTLEY RANCHO 7.5' QUAD (4), USGS BALDY MESA 7.5' QUAD (4), USGS CAJON 7.5' QUAD (4), USGS CUCAMONGA PEAK 7.5' QUAD (4), USGS DEVORE 7.5' QUAD (4), USGS GUASTI 7.5' QUAD (4), USGS ONTARIO 7.5' QUAD (4), USGS TWELVE GAUGE LAKE 7.5' QUAD (4), USGS VICTORVILLE NW 7.5' QUAD (4), PREHISTORIC (5), HISTORIC (5)

Document No.: 1062796 Unpublished Report
MCKENNA, JEANETTE A.

1993 CULTURAL RESOURCES INVESTIGATIONS, SITE INVENTORY AND EVALUATIONS, THE CAJON PIPELINE CORRIDOR, LOS ANGELES AND SAN BERNARDINO COUNTIES. MCKENNA ET AL. SUBMITTED TO EIP ASSOCIATES. UNPUBLISHED REPORT ON FILE AT S.B. CO. MUSEUM, 2024 ORANGE TREE LANE, REDLANDS, CA 92374.

Last Update: 12/29/1993 Cataloged by: WRO-CA-03 on 12/29/1993
Keywords: ARCHAEOLOGICAL RECONNAISSANCE (1), POWER GENERATING SITE (1), ROAD (1), RAILROAD (1), WATER TRANSPORTATION SITE (1), RESIDENTIAL SITE (1), LITHIC QUARRY (1), LITHIC SCATTER (1), REFUSE DISPOSAL SITE (1), WATER STORAGE SITE (1), MINING SITE (1), CAMPSITE (1), HABITATION SITE (1), BRIDGE (1), POWER TRANSMISSION LINE (1), HEARTH (1), FOUNDATION (1), MONUMENT (1), FLAKED LITHICS (3), GLASS (3), TINNED CANS (3), METAL HARDWARE (3), CERAMICS (3), FAUNAL REMAINS (3), HAMMERSTONE (3), BIFACE (3), CHOPPER (3), BASALT (3), QUARTZITE (3), CHERT (3), JASPER (3), GRANITE (3), CHALCEDONY (3), 128.45 MILES (4), MOJAVE DESERT (4), CAJON CANYON (4), SAN BERNARDINO MOUNTAINS (4), SAN GABRIEL MOUNTAINS (4), TRANSVERSE RANGES (4), CA-SBR-6699H (4), CA-SBR-6810H (4), CA-SBR-6847H (4), CA-SBR-7095H (4), CA-SBR-2257/H (4), CA-SBR-4268H (4), CA-SBR-4271H (4), CA-SBR-4411H (4), CA-SBR-4418H (4), CA-SBR-5288 (4), CA-SBR-6509 (4), CA-SBR-6516 (4), CA-SBR-7084H (4), CA-SBR-7085 (4), CA-SBR-7086 (4), CA-SBR-7087 (4), CA-SBR-7088 (4), CA-SBR-7089 (4), CA-SBR-7090H (4), CA-SBR-7094H (4), CA-SBR-5361 (4), CA-SBR-5362 (4), CA-SBR-7076/H (4), CA-SBR-7077 (4), CA-SBR-7078 (4), CA-SBR-7079 (4), CA-SBR-7080 (4), CA-SBR-7081 (4), CA-SBR-7082 (4), CA-SBR-2910H (4), CA-SBR-4252H (4), CA-SBR-4253H (4), CA-SBR-4255H (4), CA-SBR-4272H (4), CA-SBR-5560 (4), CA-SBR-6793H (4), CA-SBR-7093H (4), CA-SBR-7282 (4), CA-SBR-7295H (4), CA-SBR-7294H (4), CA-SBR-7296H (4), CPHI-SBR-012 (4), CPHI-SBR-021 (4), PSBR-3H (4), CHL-577 (4), NRHP-E-OHP-2926 (4), PSBR-36H (4), P1333-12H (4), P1333-13H (4), USGS ADELANTO 7.5' QUAD (4), USGS ASTLEY RANCHO 7.5' QUAD (4), USGS BALDY MESA 7.5' QUAD (4), USGS CAJON 7.5' QUAD (4), USGS CUCAMONGA PEAK 7.5' QUAD (4), USGS DEVORE 7.5' QUAD (4), USGS GUASTI 7.5' QUAD (4), USGS KRAMER HILLS 7.5' QUAD (4), USGS KRAMER JUNCTION 7.5 (4), USGS ONTARIO 7.5' QUAD (4), USGS RED BUTTES 7.5' QUAD (4), USGS TWELVE GUAGE LAKE 7.5' QUAD (4), USGS VICTORVILLE NW 7.5' QUAD (4), USGS WILD CROSSING 7.5' QUAD (4), PREHISTORIC (5), HISTORIC (5)

Document No.: 1062853 Unpublished Report
FOSTER, JOHN M., JAMES J. SCHMIDT, CARMEN A. WEBER, GWENDOLYN R. ROMANI, AND ROBERTA S. GREENWOOD

1991 CULTURAL RESOURCE INVESTIGATION, INLAND FEEDER PROJECT, MWD OF SOUTHERN CA. GREENWOOD & ASSOCIATES. SUBMITTED TO P&D TECHNOLOGIES. UNPUBLISHED REPORT ON FILE AT S.B. CO. MUSEUM, 2024 ORANGE TREE LANE, REDLANDS, CA 92374.

Last Update: 04/20/1994 Cataloged by: WRO-CA-03 on 04/20/1994
Keywords: ARCHAEOLOGICAL RECONNAISSANCE REPORT (1), STRUCTURAL SITE (1),

FOUNDATIONS (1), BRIDGE (1), WALLS (1), WATER STORAGE SITE (1), WATER TRANSPORTATION SITE (1), REFUSE DISPOSAL SITE (1), DAIRY SITE (1), FENCE (1), CANAL (1), RESIDENTIAL SITE (1), FLUME (1), BEDROCK MORTARS (1), RANCHING SITE (1), ORCHARD (1), AGRICULTURAL SITE (1), RAILROAD SITE (1), WELL (1), CISTERN (1), POWER PLANT (1), CERAMICS (3), GLASS (3), METAL (3), WAGON (3), WOOD (3), SHELL (3), FAUNAL REMAINS (3), GLASS BOTTLE (3), POTTERY (3), CANS (3), BRICK (3), MANO (3), TINNED CANS (3), ADOBE (3), CONCRETE (3), 136 MILES (4), SAN BERNARDINO VALLEY (4), RIVERSIDE (4), INTERMONTANE VALLEY (4), USGS SAN BERNARDINO NORTH 7.5' QUAD (4), USGS DEVORE 7.5' QUAD (4), USGS FONTANA 7.5' QUAD (4), USGS SAN BERNARDINO SOUTH 7.5' QUAD (4), USGS REDLANDS 7.5' QUAD (4), USGS HARRISON 7.5' QUAD (4), USGS YUCAIPA 7.5' QUAD (4), CA-SBR-6086H (4), CA-SBR-6354H (4), CA-SBR-6847H (4), CA-SBR-6848H (4), CA-SBR-6849H (4), CA-SBR-6850H (4), CA-SBR-6851H (4), CA-SBR-6852H (4), CA-SBR-6853H (4), CA-SBR-6854H (4), CA-SBR-6855H (4), CA-SBR-6856H (4), CA-SBR-6857H (4), CA-SBR-6858H (4), CA-SBR-6859H (4), CA-SBR-6860H (4), CA-SBR-6861H (4), CA-SBR-6862H (4), CA-SBR-6863H (4), CA-SBR-6864H (4), CA-SBR-6865H (4), CA-SBR-6866H (4), CA-SBR-6867H (4), CA-SBR-6868H (4), CA-SBR-6869H (4), CA-SBR-6870H (4), CA-SBR-6871H (4), CA-SBR-6872H (4), CA-SBR-6940H (4), CA-SBR-7021H (4), CA-SBR-7050 (4), CA-SBR-7051H (4), CA-SBR-7053H (4), CA-SBR-7054H (4), CA-SBR-7055H (4), CA-SBR-7702H (4), P1074-35H (4), P1074-124H (4), P1063-5H (4), PSBR-20H (4), PREHISTORIC (5), HISTORIC (5), GABRIELINO (5), SERRANO (5), LUISENO (5)

Document No.: 1062881 Unpublished Report
DE BARROS, PHILIP AND CARMEN WEBER

1993 CULTURAL RESOURCES INVENTORY AND EVALUATION OF THE LYTLE CREEK HYDROELECTRIC PROJECT, FERC PROJECT #1932. CHAMBERS GROUP, INC. SUBMITTED TO SOUTHERN CALIFORNIA EDISON CO. UNPUBLISHED REPORT ON FILE AT S.B. CO. MUSEUM, 2024 ORANGE TREE LANE, REDLANDS, CA 92374.

Last Update: 10/06/1994 Cataloged by: WRO-CA-03 on 10/06/1994
Keywords: ARCHAEOLOGICAL RECONNAISSANCE REPORT (1), WATER TRANSMISSION SITE (1), POWER PLANT (1), DAM (1), FLUME (1), POWER TRANSMISSION LINE (1), TELEPHONE LINE (1), SAN GABRIEL MOUNTAINS (4), TRANSVERSE RANGES (4), CA-SBR-5515 (4), P1072-15H (4), P1072-14H (4), CA-SBR-5528H (4), PSBR-37H (4), CA-SBR-6699H (4), 640 ACRES (4), USGS DEVORE 7.5' QUAD (4), HISTORIC (5)

Document No.: 1063530 Unpublished Report
LOVE, BRUCE

2000 COMCAST CABLE FIBEROPTIC LINE, LYTLE CREEK, SBNF. 19PP. CRM TECH. SUBMITTED TO TIERRA MADRE CONSULTANTS. UNPUBLISHED REPORT ON FILE AT S.B. CO. MUSEUM, 2024 ORANGE TREE LANE, REDLANDS, CA 92374.

Last Update: 12/05/2001 Cataloged by: WRO-CA-03 on 12/05/2001
Keywords: ARCHAEOLOGICAL RECONNAISSANCE REPORT (1), HISTORIC (1), POWER TRANSMISSION LINES (1), WATER SYSTEM (1), AQUEDUCT (1), 3.3 MI (4), LYTLE CREEK (4), SAN GABRIEL MOUNTAINS (4), TRANSVERSE RANGES (4), CA-SBR-8857H (4), CA-SBR-7694H (4), CA-SBR-6699H (4), CA-SBR-5515 (4), P1072-22H (4), USGS DEVORE 7.5' QUAD (4)

Document No.: 1063536 Unpublished Report
HESS, AL

1978 LAND EXCHANGE--JOHN DUMOUCHELLE. 11PP. SBNF. SUBMITTED TO USFS.

CONTRACT NO. 05-12-CA-013. UNPUBLISHED REPORT ON FILE AT S.B. CO MUSEUM, 2024 ORANGE TREE LANE, REDLANDS, CA 92374.

Last Update: 12/05/2001 Cataloged by: WRO-CA-03 on 12/05/2001
Keywords: ARCHAEOLOGICAL RECONNAISSANCE REPORT (1), 34 ACRES (4), SAN BERNARDINO MOUNTAINS (4), TRANSVERSE RANGES (4), NO RESOURCES (4), USGS DEVORE 7.5' QUAD (4)

Document No.: 1063538 Unpublished Report
WHITE, LAURIE AND ROBERT S. WHITE

1995 CULTURAL RESOURCES INVESTIGATION FLRO THE 3000 +/- ACRE CITY OF RIALTO AIRPORT AREA SPECIFIC PLAN, NORTH RIALTO, CA. 29PP. ARCHAEOLOGICAL ASSOCIATES. SUBMITTED TO CITY OF RIALTO. UNPUBLISHED REPORT ON FILE AT S.B. CO. MUSEUM, 2024 ORANGE TREE LANE, REDLANDS, CA 92374.

Last Update: 12/06/2001 Cataloged by: WRO-CA-03 on 12/06/2001
Keywords: ARCHAEOLOGICAL RECONNAISSANCE REPORT (1), HISTORIC (1), PREHISTORIC (1), DITCH (1), RESIDENTIAL SITE (1), FOUNDATIONS (1), LANDSCAPING (1), CISTERN (1), REFUSE DISPOSAL SITE (1), RESERVOIR (1), TOWNSITE (1), ROAD (1), AIRPORT (1), STRUCTURAL SITE (1), BRICK (3), AXE HEAD (3), IRON STOVE DOOR (3), 3000 ACRES (4), SAN BERNARDINO VALLEY (4), INTERMONTANE VALLEY (4), CA-SBR-6110H (4), CA-SBR-6250H (4), CA-SBR-6780H (4), CA-SBR-6781H (4), CA-SBR-6329H (4), P1072-10H (4), PSBR-3H (4), CPHI-SBR-12 (4), USGS DEVORE 7.5' QUAD (4), USGS FONTANA 7.5' QUAD (4)

Document No.: 1063539 Unpublished Report
LOVE, BRUCE

1998 IDENTIFICATION AND EVALUATION OF HISTORIC PROPERTIES: SEBMENTS OF BAKERSFIELD-RIALTO FIBEROPTIC LINE WITHIN THE SBNF, SAN BERNARDINO COUNTY, CA. 43PP. TOM DODSON & ASSOCIATES. SUBMITTED TO SBNF. UNPUBLISHED REPORT ON FILE AT S.B. CO. MUSEUM, 2024 ORANGE TREE LANE, REDLANDS, CA 92374.

Last Update: 12/06/2001 Cataloged by: WRO-CA-03 on 12/06/2001
Keywords: ARCHAEOLOGICAL RECONNAISSANCE REPORT (1), PREHISTORIC (1), HISTORIC (1), FOOD PROCESSING SITE (1), ROAD (1), RAILROAD (1), BRIDE (1), REFUSE DISPOSAL SITE (1), DITCH (1), WALL (1), POWER TRANSMISSION LINE (1), MIDDEN (1), FLAKES (3), GROUND STONE (3), MANO (3), CORE (3), QUARTZITE (3), 14.5 MI (4), CAJON PASS (4), SAN BERNARDINO MOUNTAINS (4), TRANSVERSE RANGES (4), CHL-573 (4), CA-SBR-425/H (4), CA-SBR-2208 (4), CA-SBR-2670 (4), CA-SBR-2910H (4), CA-SBR-3680 (4), CA-SBR-4253H (4), CA-SBR-4272H (4), CA-SBR-6793H (4), CA-SBR-7093H (4), CA-SBR-7295H (4), CA-SBR-7294H (4), CA-SBR-8128H (4), CA-SBR-8129H (4), CA-SBR-8130H (4), CA-SBR-8131H (4), CA-SBR-8133H (4), USGS CAJON 7.5' QUAD (4), USGS DEVORE 7.5' QUAD (4)

Document No.: 1063541 Unpublished Report
BRECHBIEL, BRANT

1998 CULTURAL RESOURCES RECORDS SEACH AND SURVEY REPORT FOR A PACIFIC BELL MOBILE SERVICES TELECOMMUNICATIONS FACILITY: CM 032-01, NEAR RIALTO, CA. 5PP. CHAMBERS GROUP, INC. SUBMITTED TO PBMS. UNPUBLISHED REPORT ON FILE AT S.B. CO. MUSEUM, 2024 ORANGE TREE LANE, REDLANDS, CA 92374.

Last Update: 12/06/2001 Cataloged by: WRO-CA-03 on 12/06/2001
Keywords: ARCHAEOLOGICAL RECONNAISSANCE REPORT (1), 0.25 ACRES (4), SAN BERNARDINO MOUNTAINS (4), TRANSVERSE RANGES (4), NO RESOURCES (4), USGS DEVORE 7.5' QUAD (4)

Document No.: 1063543 Unpublished Report
BRECHBIEL, BRANT

1998 CULTURAL RESOURCES RECORD SEARCH & LITERATURE REVIEW FOR A PACIFIC BELL MOBILE SERVICES TELECOMMUNICATIONS FACILITY: CM 025-21, CITY OF RIALTO, CA. 4PP. CHAMBERS GROUP, INC. SUBMITTED TO PBMS. UNPUBLISHED REPORT ON FILE AT S.B. CO. MUSEUM, 2024 ORANGE TREE LANE, REDLANDS, CA 92374.

Last Update: 12/06/2001 Cataloged by: WRO-CA-03 on 12/06/2001
Keywords: LITERATURE REVIEW (1), 0.25 ACRES (4), SAN BERNARDINO VALLEY (4), INTERMONTANE VALLEY (4), NO SURVEY (4), USGS DEVORE 7.5' QUAD (4)

Document No.: 1063651 Unpublished Report
STRUDWICK, IVAN AND DEBORAH MCLEAN

1997 SECOND SUPPLEMENTAL HISTORIC PROPERTY SURVEY REPORT FOR THE PROPOSED SR 30 FREEWAY PROJECT, LOS ANGELES & SAN BERNARDINO COUNTIES, CA. 45PP. LSA. SUBMITTED TO CALTRANS. UNPUBLISHED REPORT ON FILE AT S.B. CO. MUSEUM, 2024 ORANGE TREE LANE, REDLANDS, CA 92374.

Last Update: 02/04/2004 Cataloged by: WRO-CA-03 on 02/04/2004
Keywords: ARCHAEOLOGICAL RECONNAISSANCE REPORT (1), HISTORIC (1), STANDING STRUCTURES (1), GLASS (3), CERAMICS (3), BUTTON, SHELL (3), BEAD, GLASS (3), GLASS JAR (3), PIPE STEM FRAGMENT (3), SHELL (3), NAILS (3), 800 ACRES (4), SAN BERNARDINO VALLEY (4), TRANSVERSE RANGES (4), CA-SBR-8866H (4), USGS SAN BERNARDINO NORTH 7.5' QUAD (4)

Document No.: 1064012 Unpublished Report
DUNDAL, MIRIAM

2002 HISTORICAL/ARCHAEOLOGICAL REPORT: WEST SAN BERNARDINO COUNTY WATER DISTRICT ZONES 6 & 7 RESERVOIR & WATERLINE IMPROVEMENTS & INSTALLATION IN & NEAR THE CITY OF FONTANA, SAN BERNARDINO COUNTY, CA. 21PP. CRM TECH. SUBMITTED TO SAN BERNARDINO COUNTY. UNPUBLISHED REPORT ON FILE AT S.B. CO. MUSEUM, 2024 ORANGE TREE LANE, REDLANDS, CA 92374.

Last Update: 07/18/2006 Cataloged by: WRO-CA-03 on 07/18/2006
Keywords: ARCHAEOLOGICAL RECONNAISSANCE REPORT (1), HISTORIC (1), POWER GENERATING SITE (1), IRRIGATION SYSTEM (1), TOWNSITE (1), ROAD (1), DITCH (1), 3.5 MILES (4), SAN BERNARDINO VALLEY (4), INTERMONTANE VALLEY (4), 36-006589/CA-SBR-6589H (4), 36-006699/CA-SBR-6699H (4), 36-015376 (4), PSBR-4H (4), P1072-40H (4), USGS DEVORE 7.5' QUAD (4)

Document No.: 1064013 Unpublished Report
DIETLER, SARA AND SHERRI GUST

2003 TERRA VISTA DRIVE ROADWAY EXTENSION PROJECT, CITY OF FONTANA, SAN BERNARDINO COUNTY, CA. 17PP. COGSTONE RESEARCH. SUBMITTED TO PARSONS, BRINKERHOFF, QUADE & DOUGLASS, INC. UNPUBLISHED REPORT ON FILE AT S.B.

CO. MUSEUM, 2024 ORANGE TREE LANE, REDLANDS, CA 92374.

Last Update: 07/18/2006 Cataloged by: WRO-CA-03 on 07/18/2006
Keywords: ARCHAEOLOGICAL RECONNAISSANCE REPORT (1), PALEONTOLOGICAL RECONNAISSANCE REPORT (1), HISTORIC (1), STRUCTURAL SITE (1), REFUSE DISPOSAL SITE (1), TROUGH (1), GLASS (3), JAR FRAGMENTS (3), BOTTLE BASE (3), CANS (3), 0.25 MILES (4), SAN BERNARDINO VALLEY (4), INTERMONTANE VALLEY (4), 36-010878/CA-SBR-10878H (4), USGS DEVORE 7.5' QUAD (4)

Document No.: 1064015 Unpublished Report
DUKE, CURT

2000 CULTURAL RESOURCE ASSESSMENT FOR AT&T WIRELESS FACILITY #C958.1, COUNTY OF SAN BERNARDINO, CA. 4PP. LSA. SUBMITTED TO AT&T. UNPUBLISHED REPORT ON FILE AT S.B. CO. MUSEUM, 2024 ORANGE TREE LANE, REDLANDS, CA 92374.

Last Update: 07/18/2006 Cataloged by: WRO-CA-03 on 07/18/2006
Keywords: ARCHAEOLOGICAL RECONNAISSANCE REPORT (1), 0.25 ACRES (4), SAN BERNARDINO VALLEY (4), INTERMONTANE VALLEY (4), LYTLE CREEK (4), NO RESOURCES (4), USGS DEVORE 7.5' QUAD (4)

PROPERTY NUMBER	PRIMARY #	STREET ADDRESS	NAMES	CITY NAME	OWN	YR C	DHP PROG	PRO-REFERENCE NUMBER	STAT DAT	NRV	CRIT
							HIST SURV	2373-0378 0000		580	
062055	36-017500	907 WASHINGTON ST		REDLANDS	P	1900	HIST SURV	2373-0377 0000		580	
062054	36-017501	908 WASHINGTON ST		REDLANDS	P	1900	HIST SURV	2373-0376-0000		580	
062053	36-017502	910 WASHINGTON ST		REDLANDS	P	1900	HIST SURV	2373-0375 0000		580	
062052	36-017503	911 WASHINGTON ST		REDLANDS	P	1895	HIST SURV	2373-0374 0000		580	
124713	36-019648	911 WASHINGTON ST	PROPERTY ACQUISITION AND REHABILITA	REDLANDS	M	1895	PROJ REVW	HUD0806059	08/15/90	6Z	
062051	36-017504	917 WASHINGTON ST		REDLANDS	P	1895	HIST SURV	2373-0373 0000		580	
062050	36-017505	922 WASHINGTON ST		REDLANDS	P	1895	HIST SURV	2373-0372 0000		580	
062049	36-017506	923 WASHINGTON ST		REDLANDS	P	1895	HIST SURV	2373-0371-0000		580	
062048	36-017507	926 WASHINGTON ST		REDLANDS	P	1895	HIST SURV	2373-0370 0000		580	
062047	36-017508	927 WASHINGTON ST		REDLANDS	P	1895	HIST SURV	2373-0369 0000		580	
062046	36-017509	929 WASHINGTON ST		REDLANDS	P	1900	HIST SURV	2373-0368 0000		580	
062045	36-017510	937 WASHINGTON ST		REDLANDS	P	1900	HIST SURV	2373-0367 0000		580	
062044	36-017511	940 WASHINGTON ST		REDLANDS	P	1900	HIST SURV	2373-0366-0000		580	
062043	36-017512	1101 WASHINGTON ST		REDLANDS	P	1895	HIST SURV	2373-0365-0000		580	
062042	36-017513	1101 WASHINGTON ST		REDLANDS	P	1920	HIST SURV	2373-0364 0000		580	
062041	36-017514	1102 WASHINGTON ST		REDLANDS	P	1895	HIST SURV	2373-0363 0000		580	
062040	36-017515	1107 WASHINGTON ST		REDLANDS	P	1900	HIST SURV	2373-0362 0000		580	
062039	36-017516	1108 WASHINGTON ST		REDLANDS	P	1920	HIST SURV	2373-0361 0000		580	
062038	36-017517	1114 WASHINGTON ST		REDLANDS	P	1895	HIST SURV	2373-0360 0000		580	
062037	36-017518	1115 WASHINGTON ST		REDLANDS	P	1915	HIST SURV	2373-0359-0000		580	
062036	36-017519	1117 WASHINGTON ST		REDLANDS	P	1910	HIST SURV	2373-0358 0000		580	
062035	36-017520	1118 WASHINGTON ST		REDLANDS	P	1900	HIST SURV	2373-0357 0000		580	
062034	36-017521	1121 WASHINGTON ST		REDLANDS	P	1920	HIST SURV	2373-0356 0000		580	
062033	36-017522	1122 WASHINGTON ST		REDLANDS	P	1900	HIST SURV	2373 0355 0000		580	
062032	36-017523	1126 WASHINGTON ST		REDLANDS	P	1920	HIST SURV	2373-0354-0000		580	
062031	36-017524	1127 WASHINGTON ST		REDLANDS	P	1920	HIST SURV	2373 0353-0000		580	
062030	36-017525	1131 WASHINGTON ST		REDLANDS	P	1910	HIST SURV	2373 0352 0000		580	
062029	36-017526	1136 WASHINGTON ST		REDLANDS	P	1915	HIST SURV	2373 0351 0000		580	
062028	36-017527	1140 WASHINGTON ST		REDLANDS	P	1915	HIST SURV	2373-0350 0000		580	
062027	36-017528	1141 WASHINGTON ST		REDLANDS	P	1900	HIST SURV	2373-0349 0000		580	
062026	36-017529	1144 WASHINGTON ST		REDLANDS	P	1900	HIST SURV	2373 0348 0000		580	
062025	36-017530	1145 WASHINGTON ST		REDLANDS	P	1900	HIST SURV	2373 0347-0000		580	
062024	36-017531	1155 WASHINGTON ST		REDLANDS	P	1925	HIST SURV	2373-0346-0000		580	
062023	36-017532	1211 WASHINGTON ST		REDLANDS	P	1900	HIST SURV	2373 0345-0000		580	
139165		837 WEBSTER ST		REDLANDS	P	1901	HIST RES.	DOE 36-03-0015 0000	03/26/03	6Y	
							PROJ REVW	HUD0503190	03/26/03	6Y	
010009	36-017513		MOUND CITY (IOWA LINDA	VIC) REDLANDS	U		HIST RES.	SBHI-SBR 013	01/31/71	7L	
062030	36-017534	26930 BARTON RD	SAN BERNARDINO ASISTENCIA	VIC) REDLANDS	S	1927	ST FND PRG	619.5 HP 88 36 012	12/30/88	1	
							ST FND PRG	619.8-84-HP-36-013	10/02/86	3	
							HIST SURV.	2373 0456 9999		3S	
							HIST RES	SHL-0042-0001	08/01/82	7L	
062124	36-017535	27297 BARTON RD	MARSHALL HOUSE	(VIC) REDLANDS	U	0000	HIST SURV.	2373 0449-0000	01/01/78	3S	
062126	36-017536	SP 10	BP #54-340	(VIC) REDLANDS	S	1916	HIST SURV.	2373 0451-0000		7	
062127	36-017537	SP 10	BP #54 342	(VIC) REDLANDS	S	1912	HIST SURV	2373 0452 0000		7	
107469	36-017537	114 E 3RD ST	ROSCOE WATTS HOME	RIALTO	P	1913	HIST SURV	2376 0027 0000	04/01/97	4Z	7
107470	36-017540	128 E 3RD ST		RIALTO	P	1914	HIST SURV.	2376 0028 0000	04/21/97	4L	
107338	36-017538	404 E ETIWANDA AVE		RIALTO	P		HIST SURV	2376 0020-0000	04/14/97	7M1	A
107332	36-017539	195 E FOOTHILL BLVD		RIALTO	P	1911	HIST SURV	2376-0022 0000	04/14/97	7M1	7B
183024		446 E FOOTHILL BLVD		RIALTO	P	1948	PROJ REVW	HUD041/302	01/05/05	6Y	
107342	36-017540	408 E MERRILL AVE		RIALTO	P	1892	HIST SURV	2376 0032 0001	04/14/97	7M1	7
152580		1391 MERRILL AVE	ALBA (ORANGE LA 392 SOUTH Cedar AVEN	RIALTO	P	1930	HIST RES.	DOE 36 04 0028 0000	11/03/04	6Z	
							PROJ REVW	FCC040706M	11/09/04	6Y	

PROPERTY NUMBER	PRIMARY #	STREET ADDRESS	NAMES	CITY NAME	OWN	YR-CT	CHR-PROG	PRG-REFERENCE NUMBER	STAT-DATE	VRS	[illegible]
087779	36-017546	730 N ACACIA AVE		RIALTO	P	1921	HIST.SURV	2376-0002-0000	05/07/94	5S2	
087778	36-017548	760 N ACACIA AVE		RIALTO	D	1914	HIST.SURV	2376-0003-0000	05/01/94	7N1	
087779	36-017549	100 N DATE AVE		RIALTO	P	1910	HIST.SURV	2376-0005-0000	04/01/94	7N	
087780	36-017550	209 N DATE AVE		RIALTO	P	1911	HIST.SURV	2376-0007-0010	04/21/97	5D	
							HIST.SURV	2376-0030-0000	01/07/98	7N	
107450	36-017547	210 N DATE AVE		RIALTO	P	1914	HIST.SURV	2376-0037-0017	04/21/97	5D	
107451	36-017548	215 N DATE AVE		RIALTO	P	1938	HIST.SURV	2376-0037-0018	04/21/97	5D	
107452	36-017549	231 N DATE AVE		RIALTO	P	1926	HIST.SURV	2376-0037-0019	04/21/97	5D	
107461	36-017550	232 N DATE AVE		RIALTO	P	1924	HIST.SURV	2376-0037-0020	04/21/97	5D	
107462	36-017551	234 N DATE AVE	MEDUSE WOOD HOME	RIALTO	P	1918	HIST.SURV	2376-0037-0021	04/21/97	5D	
107463	36-017552	238 N DATE AVE		RIALTO	P	1904	HIST.SURV	2376-0037-0022	04/21/97	5D	
107464	36-017553	240 N DATE AVE		RIALTO	P	1921	HIST.SURV	2376-0037-0023	04/21/97	5D	
107465	36-017554	242 N DATE AVE	MAGILL HOUSE	RIALTO	P	1895	HIST.SURV	2376-0037-0024	04/21/97	5D	
107464	36-017555	300 N DATE AVE	ADAIR HOME	RIALTO	P	1935	HIST.SURV	2376-0037-0025	04/21/97	5D	
107411	36-017556	340 N DATE AVE	VIRGIL JOY HOME	RIALTO	P	1910	HIST.SURV	2376-0008-0000	04/14/97	5L	
107413	36-017557	408 N DATE AVE		RIALTO	P	1926	HIST.SURV	2376-0009-0000	04/14/97	5L	
107414	36-017558	410 N DATE AVE		RIALTO	P	1929	HIST.SURV	2376-0010-0000	04/14/97	5L	
107415	36-017559	1195 N EUCALYPTUS AVE		RIALTO	P	1930	HIST.SURV	2376-0021-0000	04/14/97	7N1	
107444	36-017560	100 N LILAC AVE	THE HOUSE	RIALTO	N	1899	HIST.SURV	2376-0028-0000	04/15/97	7N1	
107444	36-017561	950 N LILAC AVE		RIALTO	P	1929	HIST.SURV	2376-0029-0000	04/15/97	5L	
107447	36-017562	174 N MAGNOLIA AVE		RIALTO	P	1930	HIST.SURV	2376-0031-0000	04/15/97	5L	
107462	36-017563	N OLIVE AVE	NORTH OLIVE/DATE HISTORIC DISTRICT	RIALTO	P	1905	HIST.SURV	2376-0037-9999	04/16/97	5D	
107312	36-017564	103 N OLIVE AVE	RIALTO CONGREGATIONAL CHURCH	RIALTO	P	1892	HIST.SURV	2376-0034-0000	04/15/97	5S	A
107351	36-017565	104 N OLIVE AVE		RIALTO	P	1905	HIST.SURV	2376-0035-0000	04/15/97	5S2	
107450	36-017566	108 N OLIVE AVE		RIALTO	P	1910	HIST.SURV	2376-0035-0000	04/15/97	7N1	
107415	36-017567	144 N OLIVE AVE		RIALTO	P	1906	HIST.SURV	2376-0037-0001	04/16/97	5D	
107417	36-017568	200 N OLIVE AVE		RIALTO	P	1912	HIST.SURV	2376-0037-0002	04/16/97	5D	
107418	36-017569	204 N OLIVE AVE		RIALTO	P	1915	HIST.SURV	2376-0037-0003	04/16/97	5L	
107419	36-017570	204 N OLIVE AVE		RIALTO	P	1911	HIST.SURV	2376-0037-0004	04/16/97	5D	
107420	36-017571	210 N OLIVE AVE		RIALTO	P	1912	HIST.SURV	2376-0037-0007	04/16/97	5D	
107420	36-017572	216 N OLIVE AVE	CONNOR HOUSE	RIALTO	P	1912	HIST.SURV	2376-0037-0005	04/16/97	5D	
107421	36-017573	217 N OLIVE AVE	MOHLE HOUSE	RIALTO	P	1914	HIST.SURV	2376-0037-0006	04/16/97	5D	
107422	36-017574	220 N OLIVE AVE		RIALTO	P	1914	HIST.SURV	2376-0037-0008	04/16/97	5L	
107423	36-017575	221 N OLIVE AVE	JOSEPH MOAT HOUSE	RIALTO	P	1912	HIST.SURV	2376-0037-0009	04/16/97	5D	
107425	36-017576	224 N OLIVE AVE		RIALTO	P	1914	HIST.SURV	2376-0037-0010	04/16/97	5D	
107426	36-017577	227 N OLIVE AVE		RIALTO	P	1921	HIST.SURV	2376-0037-0011	04/16/97	5D	
107450	36-017578	229 N OLIVE AVE		RIALTO	P	1922	HIST.SURV	2376-0037-0012	04/21/97	5D	
107451	36-017579	230 N OLIVE AVE	SHEARER HOUSE	RIALTO	P	1923	HIST.SURV	2376-0037-0013	04/21/97	5D	
107452	36-017580	237 N OLIVE AVE	WILLIAM BEEDHAM HOUSE	RIALTO	P	1912	HIST.SURV	2376-0037-0014	04/21/97	5D	
107456	36-017581	238 N OLIVE AVE	CANADY MYERS HOUSE	RIALTO	P	1915	HIST.SURV	2376-0037-0015	04/21/97	5D	
107416	36-017582	300 N OLIVE AVE	VAN VLIET HOUSE	RIALTO	P	1909	HIST.SURV	2376-0011-0000	04/14/97	5L	
107417	36-017583	301 N OLIVE AVE	JOE PERRICH HOUSE	RIALTO	P	1931	HIST.SURV	2376-0012-0000	04/14/97	5L	
107418	36-017584	316 N OLIVE AVE	LINNSBURY HOUSE	RIALTO	P	1923	HIST.SURV	2376-0013-0000	04/14/97	5S2	
107419	36-017585	344 N OLIVE AVE	MC DONALD-MILLIGAN HOUSE	RIALTO	P	1923	HIST.SURV	2376-0014-0000	04/14/97	5L	
107420	36-017586	350 N OLIVE AVE	CROWDER HOUSE	RIALTO	P	1922	HIST.SURV	2376-0015-0000	04/14/97	5L	
107483	36-017587	104 N ORANGE AVE		RIALTO	P	1909	HIST.SURV	2376-0048-0000	04/21/97	5L	
107484	36-017588	112 N ORANGE AVE		RIALTO	P	1907	HIST.SURV	2376-0049-0000	04/21/97	5L	
107485	36-017589	131 N ORANGE AVE		RIALTO	P	1907	HIST.SURV	2376-0050-0000	04/21/97	5L	
107486	36-017590	146 N ORANGE AVE		RIALTO	P	1885	HIST.SURV	2376-0051-0000	04/21/97	7N1	5A
107487	36-017591	164 N ORANGE AVE		RIALTO	P	1905	HIST.SURV	2376-0052-0000	04/21/97	5S2	
107497	36-017592	103 N PALM AVE		RIALTO	P	1914	HIST.SURV	2376-0085-0000	04/21/97	5L	
107437	36-017593	119 N RIVERSIDE AVE	SOUTHERN ELECTRIC PLANT	RIALTO	P	1915	HIST.SURV	2376-0059-0000	04/21/97	5S	A
107438	36-017594	120 N RIVERSIDE AVE		RIALTO	P	1919	HIST.SURV	2376-0041-0000	04/22/97	7N	
107439	36-017595	127 N RIVERSIDE AVE		RIALTO	P	1923	HIST.SURV	2376-0042-0000	04/22/97	5D	
107441	36-017596	129 N RIVERSIDE AVE		RIALTO	P	1915	HIST.SURV	2376-0043-0000	04/22/97	5D	
107442	36-017597	133 N RIVERSIDE AVE		RIALTO	P	1921	HIST.SURV	2376-0044-0000	04/22/97	5D	

PROPERTY NUMBER	PRIMARY #	STREET ADDRESS	NAMES	CITY NAME	OWN	YR-C	OHP PROJ	REG-REFERENCE-NUMBER	STAT DAT	NRS	[illegible]
107501	36-017698	146 N RIVERSIDE AVE		RIALTO	P	1905	HIST SURV.	2376-0065-0000	04/22/97	6L	C
107504	36-017699	149 N RIVERSIDE AVE		RIALTO	P	1906	HIST SURV	2376-0066-0000	04/22/97	6D	C
107508	36-017700	140 N RIVERSIDE AVE		RIALTO	P	1925	HIST SURV	2376-0067-0000	04/22/97	6L	C
107509	36-017701	201 N RIVERSIDE AVE	RIALTO FIRST CHRISTIAN CHURCH	RIALTO	M	1907	HIST REG	NPS-01000037-0000	02/20/02	1S	C
							NAT.REG	16-0007	09/05/02	7S	C
							HIST SURV	2376-0067-0000	04/22/97	1S	C
107507	36-017702	205 N RIVERSIDE AVE		RIALTO	P	1905	HIST.SURV	2376-0068-0000	04/22/97	6S2	C
107509	36-017703	215 N RIVERSIDE AVE		RIALTO	P	1999	HIST.SURV	2376-0069-0000	04/22/97	3S	CA
107510	36-017704	219 N RIVERSIDE AVE	WOMAN'S CLUB	RIALTO	P	1925	HIST.SURV	2376-0070-0000	04/22/97	5S	A
107511	36-017705	229 N RIVERSIDE AVE	LOCKWOOD HOUSE	RIALTO	P	1909	HIST.SURV	2376-0071-0000	04/22/97	5S2	C
107511	36-017706	302 N RIVERSIDE AVE		RIALTO	P	1909	HIST.SURV	2376-0072-0000	04/22/97	7N1	A
107514	36-017707	320 N RIVERSIDE AVE	WELBORN HOUSE	RIALTO	P	1908	HIST.SURV	2376-0073-0000	04/22/97	5S	CB
107515	36-017708	325 N RIVERSIDE AVE		RIALTO	P	1922	HIST.SURV.	2376-0074-0000	04/22/97	5S2	C
107519	36-017709	420 N RIVERSIDE AVE	W.R. POUTS RESIDENCE	RIALTO	P	1931	HIST.SURV	2376-0075-0000	04/22/97	7N1	CB
107519	36-017710	340 N RIVERSIDE AVE	MACRAE HOUSE	RIALTO	P	1915	HIST.SURV	2376-0076-0000	04/22/97	3S	C
107519	36-017711	350 N RIVERSIDE AVE		RIALTO	P	1911	HIST.SURV.	2376-0077-0000	04/22/97	7N1	C
107521	36-017712	432 N RIVERSIDE AVE		RIALTO	P	1930	HIST.SURV	2376-0078-0000	04/22/97	5S2	C
107522	36-017713	440 N RIVERSIDE AVE		RIALTO	P	1920	HIST.SURV	2376-0079-0000	04/22/97	6S	
107522	36-017714	455 N RIVERSIDE AVE		RIALTO	P	1910	HIST.SURV	2376-0080-0000	04/22/97	7N1	CA
107525	36-017715	1500 N RIVERSIDE AVE	FONTANA POWER HOUSE	RIALTO	P	1927	HIST.SURV	2376-0081-0000	04/22/97	3S	AT
107541	36-017716	1105 N SYCAMORE AVE		RIALTO	C	1917	HIST.SURV	2376-0090-0000	04/22/97	5S4	C
107541	36-017717	516 N WILLOW AVE		RIALTO	P	1885	HIST.SURV.	2376-0092-0000	04/22/97	6S	C
107546	36-017718	741 N WILLOW AVE	WILLIAM BRILL HOUSE	RIALTO	P	1885	HIST.SURV	2376-0093-0000	04/22/97	3S	CB
080747	36-017719	554 S CACTUS AVE	V. S. COOLEY RANCH	RIALTO	P	1852	HIST.SURV.	2376-0001-0000	03/15/96	7N1	
107727	36-017721	798 S CACTUS AVE		RIALTO	P	1912	HIST.SURV.	2376-0004-0000	07/27/96	7N1	A
107726	36-017722	105 S DATE AVE	JAMES MASON HOUSE	RIALTO	P	1898	HIST.SURV	2376-0016-0000	04/14/97	6N1	C
107727	36-017723	134 S DATE AVE		RIALTO	P	1914	HIST.SURV.	2376-0017-0000	04/14/97	6L	C
107728	36-017724	138 S DATE AVE	DAVID MANUEL HOUSE	RIALTO	P	1911	HIST.SURV	2376-0018-0000	04/14/97	7N1	AC
107729	36-017725	146 S DATE AVE		RIALTO	P	1918	HIST.SURV	2376-0019-0000	04/14/97	6L	C
107345	36-017726	443 S LILAC AVE	TIBBETT HOUSE / SCHULTZBURG HOUSE	RIALTO	P	1914	HIST.SURV	2376-0020-0000	04/15/97	6L	C
107482	36-017727	106 S OLIVE AVE		RIALTO	P	1899	HIST.SURV	2376-0039-0000	04/21/97	7N1	CB
107471	36-017728	109 S OLIVE AVE	MILES BOARDINGHOUSE	RIALTO	P	1915	HIST.SURV	2376-0040-0000	04/21/97	7N1	C
107472	36-017729	114 S OLIVE AVE		RIALTO	P	1909	HIST.SURV.	2376-0041-0000	04/21/97	6L	C
107474	36-017730	124 S OLIVE AVE		RIALTO	P	1916	HIST.SURV	2376-0042-0000	04/21/97	6L	C
107475	36-017731	126 S OLIVE AVE		RIALTO	P	1908	HIST.SURV	2376-0043-0000	04/21/97	6L	C
107476	36-017732	207 S OLIVE AVE	LUCKY ROW	RIALTO	P	1912	HIST.SURV	2376-0044-0000	04/21/97	7N	A
107477	36-017733	211 S OLIVE AVE	LUCKY ROW	RIALTO	P	1910	HIST.SURV.	2376-0045-0000	04/21/97	7N	A
107481	36-017734	219 S OLIVE AVE	LUCKY ROW	RIALTO	P	1910	HIST.SURV.	2376-0046-0000	04/21/97	7N	A
107484	36-017735	119 S ORANGE AVE		RIALTO	P	1907	HIST.SURV	2376-0053-0000	04/21/97	6L	C
107491	36-017736	120 S ORANGE AVE		RIALTO	P	1906	HIST.SURV	2376-0054-0000	04/21/97	5S2	C
107492	36-017737	124 S ORANGE AVE	WARREN FRISBIE HOUSE	RIALTO	P	1916	HIST.SURV.	2376-0055-0000	04/21/97	7N1	CB
107530	36-017738	123 S RIVERSIDE AVE	RIALTO MATTRESS BARGAIN STORE	RIALTO	P	1914	HIST.SURV.	2376-0082-0000	04/22/97	5S2	A
107531	36-017739	131 S RIVERSIDE AVE		RIALTO	P	1923	HIST.SURV	2376-0083-0000	04/22/97	5S2	A
107534	36-017740	139 S RIVERSIDE AVE	DESIGNER PAINTS	RIALTO	P	1928	HIST.SURV.	2376-0084-0000	04/22/97	6L	A
107534	36-017741	139 S RIVERSIDE AVE	RIALTO JOINS	RIALTO	P	1895	HIST.SURV	2376-0085-0000	04/22/97	7N1	A
107536	36-017742	142 S RIVERSIDE AVE		RIALTO	P	1929	HIST.SURV.	2376-0086-0000	04/22/97	3S	AC
107537	36-017743	228 S RIVERSIDE AVE		RIALTO	P	1895	HIST.SURV	2376-0087-0000	04/22/97	7N1	A
1.0862		1500 S RIVERSIDE AVE		RIALTO	M		HIST.RES	DOE 10 24-0014-0000	07/15/94	6Z	
							PROJ.REVW.	PCU0103810	05/15/03	6Z	
107542	36-017744	115 S SYCAMORE AVE	VAN FRANK HOUSE	RIALTO	P	1898	HIST.SURV	2376-0091-0000	04/22/97	5S	ABC
107544	36-017754	134 W 2ND ST		RIALTO	P	1885	HIST.SURV	2376-0088-0000	04/22/97	5S2	B
107546	36-017745	142 W FOOTHILL BLVD	LAUTERBURN HOUSE	RIALTO	P	1902	HIST.SURV	2376-0021-0000	04/14/97	6L	C
107551	36-017746	1134 W FOOTHILL BLVD		RIALTO	P	1929	HIST.SURV.	2376-0024-0000	04/14/97	5S2	A
107554	36-017747	1234 W FOOTHILL BLVD	KENDUCK U IN MODEL	RIALTO	P	1929	HIST.SURV	2376-0025-0000	04/14/97	5S2	A
107557	36-017749	1338 W FOOTHILL BLVD		RIALTO	P	1928	HIST.SURV	2376-0026-0000	04/14/97	6S2	A
107560	36-017749	1368 W FOOTHILL BLVD		RIALTO	P	1928	HIST.SURV	2376-0027-0000	04/15/97	5S2	C

OFFICE OF HISTORIC PRESERVATION * * * Directory of Properties in the Historic Property Data File for SAN BERNARDINO County. Page 110 03/17/98

PROPERTY NUMBER	PRIMARY #	STREET ADDRESS	NAMES	CITY NAME	OWN	YR-C	OHP-PROG	PRG-REFERENCE-NUMBER	STAT-DAT	NRS	CRIT
[illegible]	36-017650	1410 W MERRILL AVE		RIALTO	P	1927	HIST.SURV	2876 0033 0000	04/13/97	5S2	A2
107496	36-017651	320 W RANDALL AVE		RIALTO	P	1914	HIST.SURV	2876 0058 0000	04/21/97	5S2	3
107494	36-017652	1294 W RANDALL AVE		RIALTO	P	1932	HIST.SURV	2876 0057 0000	04/21/97	6Z	3
000436	36-017654	SR 18	DALBY HILL ROAD MONUMENT	VIC: RIM FORREST	S	1870	HIST.RES	SHL-1979 0000	05/17/87	7L	
126621			"ON THE WINGS OF EAGLES" SCULPTURE	SAN BERNARDINO	C	1984	HIST.RES	NPS-97001632-0015	01/12/98	6Y	
126610			CARVED SANDSTONE FINIAL #1 FROM 19	SAN BERNARDINO	C	1893	HIST.RES	NPS-97001632-0004	01/12/98	1D	3A
126611			CARVED SANDSTONE FINIAL #2 FROM 19	SAN BERNARDINO	C	1893	HIST.RES	NPS-97001632-0005	01/12/98	1D	A2
126616			CHARLES RICH AND AMASA LYMAN MEMOR	SAN BERNARDINO	C	1912	HIST.RES	NPS-97001632-0008	01/12/98	1D	A2
126662	36-019643		ATTWS COMMUNICATIONS FACILITIES SI	SAN BERNARDINO	P		PROJ.REVW	PCC000[illegible]	08/24/00	5Y	
126624			FRANKLIN D. ROOSEVELT CIVILIAN CON	SAN BERNARDINO	C	1993	HIST.RES	NPS-97001632-0014	01/12/98	6X	
126620			CRIME VICTIMS MEMORIAL	SAN BERNARDINO	C		HIST.RES.	NPS-97001632-0019	01/12/98	6Y	
126623			WILL C. COLLETT PLAQUE	SAN BERNARDINO	C	1964	HIST.RES.	NPS-97001632-0015	01/12/98	6X	
126622			JEDEDIAH SMITH MEMORIAL PLAQUE	SAN BERNARDINO	C	1951	HIST.RES.	NPS-97001632-0016	01/12/98	6X	
126621			PIONEER MOTHERS MEMORIAL SUNDIAL	SAN BERNARDINO	C	1967	HIST.RES	NPS-97001632-0014	01/12/98	6X	
126617			FOUNTAIN	SAN BERNARDINO	C	1959	HIST.RES	NPS-97001632.0012	01/12/98	6X	
12851			STORAGE VAULTS	SAN BERNARDINO	C	1919	HIST.RES.	NPS-97001632.0009	01/12/98	6Y	
126614			CENTRAL HEATING PLANT / CENTRAL PL	SAN BERNARDINO	C	1940	HIST.RES	NPS-97001632-0001	01/12/98	1D	A2
126613			"C-WING" ADDITION / SAN BERNARDINO	SAN BERNARDINO	C	1958	HIST.RES.	NPS-97001632-0010	01/12/98	6X	
126615			ALBERT GLENN KENDALL MEMORIAL FOUN	SAN BERNARDINO	C	1939	HIST.RES.	NPS-97001632-0006	01/12/98	1D	3A
126613			NATIVE DAUGHTERS OF THE GOLDEN WES	SAN BERNARDINO	C	1940	HIST.RES	NPS-97001632-0007	01/12/98	1D	A2
126612			FOUNTAIN	SAN BERNARDINO	C		HIST.RES.	NPS-97001632.0011	01/12/98	6X	
069346	36-017652		KRAMER	SAN BERNARDINO	U		HIST.RES.	DOE 36-89-0003.0000	07/20/83	6Y	
							PROJ.REVW	BLM890718A	07/25/89	6Y	
124706	36-017672	168 13TH ST	PROPERTY ACQUISITION AND REHABILIT	SAN BERNARDINO	M	1949	PROJ.REVW.	HUD000605A2	06/15/00	6Y	
124701	36-019656	1015 13TH ST	PROPERTY ACQUISITION AND REHABILIT	SAN BERNARDINO	M	1932	PROJ.REVW	HUD000605A0	06/15/00	6Y	
124704	36-019655	1150 13TH ST	PROPERTY ACQUISITION AND REHABILIT	SAN BERNARDINO	M	1937	PROJ.REVW	HUD000605A0	06/15/00	6Y	
124703	36-019656	449 13TH ST W	PROPERTY ACQUISITION AND REHABILIT	SAN BERNARDINO	M	1945	PROJ.REVW	HUD000605AM	06/15/00	6Y	
124701	36-019654	432 14TH ST W	PROPERTY ACQUISITION AND REHABILIT	SAN BERNARDINO	M	1913	PROJ.REVW.	HUD000605AK	06/15/00	6Y	
124704	36-017680	627 14TH ST W	PROPERTY ACQUISITION AND REHABILIT	SAN BERNARDINO	M	1937	PROJ.REVW	HUD000605A2	06/15/00	6Y	
124703	36-019657	830 14TH ST W	PROPERTY ACQUISITION AND REHABILIT	SAN BERNARDINO	M	1936	PROJ.REVW	HUD000605AN	06/15/00	6Y	
124702	36-019665	1264 14TH ST W	PROPERTY ACQUISITION AND REHABILIT	SAN BERNARDINO	M	1945	PROJ.REVW	HUD000605A1	06/15/00	6Y	
124704	36-019652	1334 18TH ST W	PROPERTY ACQUISITION AND REHABILIT	SAN BERNARDINO	M	1930	PROJ.REVW.	HUD000605B	06/15/00	6Y	
077334	36-017496	0000 ST	4000 STREET HISTORIC DISTRICT	SAN BERNARDINO	D	1920	HIST.RES	SPHI.SBR.119	08/21/82	7L	
							ST.PT.INT	36.0015	06/24/92	7L	
000344	36-017677	3RD ST	DAUGHTERS OF UTAH PIONEERS PLAQUE	SAN BERNARDINO	M	1964	HIST.RES.	NPS-97001632-0018	01/12/98	6X	
							HIST.SURV.	2401 0003 0000		7	
000000	36-017678	3TH ST	BELLA UNION HOTEL SITE	SAN BERNARDINO	P	1857	HIST.RES	SPHI.SBR.[illegible]	03/31/77	7L	
031040	36-017660	4TH ST	JEDEDIAH SMITH MONUMENT	SAN BERNARDINO	U		HIST.RES.	SPHI-SBR.061	08/07/75	7L	
031045	36-017653	4TH ST	MORMON STOCKADE SITE	SAN BERNARDINO	D	1854	HIST.RES	SPHI-SBR.062	08/07/75	7L	
019395	36-017651	0000 4TH ST	ATWOOD ADOBE SITE	SAN BERNARDINO	U		HIST.RES	SPHI-SBR.006	04/25/74	7L	
031007	36-017664	5TH ST	MARTIN ADOBE SITE	SAN BERNARDINO	B	1857	HIST.RES	SPHI-SBR.121	07/01/87	7L	
[illegible]	36-017662	5TH ST	CONFEDERATE ATTACK MARKER SITE	SAN BERNARDINO	U		HIST.RES	SPHI.SBR.087	08/07/75	7L	
031011	36-017664	7TH ST	PIONEER CEMETERY	SAN BERNARDINO	M	1851	HIST.RES.	SPHI-SBR-024	01/31/75	7L	
031022	36-017665	9TH ST	STUDGES AUDITORIUM	SAN BERNARDINO	U	1927	HIST.RES	SPHI.SBR.100	01/14/84	7L	
031031	36-017666	8TH ST	HOME OF ETERNITY CEMETERY (W. LOMP	SAN BERNARDINO	P		HIST.RES	SPHI-SBR.044	01/30/75	7L	
124707	36-019670	1448 9TH ST W	PROPERTY ACQUISITION AND REHABILIT	SAN BERNARDINO	M	1944	PROJ.REVW	HUD000605AX	06/15/00	6Y	
112543	36-017671	1[illegible] ALDER ST		SAN BERNARDINO	P	1941	HIST.RES	DOE 36-97-0004.0000	10/07/97	A2	
							PROJ.REVW	HUD970903A2	12/07/97	5Y	
120617	36-017668	1174 AMOS AVE		SAN BERNARDINO	P	1938	HIST.RES	DOE-46-95-0000.0000	11/17/95	6Z	
							PROJ.REVW	FHWA950905A	08/17/95	A2	
[illegible]	36-017669	ARROWHEAD AVE	PIONEER MONUMENT	SAN BERNARDINO	U	1965	HIST.RES	SPHI-SBR.064	08/07/75	7L	
000013	36-017670	ARROWHEAD AVE	MORMON STOCKADE SITE	SAN BERNARDINO	M	1851	HIST.RES.	SHL-0043 0000	08/31/53	7L	
121747	36-[illegible]	1307 ARROWHEAD AVE N	PROPERTY ACQUISITION AND REHABILIT	SAN BERNARDINO	M	1926	PROJ.REVW	HUD000605B2	06/15/00	6Y	

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APPENDIX C: NAHC SACRED LAND SEARCH RESULTS AND NATIVE AMERICAN CONTACT LIST

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STATE OF CALIFORNIA Arnold Schwarzenegger, Governor

NATIVE AMERICAN HERITAGE COMMISSION
915 CAPITOL MALL, ROOM 364
SACRAMENTO, CA 95814
(916) 653-6251
Fax (916) 657-5390
Web Site www.nahc.ca.gov
e-mail: ds_nahc@pacbell.net

March 19, 2007

Ms. Amy M. Holmes, RPA, Senior Archaeologist
PCR SERVICES CORPORATION
One Venture, Suite 150
Irvine, CA 92618

Sent by FAX to: 949-753-7002
Number of pages: 2

Re: Cultural Resource Identification Study/Sacred Lands File Search for Proposed **Lytle Creek Ranch Specific Plan Amendment Project**; City of Devore; San Bernardino County, California

Dear Ms. ~~Holmes~~: Amy

The Native American Heritage Commission was able to perform a record search of its Sacred Lands File (SLF) for the affected project area. The SLF failed to indicate the presence of Native American cultural resources in the immediate project area. The absence of specific site information in the Sacred Lands File does not guarantee the absence of cultural resources in any 'area of potential effect (APE).'

Early consultation with Native American tribes in your area is the best way to avoid unanticipated discoveries once a project is underway. Enclosed are the nearest tribes that may have knowledge of cultural resources in the project area. A List of Native American contacts are attached to assist you. The Commission makes no recommendation of a single individual or group over another. It is advisable to contact the person listed; if they cannot supply you with specific information about the impact on cultural resources, they may be able to refer you to another tribe or person knowledgeable of the cultural resources in or near the affected project area (APE).

Lack of surface evidence of archeological resources does not preclude the existence of archeological resources. Lead agencies should consider avoidance, as defined in Section 15370 of the California Environmental Quality Act (CEQA) when significant cultural resources could be affected by a project. Also, Public Resources Code Section 5097.98 and Health & Safety Code Section 7050.5 provide for provisions for accidentally discovered archeological resources during construction and mandate the processes to be followed in the event of an accidental discovery of any human remains in a project location other than a 'dedicated cemetery. Discussion of these should be included in your environmental documents, as appropriate.

If you have any questions about this response to your request, please do not hesitate to contact me at (916) 653-6251.

Sincerely,

Dave Singleton, Program Analyst

Attachment: Native American Contact List

Native American Contacts
San Bernardino County
March 19, 2007

San Manuel Band of Mission Indians
Henry Duro, Chairperson
26569 Community Center Drive
Highland , CA 92346
(909) 864-8933
(909) 864-3370 Fax
Serrano

Morongo Band of Mission Indians
Britt W. Wilson, Cultural Resource Coordinator
11581 Potrero Road
Banning , CA 92220
britt_wilson@morongo.org
(951) 849-8807
(951) 755-5200/323-0822-cell
(951) 922-8146 Fax
Cahuilla
Serrano

Chemehuevi Reservation
Charles Wood, Chairperson
P.O. Box 1976
Chemehuevi Valley , CA 92363
chemehuevit@yahoo.com
(760) 858-4301
(760) 858-5400 Fax
Chemehuevi

San Manuel Band of Mission Indians
Ann Brierly, Environmantal Department
101 Pure Water Lane
Highland , CA 92346
abrierty@sanmanuel-nsn.gov
(909) 863-5899 EXT-4321
(909) 862-5152 Fax
Serrano

Fort Mojave Indian Tribe
Nora McDowell, Chairperson
500 Merriman Ave
Needles , CA 92363
gloriasmith@fortmojave.com
(760) 629-4591
(760) 629-5767 Fax
Mojave

Fort Mojave Indian Tribe
Esadora Evanston, Environmental Coordinator
500 Merriman Ave
Needles , CA 92363
region9epa@ftmojave.com
(760) 326-1112
(760) 629-4591
(760) 629-5767 Fax
Mojave

San Fernando Band of Mission Indians
John Valenzuela, Chairperson
P.O. Box 221838
Newhall , CA 91322
tsen2u@msn.com
(661) 753-9833 Office
(760) 885-0955 Cell
(760) 949-1604 Fax
Fernandeño
Tataviam
Serrano
Vanyume
Kitanemuk

Serrano Band of Indians
Goldie Walker
6588 Valeria Drive
Highland , CA 92346
(909) 862-9883
Serrano

This list is current only as of the date of this document.

Distribution of this list does not relieve any person of statutory responsibility as defined in Section 7050.5 of the Health and Safety Code, Section 5097.94 of the Public Resources Code and Section 5097.98 of the Public Resources Code.

This list is only applicable for contacting local Native American with regard to cultural resources for the proposed Lytle Creek Ranch Specific Plan Amendment Project; Devor Area; San Bernardino County, California for which a Sacred Lands File search was requested.

APPENDIX D: ARCHAEOLOGICAL SITE LOCATION AND DPR SITE FORMS

CONTAINS CONFIDENTIAL SITE LOCATION INFORMATION
NOT FOR PUBLIC DISTRIBUTION

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Appendix D

LYTLE CREEK RANCH

CULTURAL RESOURCES MAP

CONFIDENTIAL: NOT FOR PUBLIC DISSEMINATION

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APPENDIX E: PALEONTOLOGICAL RESOURCE RECORDS SEARCH RESULTS

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30 March 2007

PCR Services Corporation
attn: J.D. Stewart
One Venture, Suite 150
Irvine, CA 92618

re: **PALEONTOLOGY RECORDS REVIEW, LYTLE CREEK PROJECT, SAN BERNARDINO COUNTY, CALIFORNIA**

Dear Dr. Stewart,

The Division of Geological Sciences of the San Bernardino County Museum (SBCM) has completed a records search for the above-referenced property in San Bernardino County. The proposed project is located in portions of sections 6, 7, 8, 15 (projected), 16 (projected), 17, 21, 22, 23 (projected), 25, and 26, Township 1 North, Range 5 West, San Bernardino Base and Meridian, as seen on the Devore, California (1966 edition, photorevised 1988) and the San Bernardino North, California (1967 edition, photorevised 1980) United States Geological Survey 7.5' topographic quadrangle maps.

Previous geologic mapping of the San Bernardino region (Miller and others, 2001; Morton and Matti, 2001) indicates that the study area is located entirely upon surficial Recent wash sediments incising Quaternary younger fan deposits. Both of these lithologic units were laid down during the Holocene Epoch (< 10,000 years before present). These sediments have low potential to contain significant nonrenewable paleontologic resources subject to adverse impact by development-related excavation, and are therefore assigned low paleontologic sensitivity.

However, these Recent sediments may overlie older Pleistocene fan deposits or Pleistocene alluvium. These potentially-fossiliferous sediments were deposited between ~1.8 million years ago and ~11,000 years ago. Older Pleistocene sediments elsewhere in the Inland Empire have been demonstrated to be highly fossiliferous (Jefferson, 1991; Reynolds and Reynolds, 1991; Woodburne, 1991, Springer and Scott, 1994; Scott, 1997; Springer and others, 1998, 1999). Should such older Pleistocene sediments be present at depth within the boundaries of the proposed project property, and should these sediments have a lithology conducive to the preservation of paleontologic resources, they would have high potential to contain significant nonrenewable paleontologic resources and would therefore be assigned high paleontologic sensitivity.

A review of the Regional Paleontologic Locality Inventory (RPLI) at the SBCM was conducted by Craig R. Manker of the Division of Geological Sciences, SBCM. The results of this review indicate that no paleontologic localities are recorded within the boundaries of the proposed project property,

nor from within one mile in any direction. The nearest paleontologic resource locality that has yielded fossils from Pleistocene older alluvium in the San Bernardino area is SBCM 1.102.1, situated approximately 3 miles to the east of the proposed project property. This locality yielded fossil remains of an extinct proboscidean.

Recommendations

The results of the literature review and the check of the RPLI at the SBCM demonstrate that excavation in recent wash sediments and Quaternary younger alluvium has low potential to adversely impact significant nonrenewable paleontologic resources. These sediments have low paleontologic sensitivity. No program to mitigate excavation impacts to paleontologic resources is recommended for these lithologic units.

However, should undisturbed older Pleistocene sediments be present at depth or exposed during excavation, such sediments would have undetermined paleontologic sensitivity in that they might have potential to contain significant nonrenewable fossil resources. In the event that such sediments are exposed during excavation, a qualified professional vertebrate paleontologist would need to be retained to examine the sediments and assess their fossil-bearing potential. If this assessment resulted in a determination of high paleontologic sensitivity, a plan to mitigate adverse impacts to paleontologic resources would need to be developed by the paleontologist. This mitigation program would need to be consistent with the provisions of the California Environmental Quality Act (Scott and Springer, 2003), as well as with regulations implemented by the County of San Bernardino and with the proposed guidelines of the Society of Vertebrate Paleontology. This plan should include, but not be limited to:

1. Monitoring of excavation in areas identified as likely to contain paleontologic resources by a qualified paleontologic monitor. Based upon the results of this review, areas of concern within the boundaries of this project include any undisturbed subsurface Pleistocene sediments; such sediments may occur at depths of 10' or more below the existing ground surface. If required, paleontologic monitors should be equipped to salvage fossils as they are unearthed to avoid construction delays, and to remove samples of sediments that are likely to contain the remains of small fossil invertebrates and vertebrates. Monitors must be empowered to temporarily halt or divert equipment to allow removal of abundant or large specimens. Monitoring may be reduced if the potentially-fossiliferous units described herein are not present in the subsurface, or if present are determined upon exposure and examination by qualified paleontologic personnel to have low potential to contain fossil resources.

2. Preparation of recovered specimens to a point of identification and permanent preservation, including washing of sediments to recover small invertebrates and vertebrates. Preparation and stabilization of all recovered fossils are essential in order to fully mitigate adverse impacts to the resources (Scott and others, 2004).

3. Identification and full curation of specimens into an established, accredited museum repository with permanent retrievable paleontologic storage (e.g., SBCM). These procedures are also essential steps in effective paleontologic mitigation (Scott and others, 2004) and CEQA compliance (Scott and Springer, 2003). The paleontologist must have a written repository agreement in hand prior to the initiation of mitigation activities. Mitigation of adverse impacts to significant paleontologic resources is not complete until such curation into an established museum repository has been fully completed and documented.

4. Preparation of a report of findings with an appended itemized inventory of specimens. The report and inventory, when submitted to the appropriate Lead Agency along with confirmation of the full curation of recovered specimens into an established, accredited museum repository, would signify completion of the program to mitigate impacts to paleontologic resources.

References

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Woodburne, M.O., 1991. The Cajon Valley, *in* Inland Southern California: The last 70 million years, M.O. Woodburne, R.E. Reynolds, and D.P. Whistler, eds. Redlands, San Bernardino County Museum Special Publication 38(3&4), p. 41-43.

Please do not hesitate to contact us with any further questions you may have.

Sincerely,

Eric Scott, Curator of Paleontology
Division of Geological Sciences
San Bernardino County Museum

Appendix III-M-B

PCR Services Corporation Phase II Cultural and Paleontological Assessment Lytle Creek Ranch Specific Plan City of Rialto, California June 25, 2008

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PHASE II CULTURAL RESOURCES ASSESSMENT OF THE LYTLE CREEK RANCH SPECIFIC PLAN PROJECT, CITY OF RIALTO, COUNTY OF SAN BERNARDINO, CALIFORNIA

Prepared for:

LYTLE DEVELOPMENT COMPANY
180 N. Riverview Drive, Suite 260
Anaheim Hills, CA 92408
Phone: (909) 381-6007
Contact: Ron Pharris

Prepared by:

PCR SERVICES CORPORATION
One Venture, Suite 150
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Marcy Rockman, Ph.D., RPA and John Gooding

Devore and San Bernardino North, CA 1966 USGS 7.5' Quadrangles
2,447.3 Acres

Report Completed: June 25, 2008

Resources: LC-1H, LC-9H, LC-10H, LC-11H, CA-SBR -6698H, CA-SBR-6699H, CA-SBR-6700H, CA-SBR-6705H, CA-SBR-6706H, CA-SBR-6708H, CA-SBR-6709H, CA-SBR-6872H, and CA-SBR-7201H

National Archaeological Data Base (NADB) Keywords: Lytle Creek, Phase II, cultural resources, archaeological resources, spreading grounds, water control, historical archaeology

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MANAGEMENT SUMMARY

Lytle Development Company is requesting discretionary approval for the development of the Lytle Creek Ranch Specific Plan, a proposed mixed-use development currently located in the City of Rialto and in unincorporated San Bernardino County, California. Lytle Creek Ranch (Project) will be a 2,447.3-acre master planned community containing residential neighborhoods, active adult housing, elementary and middle schools, mixed-use facilities such as retail, office, and industrial space, an extensive greenbelt and trail system, recreational open space, and undisturbed open space. The Project is subject to the cultural resources requirements of the City of Rialto (City) and the California Environmental Quality Act (CEQA). The City is the CEQA lead agency for the Project and it is preparing the Environmental Impact Report (EIR). The Project will also involve the preparation of a General Plan Amendment.

PCR Services Corporation (PCR) conducted a Phase II cultural resources assessment of the above-referenced Project in May and June 2008. The assessment focused on 13 historical-period resources representing a range of water control features identified during Phase I survey, all of which appeared to date to the historical-period. The scope of work included field mapping and documentation, archival research into the history and archaeology of water control systems in San Bernardino County, and consultation with individuals knowledgeable in the history and development of the water control systems.

Results of the Phase II investigation determined that two sites, CA-SBR-6698H and CA-SBR-6705H, both portions of the Fontana Spreading Grounds, have important associations with federal work relief programs, the history of water management in southern California, and retain intact characteristic features. Recommended mitigation measures for these sites include nomination to the National Register, documentation in the format of Historic American Landscape Survey (HALS) for intact portions that will be affected by the proposed project, or alternately preservation of a representative sample. CA-SBR-6706H, also a portion of the Fontana Spreading Grounds, was previously recommended ineligible due to lack of associations and integrity. PCR concurs with this evaluation on the basis of integrity for the portion of the site that lies within the project boundaries. The balance of the recorded site to the north has been removed. Seven sites were determined to be ineligible for the National Register and California Register due to lack of identifiable associations, distinctive characteristics, and overall lack of integrity. Two sites, CA-SBR-6699H and CA-SBR-6700H, were determined to be outside the current project boundaries. CA-SBR-6699H, the Fontana Power Plant, which is still in use, has been recommended eligible to the National Register on the basis of its associations with the development of the area. Assessment of the current setting of the Power Plant and proposed development indicates that indirect impacts to the site from the proposed project will not be

significant. Site CA-SBR-6700H, a feature adjacent to the Power Plant has recently been removed by Southern California Edison for safety reasons. One site was determined to be a feature related to flood damage repair efforts and does not otherwise represent a distinctive ditch or constructions and therefore is not a historic resource. No mitigation measures are recommended for these 11 ineligible or non-sites.

1.0 INTRODUCTION AND LOCATION

PCR Services Corporation (PCR) prepared this Phase II Cultural Resources Assessment for the Lytle Creek Ranch Specific Plan (Project) at the request of Lytle Development Company. The Project is a proposed 2,447.3-acre master planned residential and mixed-use development currently located in the City of Rialto (City) and in unincorporated San Bernardino County (County), California (Figure 1, *Regional Map,* on page 4). Legal location of the Project is Township 1 North, Range 5 West, Sections 4,5,6,7,8, and unsectioned areas on the Devore, CA 1966 CA 7.5-minute United States Geologic Survey (USGS) topographic quadrangle, and an unsectioned portion of the San Bernardino North, 1966 CA 7.5' USGS topographic quadrangle (Figure 2, *Vicinity Map,* on page 5). The Project is subject to the cultural resources requirements of the City and the California Environmental Quality Act (CEQA). The City is the CEQA lead agency and is preparing an Environmental Impact Report (EIR) for the Project.

PCR conducted a Phase I cultural and paleontological resources assessment for the Project in March and April 2007 and identified 13 archaeological resources (Rockman et al. 2007). These resources include LC-1H, LC-9H, LC-10H, LC-11H, CA-SBR-6698H (hereafter CA- will be dropped), SBR-6699H, SBR-6700H, SBR-6705H, SBR-6706H, SBR-6708H, SBR-6709H, SBR-6872H, and SBR-7201H. All of these resources appeared to date to the historical period (more than 45 years old). Eleven of these resources were related to water or flood control. Two resources, SBR-6699H and 6700H are related to electrical power. As shown in Table 1, *Cultural Resources in the Project Site,* on page 6, five sites had been previously recorded and evaluated (three as significant, two as not significant), four sites had been previously identified but not evaluated, and four sites were identified during the Phase I pedestrian survey. PCR recommended site revisits for two sites previously recommended as significant to confirm current condition and Phase II evaluation for 10 sites, including previously recorded sites and newly identified sites, that had not been previously evaluated or for which additional information that may affect significance was identified during the Phase I.

The scope of work for Phase II assessment included evaluation of 11 sites. Updates to the Project boundary updates subsequent to completion of the Phase I cultural resources assessment report placed sites SBR-6699H and SBR-6700H outside of the project site. These sites were not reevaluated with respect to significance, but as SBR-6699H has previously been recommended as potentially eligible to the National Register of Historic Places (National Register), the location will be assessed with respect to potential for indirect impacts. The distribution of these 13 sites is shown in Figure A.1, Distribution of Phase II Assessment Sites, in Appendix A.) Phase II research included field reconnaissance and mapping, archival research, and consultation with individuals knowledgeable in the history and development of the water

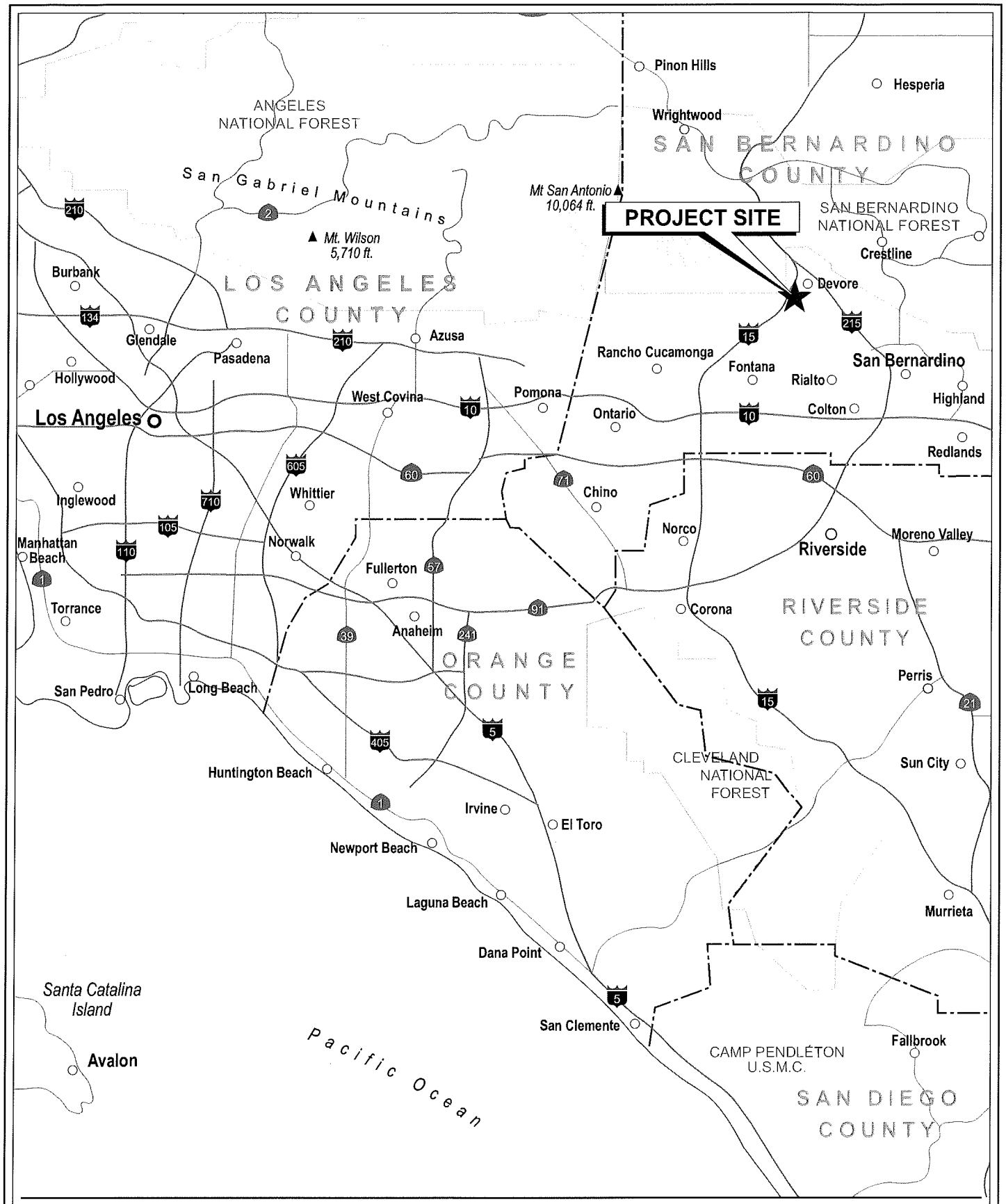
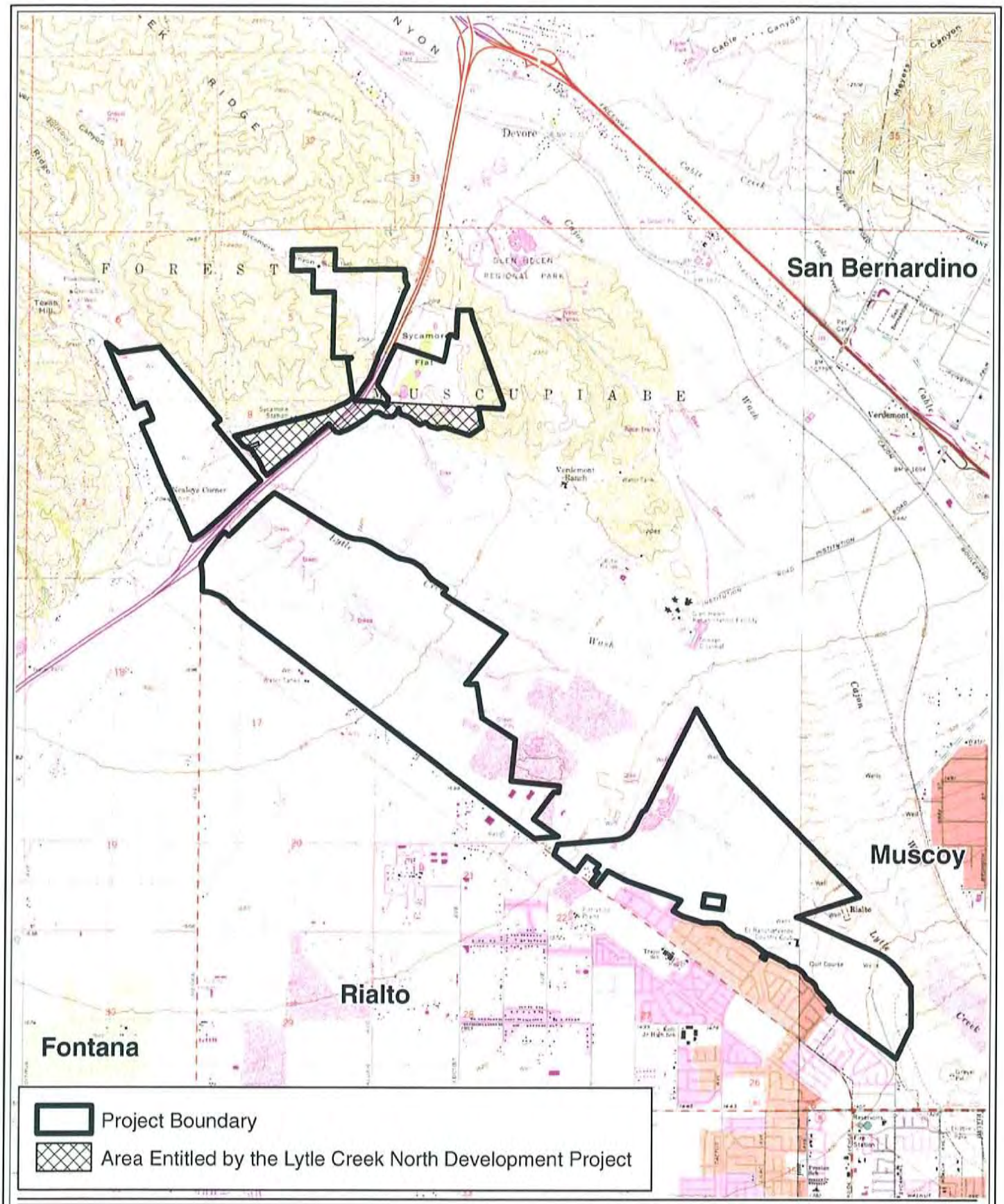


Figure 1
Lytle Creek Ranch
Regional Map

Source: PCR Services Corporation, 2007.



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Source: USGS Topographic Series (Devore, Fontana, San Bernardino North and South, CA); PCR Services Corporation, 2007.

Figure 2
Lytle Creek Ranch Vicinity Map

Table 1

Cultural Resources in the Project Site

Resource No.	Description	Evaluation Status	Evaluation Status Reference(s)
Previously Recorded Sites Not Relocated During Phase I Investigation			
CA-SBR-1416	Prehistoric artifact scatter	Unevaluated	Reynolds 1971, not relocated by subsequent investigations (see Van Wormer and Langenwalter 1990)
CA-SBR-6109H	"Old Zanja" banked earthen irrigation ditch	Unevaluated	De Barros 1987
CA-SBR-6589H	Grapeland Irrigation main canal	Unevaluated	McKenna 1990
CA-SBR-6703H	Portion of Fontana Spreading Grounds: diversion ditches and walls	Recommended eligible	Van Wormer and Langenwalter (1990)
Previously Recorded Sites Relocated During Phase I Investigation			
CA-SBR-6698H	Portion of Fontana Spreading Grounds: series of ditches	Recommended eligible	Van Wormer and Langenwalter (1990)
CA-SBR-6699H*	Fontana Powerhouse	Recommended eligible	Van Wormer and Langenwalter (1990)
CA-SBR-6700H*	"Sandbox" filtration building	Not eligible**	Van Wormer and Langenwalter (1990)
CA-SBR-6705H	Portion of Fontana Spreading Grounds: a double weir	Recommended eligible	Van Wormer and Langenwalter (1990)
CA-SBR-6706H	Portion of Fontana Spreading Grounds: series of ditches	Recommended eligible/ Not eligible	Van Wormer and Langenwalter (1990)/Dice et al. 2004)
CA-SBR-6708H	Lytle Creek Land and Improvement Company or Fontana Spreading Grounds: series of ditches	Recommended significant	Van Wormer and Langenwalter (1990)
CA-SBR-6709H	Diversion system related to Fontana Powerhouse: 2concrete piers, a diversion weir, and a low wall	Unevaluated	Van Wormer and Langenwalter (1990)
CA-SBR-6872H	Concrete structures	Unevaluated	Foster et al. 1991
CA-SBR-7201H	Concrete structures	Unevaluated	Brown and Gregory 1992
Sites Identified During Phase I Investigation			
LC-1H	Rectangular concrete feature	Unevaluated	Rockman et al. 2007
LC-9H	Concrete tank and retention	Unevaluated	Rockman et al. 2007

Table 1 (Continued)

Cultural Resources in the Project Site

Resource No.	Description	Evaluation Status	Evaluation Status Reference(s)
	pond		
LC-10H	Octagon-shaped concrete feature	Unevaluated	Rockman et al. 2007
LC-11H	Earthen historic ditch segment	Unevaluated	Rockman et al. 2007

Sites in bold type are addressed in this Phase II evaluation study.

** Sites now located outside of current project boundary.*
*** Van Wormer and Langenwalter (1990) noted that feature was constructed in 1917. Their evaluation was based on the feature being too young, i.e., "of recent age." The reason for the discrepancy between recorded age and the evaluation is unclear.*

Source: PCR Services Corporation, 2008

control systems. As available information and field recording indicated that all of the sites are essentially surface manifestations, no excavations for subsurface components were conducted.

Personnel included PCR archaeologists Marcy Rockman, Ph.D. RPA, who served as project manager, John Gooding, Senior Archaeologist, Kyle Garcia, Associate Archaeologist, and Margarita Wuellner, Ph.D., Director of Historic Resources. Qualifications of lead personnel are presented in Appendix B.

2.0 REGULATORY SETTING

2.1 REGULATORY SETTING

Numerous laws and regulations require federal, state, and local agencies to consider the effects of a proposed Project on cultural resources. These laws and regulations stipulate a process for compliance, define the responsibilities of the various agencies proposing the action, and prescribe the relationship among other involved agencies (e.g., State Historic Preservation Office and the Advisory Council on Historic Preservation). The primary federal and state laws governing and affecting preservation of cultural resources of national, state, regional, and local significance include the National Historic Preservation Act (NHPA) of 1966, as amended, CEQA, and the California Register of Historic Resources (California Register), Public Resources Code (PRC) 5024. A description of these laws and regulations follows.

2.1.1 Federal Level

2.1.1.1 National Register of Historic Places

First authorized by the Historic Sites Act of 1935, the National Register of Historic Places (National Register) was established by the NHPA of 1966, as "an authoritative guide to be used by Federal, State, and local governments, private groups and citizens to identify the Nation's cultural resources and to indicate what properties should be considered for protection from destruction or impairment."[1] The National Register recognizes properties that are significant at the national, state and local levels.

Guidelines for nomination to the National Register require that significant resources exhibit aspects of important themes in American history, architecture, archaeology, engineering, and culture and possess integrity of location, design, setting, materials, workmanship, feeling, and association and:

1. that are associated with events that have made a significant contribution to the broad patterns of our history; or

2. that are associated with the lives of persons significant in our past; or

[1] *Code of Federal Regulations (CFR), 36 § 60.2.*

3. that embody the distinctive characteristics of a type, period, or method of construction, or that possess high artistic values, or that represent a significant distinguishable entity whose components may lack individual distinction; or

4. that have yielded or may be likely to yield, information important to history or prehistory.

2.1.2 State Level

2.1.2.1 California Register of Historical Resources

The California Office of Historic Preservation (OHP), as an office of the California Department of Parks and Recreation (DPR), implements the policies of the NHPA on a statewide level. The OHP also maintains the California Historic Resources Inventory (HRI). The State Historic Preservation Officer (SHPO) is an appointed official who implements historic preservation programs within the State's jurisdictions.

Created by Assembly Bill 2881 which was signed into law on September 27, 1992, the California Register is "an authoritative listing and guide to be used by state and local agencies, private groups, and citizens in identifying the existing historical resources of the state and to indicate which resources deserve to be protected, to the extent prudent and feasible, from substantial adverse change."[2] The criteria for eligibility for the California Register are based upon National Register criteria.[3] Certain resources are determined by the statute to be automatically included in the California Register, including California properties formally determined eligible for, or listed in, the National Register.[4]

To be eligible for the California Register, a prehistoric or historic property must be significant at the local, state, and/or federal level under one or more of the following criteria:

- Is associated with events that have made a significant contribution to the broad patterns of California's history and cultural heritage;
- Is associated with the lives of persons important in our past;

[2] *California Public Resources Code § 5024.1(a).*

[3] *California Public Resources Code § 5024.1(b).*

[4] *California Public Resources Code § 5024.1(d).*

- Embodies the distinctive characteristics of a type, period, region, or method of construction, or represents the work of an important creative individual, or possesses high artistic values; or

- Has yielded, or may be likely to yield, information important in prehistory or history.

A resource eligible for the California Register must meet one of the criteria of significance described above and retain enough of its historic character or appearance (integrity) to be recognizable as a historical resource and to convey the reason for its significance. It is possible that a historic resource may not retain sufficient integrity to meet the criteria for listing in the National Register, but it may still be eligible for listing in the California Register.

Additionally, the California Register consists of resources that are listed automatically and those that must be nominated through an application and public hearing process. The California Register automatically includes the following:

- California properties listed on the National Register and those formally Determined Eligible for the National Register.

- California Registered Historical Landmarks from No. 770 onward.

- Those California Points of Historical Interest (PHI) that have been evaluated by the OHP and have been recommended to the State Historical Commission for inclusion on the California Register.

Other resources that may be nominated to the California Register include:

- Historical resources with a significance rating of Category 3 through 5.[5]

- Individual historical resources.

- Historical resources contributing to historic districts.

- Historical resources designated or listed as local landmarks, or designated under any local ordinance, such as an historic preservation overlay zone.

[5] *Those properties identified as eligible for listing in the National Register, the California Register, and/or a local jurisdiction register.*

2.1.2.2 California Environmental Quality Act

CEQA is the principal statute governing environmental review of Projects occurring in the state. CEQA requires lead agencies to determine if a proposed Project would have a significant effect on archaeological resources (PRC Sections 21000 *et seq.*). As defined in Section 21083.2 of the PRC a "unique archaeological resource" is an archaeological artifact, object, or site, about which it can be clearly demonstrated that without merely adding to the current body of knowledge, there is a high probability that it meets any of the following criteria:

- Contains information needed to answer important scientific research questions and there is a demonstrable public interest in that information.
- Has a special and particular quality such as being the oldest of its type or the best available example of its type.
- Is directly associated with a scientifically recognized important prehistoric or historic event or person.

In addition, CEQA Section 15064.5 broadens the approach to CEQA by using the term "historical resource" instead of unique archaeological resource. The CEQA Guidelines (Guidelines) recognize that certain historical resources may also have significance. The Guidelines recognize that a historical resource includes: (1) a resource in the California Register; (2) a resource included in a local register of historical resources, as defined in PRC §5020.1 (k) or identified as significant in a historical resource survey meeting the requirements of PRC §5024.1 (g); and (3) any object, building, structure, site, area, place, record, or manuscript which a lead agency determines to be historically significant or significant in the architectural, engineering, scientific, economic, agricultural, educational, social, political, military, or cultural annals of California by the lead agency, provided the lead agency's determination is supported by substantial evidence in light of the whole record.

If a lead agency determines that an archaeological site is a historical resource, the provisions of §21084.1 of the PRC and §15064.5 of the Guidelines apply. If an archaeological site does not meet the criteria for a historical resource contained in the Guidelines, then the site is to be treated in accordance with the provisions of PRC §21083, which is as a unique archaeological resource. The Guidelines note that if an archaeological resource is neither a unique archaeological nor a historical resource, the effects of the Project on those resources shall not be considered a significant effect on the environment. (Guidelines §15064.5(c)(4)).

2.1.3 Local Level

The Cultural and Historic Resources Element (Element) within the City's General Plan (1992) states the policies and goals for the identification and protection of cultural resources within the City and its sphere of influence. The Element also stipulates the all cultural resources will be recorded and evaluated. Furthermore, the measures developed to mitigate adverse impacts to such resources will be taken in accordance with CEQA, the National Environmental Quality Act, and/or the NHPA.

The City classifies cultural resources identified within their City limits into one of the following categories: archaeological resources, historic archaeological resources, and historic resources. Archaeological resources are physical properties in the environment resulting from human activities that predated recorded history, or until the Mission Era, circa 1769. These resources are attributed to the Serrano or Gabrielino Indians, who once occupied the region within the City limits and surrounding vicinity. Historical-period archaeological resources are resources that date from the 1769 to the beginning of the 20th century and are generally attributed to Euro-American settlement of the region. These resources are relatively rare in the Project vicinity. Historic resources refer to resources that date from the beginning of the 20th century to 50 years ago and are attributed to the primary development of the City.

The City has also developed a Historic/Archaeological Resources Sensitivity Map based on the results of previous cultural resource studies that highlights areas where resources are more likely to be encountered than others. According to the map, portions of the Neighborhoods II, III, and IV of the project site are located within a high sensitivity zone for prehistoric archaeological resources. The project site is not designated as sensitive for historical-period archaeological resources.

3.0 BACKGROUND AND PROJECT OBJECTIVES

3.1 ENVIRONMENTAL SETTING

The majority of the project site is located within the floodplain of Lytle Creek Wash, a large intermittent stream which originates in the eastern San Gabriel Mountains northwest of the project site (Figure 3, *Aerial Photograph,* on page 14). The northern extent, Neighborhood I, is located on distal alluvial fan deposits derived from the San Gabriel Mountains (California Division of Mines and Geology 1966). Topography is generally flat throughout the project site, with elevations ranging from 1400 to 2400 feet above mean sea level (see Figure 2).

The earliest study of Lytle Creek ranked it as the third largest tributary of the Santa Ana watershed (Hall, 1888; 124). This demonstrates that the significant water flow from Lytle Creek was recognized from the very earliest investigations of agricultural potential of the Santa Ana watershed. The Santa Ana River is the largest coastal stream in southern California. (Scott 1976). The water shed basin covers parts of three counties: Orange, Riverside, and San Bernardino (Post 1928:1). The Santa Ana River retains its name all of the way to its source in the Pacific Coast Range, at the most easterly extent of the watershed. In addition to Lytle Creek, other major tributaries to the Santa Ana include Cahone Creek, Bear Creek, Mill Creek, and San Timoteo Creek. It is believed that all of these large tributaries were perennial prehistorically and were fed by over thirty intermittent streams. The City of San Bernardino was founded at the confluence of Cahone Wash, the Santa Ana River and San Timeteo Creek. This junction roughly defines the boundary between the upper and the middle of the Santa Ana drainage.

The water table and flood regimes of the Lytle Creek-Santa Ana drainage are part of a dynamic and complex system and the constraints and potentials of the area do not appear to have been immediately known to early European settlers. Currently, three natural driving forces are recognized. First is the magnitude of the annual precipitation cycle which is often characterized by very wet rainy seasons followed by drought style dry seasons. Second is the elevation gain for the watershed which begins at sea level in the southwest and terminates at over 8,600 feet along the Pacific Coast Crest in the northeast, a distance of only 150 miles. Third, the geology of the Pacific Coast Range is predominantly ruptured and faulted metamorphic and conglomerate rock that is highly prone to erosion. These three factors often combine to build high volume, high velocity flood events that carried massive debris loads down thousands of feet in a matter of a few hours. For example, the vertical distance between Big Bear Lake (located approximately 25 miles northeast of the Project area) and the City of San Bernardino is 5,710 feet (slightly over one mile).

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Source: PCR Services Corporation, 2008.

Figure 3
Lytle Creek Ranch
Aerial Photograph

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The result of these forces includes a sequence of major historic floods in the upper Santa Ana watershed. This chronicle is condensed from research (Earp n.d.:4-18), at the Water Resources Institute, California State University, San Bernardino:

1825 Earliest written account " the Great flood of 1825". The river reportedly cut a new channel to the sea.

1851-52 The year Mormons settled San Bernardino

1861-62 "The Noachian deluge of California floods" Rain began on Christmas day and continued through January 18, and ended with a 24 hour downpour.

1867 This was reported in the newspaper Guardian. San Bernardino was cut off for more than one week.

1884 This is also reported to have cut a new channel to the sea.

1886-87 By some accounts this was not considered a true flood, however several blocks in San Bernardino were isolated with people blocked in houses.

1889 Another Christmas Day flood which began on December 11 and rained steadily for 14 days.

1909-10 Rain began in 1909 and the flood hit January 1, 1910. San Bernardino was cut off from communication and travel for several days.

1916 Rain began January 5 and lasted through January 17. Two people were killed, and San Bernardino was again isolated. The 1916 flood prompted State and Federal agencies to begin planning flood control efforts.

1938 This flood was very devastating and was also the most well documented. It was the last flood prior to implementation of modern flood control methods.

1968 Large flood known to have occurred.

This small flood data sample suggests that terrain altering floods in the Santa Ana watershed have had a ten year average but with a wide range of two to twenty-five years.

The project site supports numerous plant communities and/or associations. These include but are not limited to scrub, chaparral, riparian, and grassland plant communities. These plant communities provide habitat for a variety of reptiles, amphibians, and mammals. Mammals observed or otherwise detected within the area include the desert cottontail, California ground squirrel, San Diego black-tailed jackrabbit, coyote, mule deer, bobcat, and multiple species of mice and rats. A number of other species are expected to be resident within the region and may occasionally utilize the study area to forage or for cover (Nelson and Erickson 2007).

Existing conditions within the project site include undeveloped land and the El Rancho Verde Golf Course. Residential development exists immediately off-site to the southwest of Riverside Avenue within the City. Several County facilities are located just off-site to the east, including Glen Helen Regional Park, Verdemont Ranch, Glen Helen Rehabilitation Facility; a sheriff's training facility, and an off-road vehicle recreation area. Disturbances to the project site include Lytle Creek Wash flood events, two-track roads, and wildfires. In October 2003, the project site was affected by the Padua and Grand Prix Fires which merged in the vicinity (Kohler 2003). Sections of the Lytle Creek North Planned Development Project adjacent to Neighborhood I have been graded and prepared for development (see Figure 2).

3.2 CULTURAL SETTING

The prehistoric and ethnographic background of the project site and vicinity were reviewed extensively in Rockman et al. (2007). The background presented here expands on the historical use of the project site and vicinity, which is the focus of this Phase II analysis.

The project site is located within a large section of the historic Rancho Muscupiabe (Muscupiabe), which is named after a nearby Serrano village called *Muscupiabit*. Muscupiabe encompassed approximately one square league (approximately 4,500 acres) of northwestern San Bernardino Valley (L.D. King 2001). In 1843, Governor Manuel Micheltorena gave the Muscupiabe to Michael White, a European settler (Kielbasa 1997). Muscupiabe was abandoned by 1845 because it could not be defended against the local Native Americans. In 1870, the United States Land Commission conducted a survey of Muscupiabe and expanded it to approximately 30,000 acres. The survey was conducted as a result of a dispute over the water rights to Lytle Creek (L.D. King 2001). In 1851, Captain Andrew Lytle led the Mormon Battalion and Mormon settlers to the San Bernardino area. Lytle Creek Wash was named after Captain Lytle. These first Mormon settlers camped at Sycamore Grove, is now California Historical Landmark (CHL) number 573, located within the Glen Helen Regional Park (see Figure 2).

Lytle Creek Wash has a long history of water capture and conveyance and has been the subject of many water rights disputes. In the mid-to-late 1800s, three ditches were constructed to

transport water. These ditches included the Rancheria Ditch, the Old Town Ditch, and the Lloyd Ditch (L.D. King 2001: 4.10-5). At this time, settlers living on Muscupiabe lands fought with the rancho owners over water rights. The Lytle Creek Water Company was formed by 1881 to manage water rights. Soon thereafter, real estate investors changed its name to Semi-Tropic Land and Water Company. It went bankrupt by 1896. Thereafter, numerous companies held the water rights to Lytle Creek Wash. In 1932, the Fontana Union Water Company constructed a series of concrete and stacked-rock water control features located in and around Lytle Creek Wash, known as the Fontana Spreading Grounds (Van Wormer and Langenwalter 1990). These flood control features were constructed as part of the Lytle Creek Flood Control Project (Dice et al. 2004). As described above, several major floods swept through the project site and vicinity in the twentieth century, including well-documented floods 1938 and 1968. Both of these floods and subsequent abandonment or repair of water management constructions affected the condition of some of the earlier water control features in the area. A series of wells has also been established within the project site and vicinity by the 1920s and the area continues to produce water for surrounding area in the present.

Other uses of the Project vicinity in recent times include the development of vineyards. The Klein/Elenna Brothers Ranch was located in the Sycamore Flat area (see Figure 2). The Ranch was occupied by vintners from the 1920s to the 1970s (Leonard 1979). This area was graded in 2005 and is currently being developed as part of the Lytle Creek North Planned Development Project (Garcia and Marken 2005).

3.3 PREVIOUS RESEARCH

As reviewed in Rockman et al. (2007: Table 1), a total of 13 previous archaeological investigations have covered all or a portion of the project site (all: Van Wormer and Langenwalter 1990; Neighborhood I: Schuiling 1973, Swanson 1988, and Dice et al. 2004; Neighborhood II: Heran 1978, Foster et al. 1991, and Brown and Gregory 1992; Neighborhoods II and III: de Barros 1987; Neighborhood III: Foster 1986, Duke 2000, and Michael Brandman Associates 2003; and Neighborhood IV: Reynolds 1971, and Brock et al. 1986). These investigations identified 11 archaeological sites within the current project boundaries. PCR's Phase I investigation (Rockman et al. 2007) relocated seven of these sites and identified four new sites. PCR also relocated two additional previously identified sites, SBR-6699H and SBR-6700H, that are outside of the current project boundary. These sites were summarized along with their evaluation status in Table 1.

As shown in Table 1, documentation and evaluation of the Fontana Spreading Grounds has a complex history. These Spreading Grounds were first recorded in 1990 by Van Wormer and Langenwalter (1990:14-17). Based on review of the 1941 USGS Devore, CA 7.5' topographic quadrangle, the Grounds were estimated to originally have covered the flood plain

of Lytle Creek north of Riverside Avenue from the Fontana Power Plant in the southeast to the mouth of canyon in the northwest. Spreading grounds to the southeast of the Fontana Power Plant were identified as the Lytle Creek Land and Improvement Company Spreading Grounds. Constructions in the Grounds included a main central channel and four water distribution gates or weirs. Each weir included two gates on either side of a series of dams. Distribution canals extended from the gates into complex series of ditches. Van Wormer and Langenwalter noted that due to impacts from the 1938 and 1968 floods, subsequent flood control activities, and development of access roads, substantial portions of the Fontana Spreading Grounds had been destroyed or extensively disturbed. Some features, however, were identified across portions of the original extent of the Grounds. These portions were recorded as individual sites, as follows:

- PEL 89-4 – SBR-6698H
- PEL 89-10 – SBR-6703H
- PEL 89-11 – SBR-6704H
- PEL 89-12 – SBR-6705H
- PEL 89-13 – SBR-6706H
- PEL 89-14 – SBR-6709H

Although portions were recorded separately, Van Wormer and Langenwalter (1990:17) evaluated the grounds as whole. They concluded that the Spreading Grounds are "an important resource under Criterion B in that it is significant from an engineering point of view. In addition it may be associated with the work relief programs of the early 1930s. If this is the case it would be eligible for nomination to the National Register of Historic Places. Preservation of portions of this feature should be considered, especially the stacked rock wall in the northern portion at location (PEL 89-10 [SBR-6703H]). If portions are to be impacted detailed mapping and scale drawings of those areas should be completed. Due to the large area, complexity, and dense vegetation cover of the feature [Spreading Grounds], controlled clearing and aerial photography may be a practical mapping methodology."

In 2004, Michael Brandman and Associates (MBA) conducted an Extended Phase I investigation of SBR-6706H (PEL-13), located in the proposed Lytle Creek North Planned Development Project (i.e., immediately south of Neighborhood I) (Dice et al. 2004). This investigation was conducted at the request of the County of San Bernardino as the proposed development would destroy the site, which was at that time classified as a historic resource under CEQA. MBA's Extended Phase I investigation included field reconnaissance, archival research (including review of aerial photographs), and re-evaluation of SBR-6706H. MBA confirmed the Van Wormer and Langenwalter (1990) finding that the flood control features were constructed in

1932 by the Lytle Creek Water Conservation Association as part of the Lytle Flood Control Project, also known as the Fontana Spreading Grounds. MBA noted that the flood control features had been damaged by floods in March of 1938. Therefore, MBA recommended that CA-SBR-6706H not be considered eligible for the California Register or the National Register due the lack of site integrity and because the site has lost its original function (Dice et al. 2004:21). MBA also stated that, due to the fact that the original ground surface had been modified by the construction of the flood control features in 1938, there was a low chance that buried cultural resources would be encountered during construction. MBA estimated that the archaeological sensitivity of the area surrounding the site to be low and did not recommend construction monitoring by a qualified archaeologist. MBA recommended that SBR-6708H (PEL-16) be considered part of the Fontana Spreading Grounds, rather than a separate spreading ground built by the Lytle Land and Improvement Company as indicated by Van Wormer and Langenwalter (Dice et al. 2004:13). MBA noted that other portions of the Fontana Spreading Grounds (specified as PEL-4, which is SBR-6698H) remained outside of the Extended Phase I evaluation (Dice et al. 2004). On the basis of this information included in the Dice et al. 2004 report, PCR understands that their evaluation of SBR-6706H did not include SBR-6698H.

SBR-6699H, the Fontana Power Plant, was recommended as eligible to the National Register by Van Wormer and Langenwalter under Criterion A as it played an important role in the development of the area. Van Wormer and Langenwalter recommended that the site be avoided, and that any potential impacts be discussed with its operator, Southern California Edison. The Historical Resources Inventory (dated March 17, 2006) lists the Fontana Power Plant as appearing eligible for the National Register under criterion A and C as an individual property through survey evaluation as of April 22, 1997.

As summarized in Table 1, sites SBR-1416, SBR-6109H, and SBR-6589H, and the portion of the Fontana Spreading Grounds recorded as SBR-6703H were not relocated during the Phase I investigation. SBR-6703H was recommended eligible by Van Wormer and Langenwalter (1990) as part of their assessment of the Fontana Spreading Grounds. The other three sites were not evaluated as part of their original recording. As these sites were not relocated, no additional site-specific work has been recommended, with the exception of monitoring in the vicinity of SBR-1416 (Rockman et al. 2007).

3.4 PHASE II RESEARCH GOALS

Based on the above information, the objectives of this Phase II investigation include the tasks listed below for the following sites: LC-1H, LC-9H, LC-10H, LC-11H, SBR-6698H, SBR-6699H, SBR-6700H, SBR-6705H, SBR-6706H, SBR-6708H, SBR-6709H, SBR-6872H, and SBR-7201H:

- Confirm relationships between sites/features and larger known water control systems, or identification of independent features. This task is essential in clarification of the complex history of the project area. The remains are numerous and varied. As part of this task, confirm locations of the sites with respect to current project boundaries and proposed development plan.

- Determine role of sites in the historic context of water control in San Bernardino and southern California, their rarity or commonality and identification of unique engineering aspects of the water control features. Previous reports have presented conflicting interpretations and evaluations.

- Review of the integrity of the sites and their ability to convey historic relationships and/or characteristic features. The project area has been intensively developed and modified over the past one hundred and fifty years. At the same time the area has experienced ten major flood events that modified the landscape and prompted numerous repairs and modifications. In some cases modification has compromised integrity and interpretive value and in other cases it has not.

- For significant sites, review of potential project-related impacts. According to the design plans, project related impacts will amount to total destruction of all sites and features within the limits of the project area that are not located in designated open space. This will come about as a result of surface grading, installation of utilities, installation of streets and curb and gutter, and leveling of home site pads, and application of approximately three feet of top soil on the pads. Thus the remaining evidence of these sites will be limited to the written records, the photographs, and the maps made during this and previous assessments.

4.0 METHODS

Methods used to prepare the Phase II evaluation included fieldwork, archival research, and assessment of potential Project impacts.

4.1 FIELD VISITS

Two site visits were conducted to gather additional site-specific information, including site-specific characteristics, review previously collected documentation, and confirm condition of the sites and potential Project impacts. The first visit was conducted on May 6, 2008 by PCR archaeologists John Gooding and Kyle Garcia, Leon Long, Assistant Manager of the West San Bernardino Water District (retired), and Kevin Lynch, Ron Pharris, and Jan Dabney, representing the Lytle Development Company. This visit included all 13 sites with the primary objective of confirming with Mr. Long previous use interpretations of several of the sites. All of the sites were re-photographed at this time. Field notes were collected regarding site interpretations, conditions, and anticipated Project impacts, and previously prepared field maps were re-checked for accuracy. The second site visit was conducted on June 17, 2008 by PCR archaeologists Marcy Rockman and John Gooding and Leon Long. The objective of this visit was to ground-truth portions of site SBR-6698H identified on aerial photographs, collect elevation and setting photographs of SBR-6699H, and review site use and integrity information of sites SBR-6872H and SBR-7201H with Mr. Long.

4.2 ARCHIVAL RESEARCH

Per the Phase II research goals described above, PCR conducted research through the institutions listed in Table 2, *Archival Research Sources,* on page 22. Information gathered included primary and secondary documentary sources as well as verbal information from knowledgeable individuals on the staff.

4.3 IMPACTS ASSESSMENT

In order to determine potential impacts to sites within the project site, PCR reviewed current Project development plans provided by Lytle Development Company and discussed anticipated location-specific impacts with representatives of Lytle Development Company during the May 6, 2008 project site visit. Direct impacts to archaeological resources were defined as those Project-related activities that will excavate, blade, grade, or otherwise remove the site locations and materials. Indirect impacts were defined as those Project activities or

Table 2

Archival Research Sources

Organization	Contact	Research Subjects	Access Information
Fontana Union Water Company	Ms. June Silva, Secretary	History of the Fontana Union Water Company [a]	(909) 822-9199
Orange County Water Conservancy District	Mr. Adam Hutchison	History of spreading grounds in lower Santa Ana drainage	(909) 793-4901
Rialto Historical Society	Mr. Steve Shaw, President Mr. John Adams, Historian	History of Upper Santa Ana drainage, particularly associations of historically important persons with water resources	{johnadams909@sbcglobal.net}
San Bernardino County Agricultural Commission	Mr. Roger Birdsall (retired)	Land-use history (including customers for water along Lytle Creek)	(909) 875-1093
San Bernardino County Flood Control District	Mr. Steve Gibson, Engineering	Planning and sequence of flood control structures in along Lytle Creek since 1939	(909) 387-8101
San Bernardino Municipal Water Department	City of San Bernardino	Inventory of active water wells under their jurisdiction [b]	(909) 384-5095
San Bernardino Valley Municipal Water District	Melissa Zoba	*History of water use in upper Santa Ana drainage* [c]	Milissaz @ SBCMWD. (909) 387-9200
San Bernardino Valley Water Conservation District	Mr. Chris Bahnsen, Historian	History, including maps and photographs of spreading grounds in the upper Santa Ana drainage	(909) 793-2503
Water Resources Institute, California State University, San Bernardino	Ms. Susan Longvil, Director Ms. Susan Earp, Staff	History of water development activities along Lytle Creek and the upper Santa Ana drainage	(909) 753-7683 slongvil@csusb.edu searp@csusb.edu

Table 2 (Continued)

Archival Research Sources

Organization	Contact	Research Subjects	Access Information
West San Bernardino Valley Water District	Mr. Anthony (Butch) Ariza, Superintendent Mr. Leon Long, Assistant Superintendent (retired)	Identification of wells and other features within the project area	(909) 875-1804 Office (909) 644-2411 Mr. Long

[a] *The Fontana Union Water Company is a paper company with a Board of Directors and no staff. The company still holds water rights which pay dividends and is the reason for its continued existence. Their files were not accessible as of 6/4/08*

[b] *The Department has a list of active water wells but does not have resources for searching well histories for the public.*

[c] *The Valley District is a state sanctioned water wholesaler that keeps contemporary data on groundwater storage. Inventory includes electronic library with some well data; however comprehensiveness of total inventory and background cannot be guaranteed.*

Source: PCR Services Corporation, May-June 2008

products that increase the likelihood that a site will be disturbed by natural or cultural process, such as erosion due to nearby grading or collection of artifacts due to a larger than usual number of people passing through the site area, or present alterations to the setting of a site through disruption of views and surroundings.

5.0 RESULTS

The objective of the Phase II cultural resource assessment is to provide recommendations with respect to their eligibility to the California Register. As described in the Regulatory Setting, above, evaluations of eligibility follow criteria set out in Title 36, Part 60, of the Code of Federal Regulations (36 CFR 60), and California Public Resources Code § 5024.1(b)., described above in section 2.0.. In brief review here, these regulations state that an archaeological resource must have integrity and a "quality of significance" in American history, architecture, archaeology, engineering, and culture in association with: (a) an event or broad pattern of history; (b) a famous person; (c) characteristics of a distinctive type or master; or (d) the potential to provide other information important to history or prehistory, in order to be considered eligible for the National Register or for the California Register.

Quality of significance and associations are determined by means of historic contexts. A historic context, as defined by the National Park Service (NPS) is a body of information about the past organized by place, time, and theme (NPS 1986:7-8, 1991:11). A theme is essentially a research topic, arranged in terms of what is currently known about the topic and questions that additional research and analysis may be able to address. Recommendations of resource eligibility are made on the basis of how representative a resource is of a theme or its potential to contain information that can be used to address thematic questions.

For Lytle Creek Ranch Project, historic context place is defined as the upper Santa Ana drainage. Historic context time is determined by the temporal range of archaeological resources in the project site, namely the late nineteenth to mid twentieth century. Research conducted by PCR did not identify any previously prepared historic contexts for the history of water use in the upper Santa Ana drainage. Therefore, the archival research is developed into a historic context below, followed by assessment of each site in relation to the context.

5.1 HISTORIC CONTEXT

The following context is organized into two sections, first a summary of the history of water companies in the upper Santa Ana drainage, and second an overview of developments in regional water management and technology. The first section is based primarily on Scott (1976), with information reorganized according to individual companies, as this was the most complete history for the project identified during the archival research. This chronological information is intended to provide information per major historical themes and identification of major persons,

and to provide a background for the trends and history of technology information prepared from diverse archival sources in the second section.

Chronology of Water Companies

The earliest known water control project in San Bernardino County appears to date to the end of the Mission Period. It was undertaken by a band of Guachama Indians who had visited the San Gabriel Mission and recognized how the mission Indians had benefited from irrigating their croplands. The Guachama requested assistance from the mission in developing and irrigation at their Rancheria south of the Santa Ana River and west of the present city of Redlands. The mission granted their request and resulted in the construction of the Mill Creek Zanja in 1819-20. This was the first irrigation project in the upper Santa Ana Valley and the second in the whole of the drainage basin. (Scott, 1976: 9).

The Rancheria Ditch

Water development along Lytle Creek began in 1843 with the construction of the Rancheria Ditch. Land was had recently been secularized and the ranches at this time were economically oriented toward cattle and sheep ranching. Consequently, irrigation ditches at this time were predominantly small localized affairs. The Lugo family of the San Bernardino Rancho built the Rancheria Ditch in cooperation with Mexican immigrants that had built a village named Politana after a nearby Native-American site. The Rancheria Ditch heading was built into the cienaga known as Raynor or Garner Springs, an area thought to be between the east and west branches of Lytle Creek. The ditch was partially abandoned in 1851, although the owners of the ditch continued to claim all of the water from the Raynor Spring and went to litigation with Raynor in the early 1870's (Scott 1976:126-127).

Mormon settlers Amsa Lyman and Charles Rich bought the San Bernardino Rancho in 1851 and began a new ditch, named the Mormon Ditch, in 1852 with a heading very near the location of the Rancheria Ditch heading. The following year, George Lord installed a ditch approximately two miles upstream of Raynor Springs on the southwest side of Lytle Creek to serve his own agricultural plots. In 1854, the Mormon settlers built a new ditch headgate approximately 1.25 miles above the heading of the Lord Ditch which became known as the Old Town Ditch. Soon after the Old Town Ditch was built the Rancheria Ditch was put back into service and claimed all water from the Raynor Spring

Owners of the remaining rights to the Rancheria Ditch incorporated as the Rancheria Water Co. in April 1900. For the owners, the hour rights of total flow were converted to stock in the company. The company attempted to build and maintain water distribution systems. The

Rancheria Ditch incorporated as the Rancheria Water Co. in April 1900. By 1924 they controlled 120 miner's inches. The company declared bankruptcy in 1959 (Scott 1976:128).

The Colton Land and Water Company

Not surprisingly, the rapid sequence of ditch development began a lengthy period of fractious interaction and disputes over water use and rights. Mr. P.A. Raynor was the principal owner of the land of the Raynor Springs. Raynor and his associates were sub-dividers of the City of Colton and the organizers of the Colton Land and Water Company in 1877. By previous agreement in 1875, Raynor allowed the owners of the Rancheria Ditch Company all of the water that would flow through a 6 inch vertical slot the exact calculation into water volume is not known. Shortly after 1877 Raynor acquired majority rights to the spring, installed a small number of artesian wells and provided a specific figure of 72 miner's inches (1.44 CFS) was adopted for the Rancheria Ditch. With increased saturation of the soil by 1882 there was a decreased need and conveyed to Colton Terrace area (Hall 1888 p 278) presumably reverting to Raynor.

By 1881 the Colton Land and Water Company water was split almost 50/50 between agriculture and domestic supply for the City of Colton. In 1891 Raynor (The Colton Land and Water Company) merged with the Vivienda Water Company. By 1892 Raynor contracted to deliver 451 ½ miners inches (9.03 CFS) to the Semi-Tropic land and Water Company to be built up to in increments and to be used only between December 1 and May 1 for irrigation purposes. Between 1870 and 1892 the Raynor Tract increased ground water extraction from 200 miner's inches to 726 miner's inches or 363 percent. The result was the notable depletion of the water table.

The Lytle Creek Water Company

The story of the Lytle Creek Water Company is a convoluted tale of the local growth of the water industry. Origins of the Company began with the Muscupiabe Rancho Grant (MRG) made to Michael White made in 1843 which included almost all of the water rights of Lytle Creek. For the following 28 years many parties mistakenly settled on the MRG lands and started claiming water and developing irrigation systems. Chief among these were the Mormon settlers who built the Mormon Ditch on what they thought was government land. They came into conflict with Mr. Lord who had purchased what he thought was government land and built the Lord ditch above the Mormon Ditch. The Mormons moved out between 1857 and 1859 and sold their Old Town Ditch with water rights to local farmers who built tributary ditches and extended the original ditch further upstream. Mr. Lord continued water conflicts with the new owners. All of this was trumped in 1871 when the original Muscupiabe Ranch Grant was finally surveyed. It was believed to be 4,438 acres but was found to comprise 30,145 acres and a patent was granted for that amount. In 1855 White had split the grant and sold it to two parties, and

both portions went through a succession of owners. Litigation between land owners and water appropriators began in 1877. The appropriators formed the Lytle Creek Water Company in 1881 to defend appropriated water rights and to acquire additional water rights, ditch rights-of- way, and real estate. In May 1935 by execution of deeds, the Lytle Creek Water Company divided into the Fontana Union Water Company and the Lytle Creek Water Company.

The Semi-Tropic Land and Water Company and the Lytle Creek Water and Improvement Company

These two companies were tightly inter-related. The Semi-Tropic Company was started in January 1887 with land as well as shares in the Lytle Creek Water Co. The same owners also created the Lytle Creek Water and Improvement Co. in May 1887. The purpose of the Semi-Tropic was primarily to trade in water rights, and the purpose of the Lytle Creek Water and Improvement was as a construction company. The Semi-tropic built the Realto Canal. From 1888 until 1896 both of these companies went through excessive exchanges, mergers, and sales of shares in stock and water rights which ended in bankruptcy for the Semi-Tropic Land and Water Co. The Lytle Creek Water and improvement Co. survived with very few assets until 1960 when it was annexed by the Semi-Tropic County Water District, which was the predecessor of the West San Bernardino County Water District (Scott 1976: 134-6).

The Rialto Irrigation District

This district was organized in 1890 as an agricultural district that that was a client of the Semi-Tropic Land and Water Co. With the bankruptcy of the Semi-Tropic some water rights fell to the Realto Irrigation District which functioned until 1900 when sale of some of the remaining water rights terminated the activities of the District (Scott 1976, 137-8).

Lineage of Fontana Companies

The Fontana Development Company was created in 1901 with purchased assets of the Cicala Water Co. of Iowa and the Anglo-American Canaigre Co. In 1903 the company partnered with Lytle Creek Water Company and Lytle Creek Water and Improvement Company in a pipeline construction used by the Grapeland Irrigation District. In 1906 the Fontana Land and Water Company was organized as a water broker and construction company. It bought stock in the Fontana Development Co. The new company acquired the domestic water supply of the City of Realto from bankrupt Semi-Tropic Land and Water Co

In 1909 The Fontana Water Co. was organized and acquired the right to use ditches originally built by the Grapeland Irrigation District and leased by Fontana Development Co. The Fontana Water Co. operated until 1912 when it was purchased with all properties and water

rights. The purchasers organized two companies in 1912, the Fontana Land Co. and the Fontana Union Water Co. An additional company, the Fontana Domestic Water Co., was organized in the late 1920's to supply domestic water to the agricultural area of the Fontana District. In the late 1940's the San Gabriel Valley Water Co. acquired the assets of the Fontana Domestic Water Co. and has delivered services since that time.

By 1924 the assets of the Fontana Land and Development co., Fontana Water Co., Fontana Land Co., and Orchard Mutual Co. were combined with those of the Fontana Union Water Co., a situation that still exists (Scott 1976, 142-4).

Trends in Water Management and Technology

The history of the interaction between the people of the San Bernardino Valley and the Santa Ana River appears to have been forces of development pushing against the natural forces of the creeks and rivers that supported them. For example, the Southern Pacific Railroad arrived in Colton in 1875 and by 1875 the Santa Fe Railroad had rail lines along the Santa Ana River, San Timeteo Creek and Cahone Creek over Cahone Pass (McAfee, 1973, 122-23). This had several effects. First, it brought more people to the valley which brought more population into the broad floodplains of the creeks and the river. Second, it increased agricultural business that relied even more heavily on the water resources, but most importantly the rail lines were built along the bottoms of the drainages in the direct path of the floods. Flood events often covered or washed out tracks, and construction of bridges often created debris dams and railroad grades often acted as levees that channelized floods creating more damage downstream(McAfee 1973, 183)

In 1884 construction began on the Bear Valley Dam at the present-day site of Big Bear Lake (Crafts 1906:160). This is thought to be the first reservoir construction on the watershed and was apparently intended for flood control.

The flood of 1909-10 caused considerable damage in San Bernardino and washed out or destroyed every bridge. This resulted in a partnership between the railroads and the San Bernardino County Supervisors to build temporary dikes to divert Lytle Creek for the remainder of the year (Earp, personnel communication)

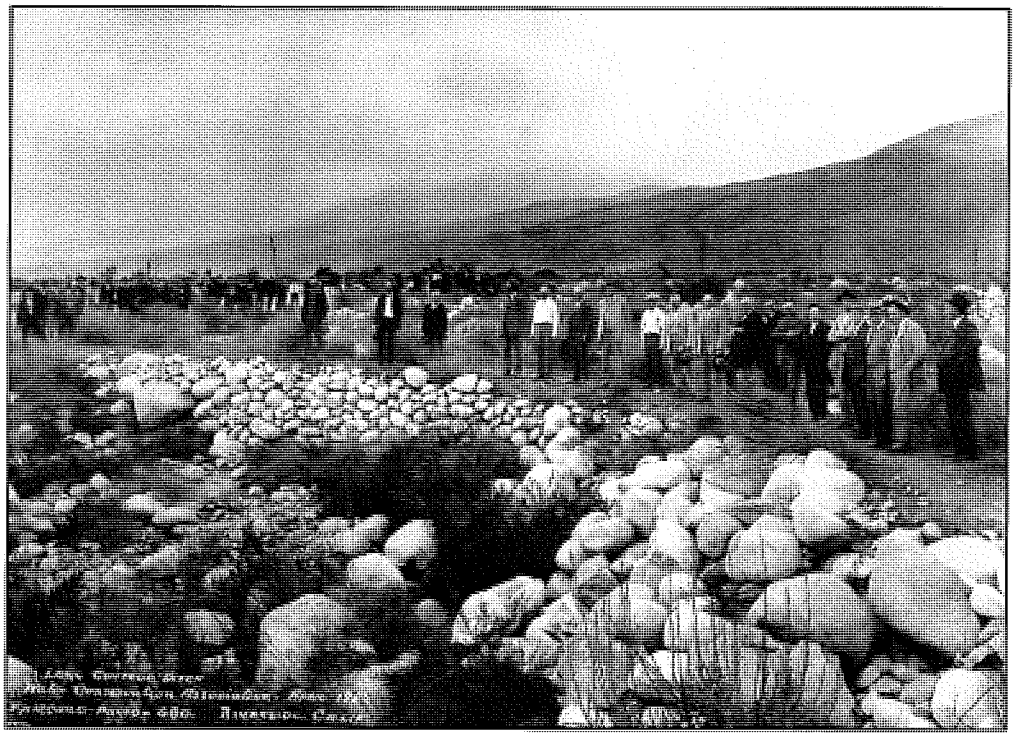
In brief terms the evolution of water control systems in the Santa Ana watershed began with simple irrigation ditches. The occasional devastating floods usually destroyed ditch systems which meant loss of a growing season and expense of reconstruction and reinforcing ditch facilities. The early introduction of artesian water wells lengthened the irrigation season, but when combined with the ditches began to draw down the water table. Also artesian wells were usually located well into the bed of the creeks and were even more vulnerable to flood

damage. A solution to the dual problems of flood damage and the dropping water table was the construction of spreading grounds.

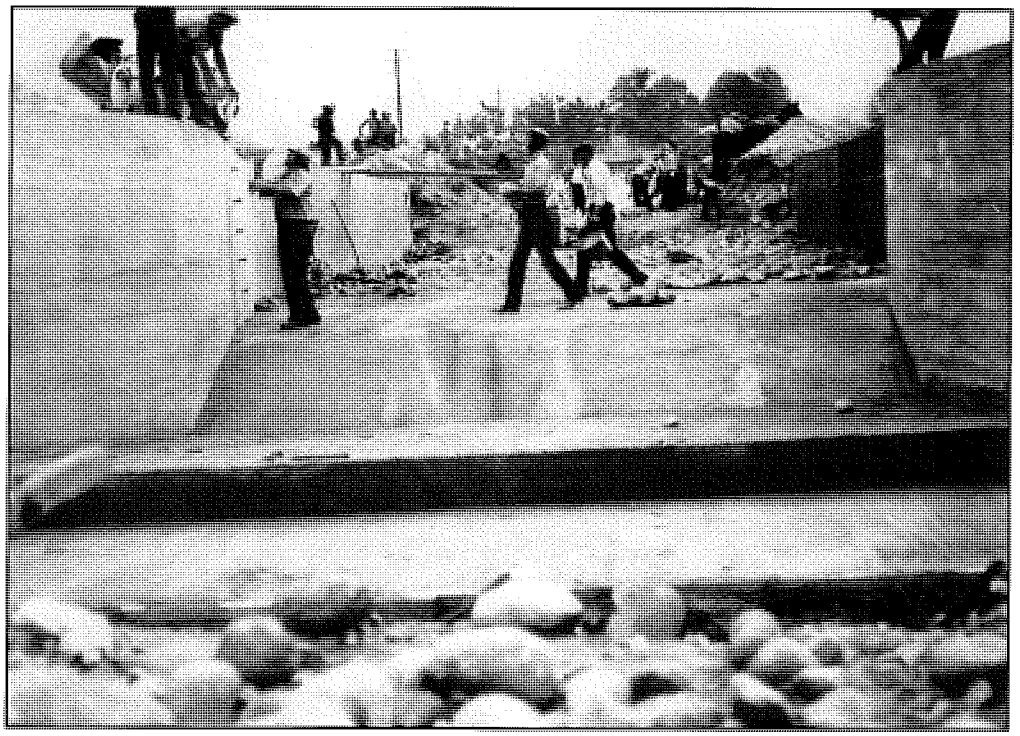
The general question of the history of development of spreading grounds has not been discovered by these authors at this time. By way of definition, spreading grounds are surface structures built on the floodplain adjacent to an active drainage. The structures take the form of contour ditches that are cut or built at angles away from the fall line of the drainage so that water from flood events is drawn to less steep channels and side ponds where the velocity of the water is slowed to allow percolation into the soil. Contour ditches were built in denticulate and bifurcating systems to maximize flood water retention. Thus a spreading ground could cover as many acres as the floodplain allowed. Of necessity the contour ditches were custom designed for their locations and were hand built (Photograph 1, Figure 4, *Historic Photographs,* on page 30). The engineering aspects of the construction of spreading grounds are repetitive, but because of topography and source materials each spreading grounds would have it unique characteristics. The historic photograph illustrates several key points. First, the appearance of primitive construction should not be confused with effectiveness, stability, and durability. The as-built structure illustrated easily represents remaining structures found today. Second, the date of the photograph (1926) is believed to commemorate the completion of a system (Earp, personnel communication). If that is the case, it may represent one of the earlier examples of large scale spreading grounds in the Santa Ana drainage (photograph courtesy of the San Bernardino Valley Water Conservation District)

In 1910 a Water Conservation Association was formed in the San Bernardino Valley with the mission of conservation of ground water, however, its functions, structure, and memberships are unknown. This time period (1910-1930 is not well known due the lack of readily available reference material, or records material sources being located in other regions. The Water Conservation Act of 1931 in California provided local citizens the opportunity to vote for the creation of the San Bernardino Valley Water Conservation District as a public agency. The district was organized to control water export form the drainage, to intervene with other agencies regarding water issues, to build hydroelectric plants and to oversee water development issues in the valley. The Water Conservation Association was dissolved in the 1940's and all assets were transferred to the District (San Bernardino Water Conservation District, public communication).

Attention was again turned to flood and water control measures as a result of the 1916 flood. The U.S.G.S. conducted a survey of the flood event (McGlashan and Ebert, 1918). But it wasn't until 1925 that the State of California allocated funds for a study of flood control and water conservation the Santa Ana River Basin (Funk 1978:1-4). One of the results of this study was the report by William S. Post (1928) which included the map of reservoirs, reservoir sites, and spreading grounds as well as potential spreading grounds (Figure 5, *1928 Map Showing Santa Ana Watershed -Spreading Ground Locations,* on page 31). In 1927 the State of



Photograph 1: Overview of typical contour ditch at completion of construction in April 1926. Note integrity shown.

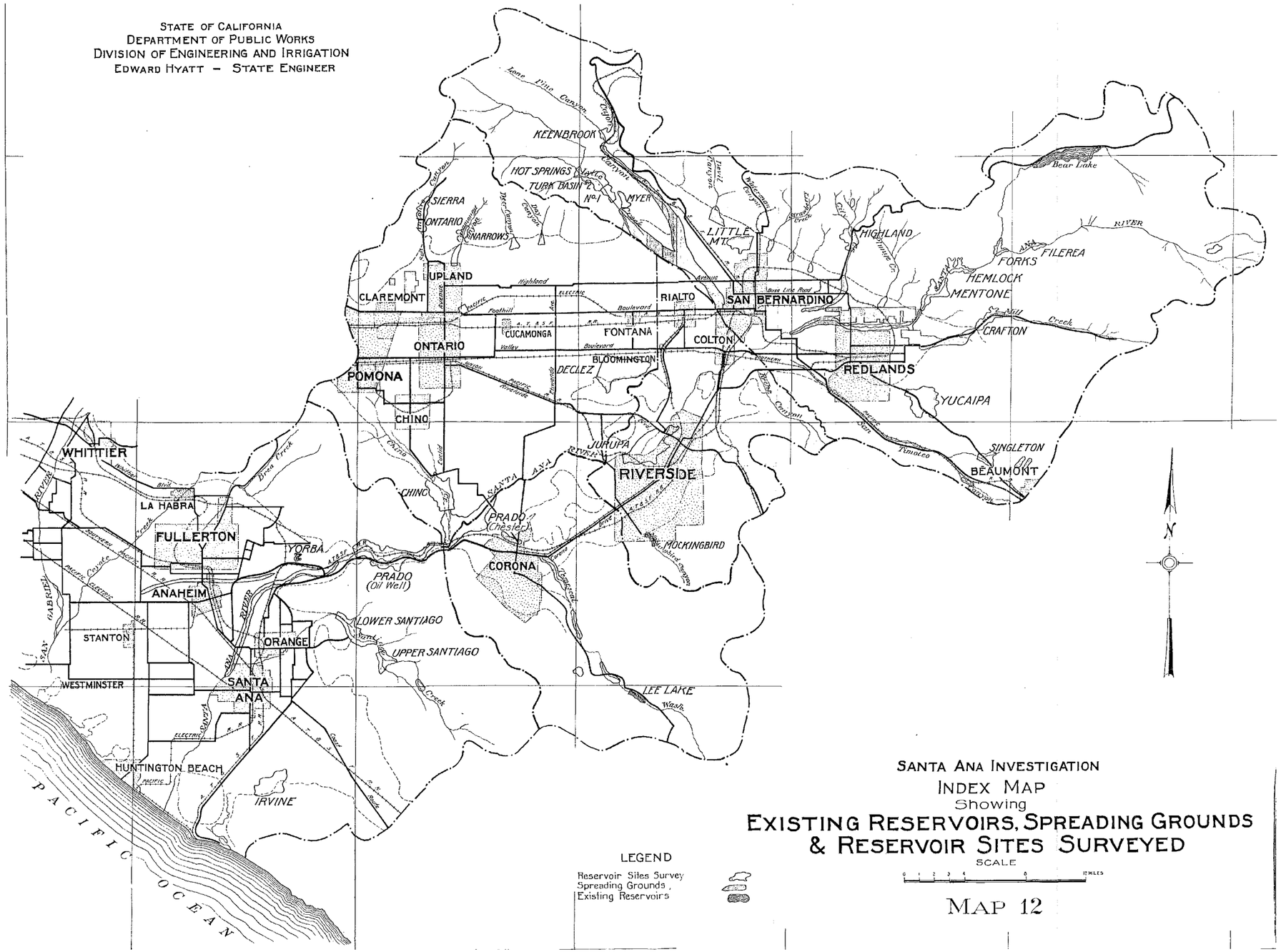


Photograph 2: Overview of the venturi flume (parshall flume) under construction near Highland, California in March 1933.

PCR

Figure 4
Lytle Creek Ranch
Historic Photographs

Source: PCR Services Corporation, 2008.



PCR

0 3 6 12 Miles

Source: State of California, Department of Public Works, Division of Engineering and Irrigation.

Figure 5
Lytle Creek Ranch
1928 Map Showing Santa Ana Watershed
and Spreading Ground Locations

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California provided $40,000 dollars of matching funds to local areas in the Santa Ana Watershed for flood. Control (Funk 1978:1-4). Apparently the State of California made a summary report of the Santa Ana River Basin in 1930 that discussed the decline of the ground water levels (Earp, personal communication); however, this volume has not been located.

The work of Post (1928) identified locations and some cost estimates for 50 Unit Projects within the drainage. The total range of water control features included: reservoirs, dikes, levees, canals, weirs, flumes, diversions, sandboxes, and spreading grounds. Lytle Creek is one of the spreading grounds he specifically discussed (Ibid:76-80), along with the Santa Ana cone, Mill Creek, the San Antonio debris cone, and the Cucamonga spreading grounds. At the time of his investigation the Lytle Creek spreading ground had been in existence for 16 years and had various sponsorships. For example in 1925-26 a concrete dam was built by the Lytle Creek Protective Association. The intake of the spreading ground supplied 5,000 linear feet of ditches and the area of the spreading ground was estimated at approximately 1,000 acres (1928:173).

By 1933-34 several flood control projects were underway in the Santa Ana Drainage including work on San Timeteo Creek, and the Santa Ana River. Historic photographs indicate the Water Conservation District had a hand in local administrator for Civil Works Administration and Civilian Conservation Corp s (CCC) workers for water projects in the area. Photographs of the work of 1933-34 are illustrative of the large scale of the work on flood control. Though construction was still predominantly hand labor, there is evidence of designed concrete structures such as the Venturi Flume under construction near Highland Avenue (see Photograph 2, Figure 4). At some point in this time period a CCC camp was built on the floodplain of the Santa Ana south of San Bernardino, and after the CCC abandoned the camp it became a migrant labor camp (Chris Bahnsen, personal communication). The specific location of this camp is unknown. It is believed to have been knocked down by a subsequent flood. (Earp, personal communication).

At the formation of the San Bernardino Valley Flood Control District in 1939 all issues concerning flood control structures can under its jurisdiction. That information should be available in files of the district, but early projects in the Lytle Creek area took a back seat to the war effort of World War II (Gibson, personal communication). By the end of World War II engineering technology had changed and construction emphasis on heavy machinery introduced different designs and approaches to flood control. Hand-built spreading walls were replaced by very large water retention basins that could be dug out using heavy equipment. Therefore by 1945 the Fontana Union Water Company spreading grounds had become obsolete. The diversion structures that have survived subsequent floods and other developments are physical representatives of a design technology for flood control in southern California dating approximately 1900-1939.

Wells

Apart from the spreading ground and flood control structures, the most dominant man-made features in the project site landscape are the remnants of the water wells. The distribution of these features identified in the project site is shown in Figure A.3, *Distribution of Water Wells in the Project Site*, in Appendix A. The physical remains of the well heads discussed below have been replaced by more sophisticated and durable well systems. The ownership and the management of those wells however are in the hands of companies and agencies that are the descendents of the early water developers and ditch companies in the San Bernardino area. The Fontana Union Water Company, the West San Bernardino Water District, and the San Bernardino Valley Municipal Water District, are three that continue to own and operate wells that are in or adjacent to the project area. They also continue to maintain easements in many of the original locations. They continue the legacy of water development (Leon Long, personal communication).

Summary

In summary the flood control system exemplified by the Fontana Union Water Company spreading ground may not be unique, but is rare. Other spreading ground locations were planned and developed in the Santa Ana watershed, however none appear to have been documented in the historical record. The twin attempts at minimizing the damage cause by unpredictable flood events, and harnessing flood waters to recharge the water table were not topics of scientific inquiry. The initial attempts appear to have been locally conceived and privately funded by the farmers and orchard owners that were most directly affected by flood events. Clearly the interceding by the U.S. Army Corps of Engineers in flood prevention efforts beginning in the central south in the early twentieth century brought great relief to threatened agricultural areas throughout the United States. However it appears that the flood control structures at Lytle Creek illustrate a time period that has been overlooked in the historical record, and as such constitute a rare resource in understanding early settler's adaptations to the limitations and requirements of practicing agricultural in Southern California.

5.2 SITE FINDINGS AND EVALUATIONS

The following section presents the Phase II results for each of the evaluated sites (see Figure A.1). Discussion includes original Phase I description, results of Phase II investigations, significance evaluation, and potential impacts. Illustration of the potential impacts according to the proposed development plan is shown in Figure A.4, *Phase II Sites in Relation to Development Plan*, in Appendix A.

LC-1H

Previous Description

Site LC-1H (Photograph 3, Figure 6, *Project Site Photographs,* on page 35) was recorded as the remains of a rectangular concrete feature located in Neighborhood VI. The feature measured 7 x 16 x 3 ft., oriented northeast-southwest. Seven bent rebar spaced 1 ft. 7 in. apart and a 3 x 2 ft. metal were noted on top of the feature. The concrete was noted as containing local aggregate. Condition of the feature was noted as intact and fair, with cracks in the concrete in a few areas that are filled with silicone caulking, likely a recent improvement. A small seven inch metal drainage pipe was noted 5 ft. south of the feature and the modern Fontana Water District building F-42 48 ft. to the northeast (Rockman et al. 2007:35-36).

Phase II Research

Information provided by Leon Long during the May 6 field visit indicates that LC-1H is the remains of an irrigation weir that was at one time associated with a still-active well located 10 meters to the northeast. This square box style of weir was typical of water well irrigation in that it allowed the water to be controlled and directed into different pipes or ditches to send water to different orchards or fields allowing the well to service the largest possible area. It is believed to have been built by the owner(s) of what would have been the nearby agricultural plots. The date of construction of the weir is unknown. The intake pipe from the well has long since been removed as have all of the feeder pipes. The water well associated with LC-1H is Well No. 45 of the San Bernardino Municipal Water District. Although the well is located within the Fontana Spreading Ground, it does not appear to be related to it.

Evaluation

Based on the site features and available information, site LC-1H does not appear to meet the criteria for eligibility for either the National Register or the California Register. Neither written records, nor personages can be associated with it. It is the remains of one feature of a multi-featured irrigations system and as such lacks sufficient integrity. This site is not related to the spreading ground features and is not related to well development by any of the local water management companies. Features of this type were common in irrigation systems where the source was a well and the transportation system was a pipe or a ditch, and several are still in existence in the area (Long, personal communication). The integrity of this site and its ability to convey the nature of its historic use is poor. Site recording and research prepared to date appear to have exhausted its information potential. PCR recommends that the site be considered not significant.

Impact Assessment

Site LC-1H is located within area designated as open space (Figure A.4). As such, the proposed project does not present a direct impact to the site. As the site is recommended to be not significant, no future work is recommended.

LC-9H

Previous Description

LC-9H (Photograph 4, Figure 6, *Project Site Photographs,* on page 35) was recorded as a large, round concrete tank and retention pond in Neighborhood I. No diagnostic features or artifacts were noted, and construction date of the tank and pond were considered to be unknown. The tank was measured as 30 ft. in diameter with walls 12 ft. high and 8 in. thick. The tank was constructed from layered brick and concrete laid in an upward spiraling fashion. The roof of the tank has burned and collapsed and it is now inside the tank. Inside the tank are large concrete columns that supported the roof. The tank is located on a south-facing slope and the northern portion of the tank is partially set into the slope. A water retention pond 131.2 ft. in diameter and 65.6 ft deep is located upslope to the north. A metal pipe located halfway up its western wall connects the retention pond and the tank. Both the interior and exterior walls of the tank have been defaced by modern spray paint graffiti. Overall, the site was assessed as being in fair to poor condition.

Phase II Research

The May 6 field revisit determined that the site is a cistern (above-ground water tank) that was part of a gravity feed water supply system for irrigation that included the catchment pond further up the slope. Water supply to the tank appears to have been limited to surface runoff. The outlet pipes for the water supply were probably removed many years ago. The site does not appear to be part of the Fontana Spreading Ground to the south. Due to its proximity to the Old Ellena Ranch, available documentation for the Ranch was reviewed for indication of such a tank as an improvement for the vineyard operations there (King 2001). No references to the tank were found in these documents. This does not rule out an association to the Ranch. Construction date of the tank is unknown. The quality of construction of the tank is poor, with a low number of rebar per quantity of concrete. The poor construction and low durability of the structure suggests minimal investment and so it appears that the functional life of the tank was intended to be short.

Photograph 3: Overview of LC-1H, view northwest.

Photograph 4: Overview of LC-9H, view southwest.

PCR

Figure 6
Lytle Creek Ranch
Project Site Photographs

Source: PCR Services Corporation, 2008.

Photograph 5: Overview of LC-10H, view southeast.

Photograph 6: Overview of LC-11H, view southeast.

PCR

Figure 7
Lytle Creek Ranch
Project Site Photographs

Source: PCR Services Corporation, 2008.

Evaluation

Based on the above description, site LC-9H does not appear to meet the criteria for eligibility for either the National Register or the California Register. Neither written records, nor personages can be associated with it. It is the remains of one feature of a multi-featured irrigation system and as such lacks sufficient integrity. This site is not related to the Fontana Spreading Ground and is not related to well development by any of the local water management companies. Features of this type were common in irrigation systems where the users had riparian land rights but perhaps no water rights such as a ditch membership or a well. Several are still in existence in the area (Leon Long, personal communication). The integrity of this site and its ability to convey historic relationships is poor. Site recording and research prepared to date appear to have exhausted its information potential. PCR recommends that the site be considered not significant.

Impacts Assessment

Site LC-9H is located within area designated as open space (Figure A.4). As such, the proposed project does not present a direct impact to the site. As the site is recommended to be not significant, no future work is recommended.

LC-10H

Previous Description

LC-10H (Photograph 5, Figure 7, *Project Site Photographs*, on page 38) was recorded as an octagon-shaped concrete feature located in Neighborhood III. Construction date of the feature was not determined. The outside diameter of the structure measures 12 ft. 2 in. There is an opening in the center of the structure that has a depth of 6 ft. 3 in. and a diameter of 9 ft. 4 in. A concrete slab extends southwest from the top of the feature. Underneath the walls of the structure are hanging metal drums which may have originally been base supports or columns set on the ground surface; erosion has removed sediments from beneath the metal drums. Overall, the site is in fair to poor condition.

Phase II Research

Information gathered during the May 6 field visit determined that LC-10H is a water well head that has eroded out. The concrete collar was anchored in the ground to support the small derrick used for drilling shallow wells. When the derrick was removed the collar served as support for the pump head. Concrete collar heads became standard for water wells drilled in

creek beds or ease of relocating and re-drillings after floods. The date 1954 is inscribed in the concrete of the site. The site is the property of the West San Bernardino County Water District.

Evaluation

Based on the above description, site LC-10H does not appear to meet the criteria for eligibility for either the National Register or the California Register. This site is not associated with the Fontana Spreading Ground. Due to lack of specific location data in the district files, the well number cannot be confirmed. No specific historic personage can be associated with it. Concrete collar well heads are common in the Santa Ana watershed as well as most other desert coastal streams where drilling was attempted in the streambeds. When the several water agencies that have wells on Lytle Creek are considered, this site is one of approximately 40 or more (Leon Long, personal communication). Due to the fact that all of the drive mechanisms and all of the pipeline connections have been removed, the integrity of this site and its ability to convey historic relationships is poor. Site recording and research prepared to date appear to have exhausted its information potential. PCR recommends that the site be considered not significant.

Impacts Assessment

Site LC-10H is located within area designated as open space-joint use (Figure A.4). As such, the proposed project does not present a direct impact to the site. As the site is recommended to be not significant, no future work is recommended.

LC-11H

Previous Description

LC-11H (Photograph 6, Figure 7, *Project Site Photographs*, on page 38) is an earthen ditch segment located in Neighborhood IV. It measures 193.2 ft. long and 9.8 ft. wide and 2 ft. high. Cobbles are stacked on top of the walls of the ditch. The ditch may be part of a ditch system that was constructed in the late nineteenth century prior to the digging of the Rialto Canal, which was in use 1888-1940. Additional research is needed to determine if the ditch was part of a larger ditch system. The ditch has been disturbed by flooding and is in fair condition.

Phase II Research

This is a bulldozer cut and not a purposefully built ditch. Per information provided by Leon Long, the indications of the bulldozer origin include unsorted rock along the walls as opposed to the selected consistent rock of built walls and the variable height of the wall as opposed to built walls that rise and fall in gradients. It was noted that the upstream end of the

ditch was truncated by the erosion of Lytle Creek which flows approximately three meters below the present ground surface of the ditch. There is some possibility the ditch was a bulldozer cut to extend an old south side dike for the creek during or after the 1938 flood.

Evaluation

Based on the above description, site LC-11H does not appear to meet the criteria for eligibility for either the National Register or the California Register. Neither written records, nor personages can be associated with it. It is the remains of random earth moving activity subsequent to one of the flood events and as such lacks sufficient integrity. This site is not related to the design of the Fontana Spreading Ground and is not related to well development by any of the local water management companies. Features of this type were common surface scars in rehabilitation of stream beds after floods and are found throughout the Lytle Creek and Santa Ana river drainages (Long, personal communication). The integrity of this location and its ability to convey historic activity is extremely poor. Site recording and research prepared to date have exhausted its information potential. PCR recommends that the site be considered not significant.

Impact Assessment

LC-11H is located within area designated as multi-family residential (Figure A.4). Development of this area presents a direct impact to the cut. As the cut is recommended to be not significant, no future work is recommended.

CA-SBR-6698H

Previous Description

Site CA-SBR-6698H was recorded in 1990 by Van Wormer and Langenwalter as two groupings of ditches, some rock lined and approximately 3-10 ft. deep, which together formed a spreading ground over an approximately 364-acre area. Both portions of site, separated by the current I-15 corridor, were relocated by PCR and found to be in similar condition, although the site has been disturbed by wildfires and flooding since 1990. Several intact piled-rock walls remain, although many have been disarticulated and destroyed. Overall, the site is in fair to poor condition. The boundary of the northern portion of the site was modified to cover a narrower area that extends farther to the northwest.

Phase II Research

As noted previously, the two loci of CA-SBR-6698H, along with CA-SBR-6706H, and the intervening CA-SBR-6705, are all part of what was known as the Fontana Union Water Company Spreading Grounds. Van Wormer and Langenwalter (1990) did not state any methodological reasons for recording the site in segments. They recognized the spreading grounds as a single coherent feature (1990:Fig.5) (attributed to U.S.G.S Devore Quadrangle, 1941). However in descriptive discussion they separate it as bisected by the active stream bed of Lytle Creek with CA-SBR- 6706H (PEL-89-3) (1990:Fig. 3) on the northeast bank and CA-SBR-6698H (PEL-89-4) (Ibid.) on the southwest bank. CA-SBR-6698H is subdivided to two loci with the same number presumably because they are both on the south bank of Lytle Creek with field designations of PEL-89-4 as located above and PEL-89-10 which is the extreme northwest (upstream) extension of the spreading grounds. The bisection and distance of separation of these two loci is attributed to intervening floods in the past 74 years and the construction of Interestate15 along with other development efforts. However the authors discuss the spreading grounds as a set piece (1990:16-19), identify interactive features, and locate them (Ibid: Fig.6). Since 1990 much of the single original site of the Fontana Union Water Company Spreading Grounds has been lost to natural events and surrounding development.

As described above, the clearest date information for development of the spreading grounds in this location is the report prepared by William Post in 1928 on potential water control features for the Santa Ana watershed. He identified locations and some cost estimates for 50 Unit Projects within the drainage. The total range of water control features included reservoirs, dikes, levees, canals, weirs, flumes, diversions, sandboxes, and spreading grounds (Figure 4). Lytle Creek is one of the spreading grounds he specifically discussed (Post 1928:76-80), along with the Santa Ana cone, Mill Creek, the San Antonio debris cone, and the Cucamonga spreading grounds. At the time of his investigation, a spreading ground along Lytle Creek had been in existence for 16 years, indicating an origin ca. 1912, and had various sponsorships. For example, in 1925-26 a concrete dam was built by the Lytle Creek Protective Association. Post noted that the intake of the spreading ground supplied 5,000 linear feet of ditches and that the overall area of the Lytle Creek spreading grounds was about 1,000 acres (1928:173).

The extent to which the spreading ground walls and ditches were expanded and updated after 1928 is not clear. As described above, federal work relief programs in the 1930s, including the CCC and the CWA, are known to have worked on several flood and water control-related projects in the project site vicinity, including the Santa Ana River and San Timoteo Creek. Information about CCC or CWA involvement in the Fontana Spreading Grounds may remain at the Fontana Union Water Company offices. As noted in Table 2, above, the files of the Fontana Union Water Company could not be accessed during research for this assessment. The large quantities of hand labor represented in the remaining portions of SBR-6698H appear to be

consistent with the quantities and types of work performed by the CCC and CWA in the Santa Ana drainage, as illustrated in Figure 5, above.

Field revisits during the Phase II evaluation identified three locations with intact and well-preserved dry laid stone walls that formed the basis of the Fontana Spreading Ground. These areas are delineated in Figure A.2, Intact Portions of CA-SBR-6698H and CA-SBR-6075H (Weir 3), in Appendix A and illustrated in Photographs 7-8, Figure 8, *Project Site Photographs,* on page 43. The northern location includes two culverts that diverted water along the stone walls. The two southern locations consist of extensive lengths of multiple walls (see Figure 7). Based on the style and height of the walls illustrated in the historic photographs above (see Figure 4) and the absence of tumbled rocks around the walls (see Figure 6), the condition of the walls appears to be similar to their originally constructed condition. Review of the Fontana Spreading Ground plan included in Dice et al. (2004:Exhibit 3, throughout) indicates that while the locations of the weirs and main line ditches were specified in an engineering plan, the individual walls do not appear to have been designed in advance. Several of the walls in the two southern locations have serpentine forms and most follow contours of the local ground surface.

Evaluation

Based on the above description, SBR-6698H meets several of the criteria of eligibility for both the National Register and the California Register, as follows:

Criteria Findings:

a. SBR-6698H is representative of the history of early water management in the upper Santa Ana drainage. Spreading ground technology was an early form of ground water recharge and flood control and management of water key to economic development of the area. Association of SBR-6698H with federal work relief programs of the 1930s is a data gap, but cannot be ruled out.

b. Available information has not indicated specific individuals instrumental in creation of spreading grounds.

c. SBR-6698H is a prime example of early water management construction in the Santa Ana drainage. The site appears to be one of few remaining examples of this period and type of construction. Integrity of selected remaining portions conveys the scope and style of construction.

d. Available information indicates that (Dice et al. 2004: Exhibit 3, throughout) indicates that the Fontana Spreading Ground was constructed according to an overall plan with individual walls built in response to local conditions. Therefore,

distribution of features contains retains information as water engineering skill and know-how of the early twentieth century.

As shown in the photographs in Figure 7, the three delineated portions of SBR-6698H retain the historic character of multiple rows of laid walls the surrounding setting, particularly views to the north, east, and west, retain integrity of the original setting of the spreading grounds. The remaining delineated portions are both recognizable as a historical resource and able to convey the reason for their significance. PCR recommends that this site be considered significant.

Impacts Assessment

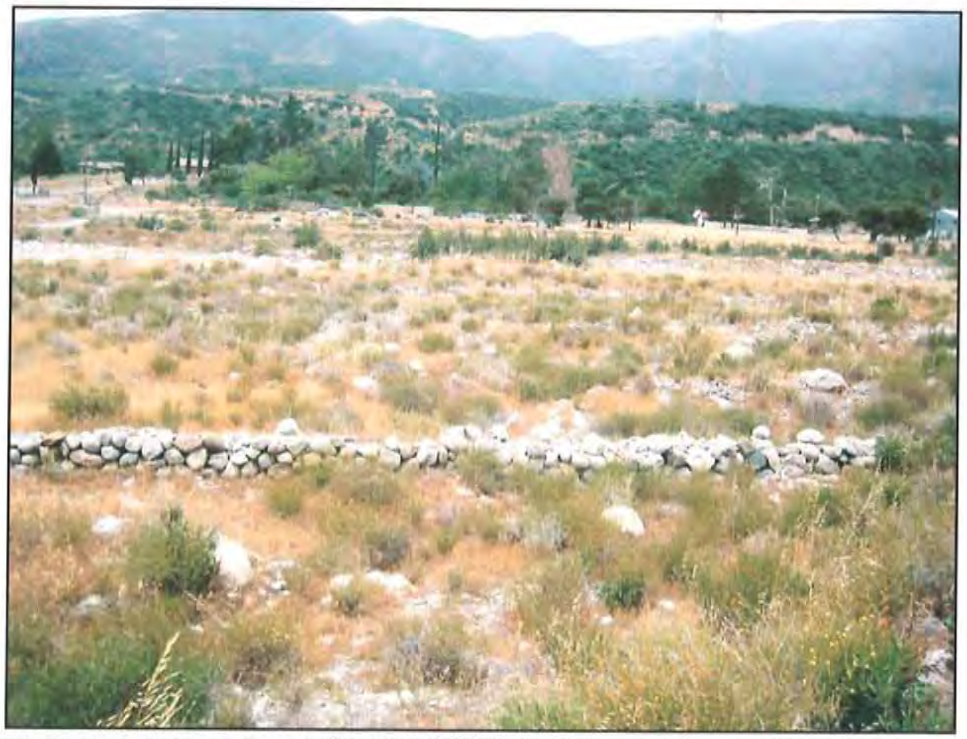
The northern intact portion of SBR-6698H is located within an area designated as open space. Therefore, the project does not present a direct impact to this location. The two southern locations are located in areas designated as single family residential, multi-family residential, and elementary school. These project site uses will directly impact these intact remaining portions of the site. Recommendations for future treatment of the site are described in Chapter 6, Conclusions and Recommendations.

CA-SBR-6699H

Previous Description

Site 6699H (Photograph.9, Figure 9, *Project Site Photographs,* on page 45) was recorded in 1990 by Van Wormer and Langenwalter as the Fontana Powerhouse and its grounds, intake, penstock, and outflow conduits in Neighborhood II. The original site form indicates that, although the outbuildings, intake, penstock, and outflow conduits were included in the site, the standing or above-ground portions had been removed prior to the site recording (Van Wormer 1989a). The Fontana Powerhouse facility was evaluated and determined that it appeared eligible for the National Register under Criterion A because it played an important role in the development of the area (Van Wormer and Langenwalter 1990). It has been recommended that the site be avoided, and that any potential impacts be discussed with its operator, Southern California Edison. The HRI (dated March 17, 2006) lists the Fontana Powerhouse as appearing eligible for the National Register under Criteria A and C as an individual property through survey evaluation as of April 22, 1997.

PCR relocated the Fontana Powerhouse. No traces of the outbuildings, intake, penstock, and outflow conduits were located. The Fontana Powerhouse is in operation and is regulated by Southern California Edison; due to this fact the grounds were not accessible. It appears to be in good condition. The original site recording indicated the site location with a dot. PCR defined a



Photograph 7: Overview of CA-SBR-6698H North Locus, view southwest.

Photograph 8: Overview of CA-SBR-6698H Main Locus, view southwest.

PCR

Figure 8
Lytle Creek Ranch
Project Site Photographs

Source: PCR Services Corporation, 2008.

Photograph 9: Overview of front elevation of CA-SBR-6699H, view northeast.

Photograph 10: Overview of CA-SBR-6700H, view west.

PCR

Figure 9
Lytle Creek Ranch
Project Site Photographs

Source: PCR Services Corporation, 2008.

boundary for the site based on the extant structure of the Powerhouse and adjacent fenced grounds.

Phase II Research

PCR assessed potential indirect impacts by reviewing the criteria under which SBR-6699H has previously been recommended eligible and potential indirect impacts to the site presented by the proposed project development plan. Photos were taken of the accessible elevations of the property and of views from the property to the east, south, west, and north (to the extent feasible) and were reviewed with PCR's Director of Historic Resources, Margarita Wuellner, Ph.D.

The site has been recommended eligible under Criteria A and C, which relate to its role in the history of the development of the area and its characteristic architectural style. The building retains these characteristics. Modern development has encroached the building to its southern and eastern sides. This nearby modern development does not detract from the ability of the building to convey its historic characteristics.

Evaluation

Based on the above description the site does meet the criteria to be eligible for nomination to both the National Register and California Register. The site still retains the fundamental features that make it eligible for inclusion on the National Register of Historic Places. PCR concurs with the earlier significance findings.

Impact Assessment

SBR-6699H is located outside the current project boundary and is still an active Southern California Edison facility. As such, the project will not directly impact the site. Surrounding development is planned as mixed use (Figure A.4). Information provided by Lytle Development Company indicates that the mixed use intended for this portion of the project site is anticipated to be commercial. The height and styles of this development has not been confirmed, but is anticipated to be one to two stories in height. Therefore, the potential for indirect impacts to the site appear to be low. Recommendations for future treatment of the site are described in Chapter 6, Conclusions and Recommendations.

CA-SBR-6700H

Previous Description

Site CA-SBR-6700H (Photograph10, Figure 9, *Project Site Photographs,* on page 45) was initially recorded by Van Wormer and Langenwalter in 1990 as a sandbox filtration building with a subsidiary gauging house related to the Fontana Powerhouse built in 1917 in Neighborhood III.

PCR relocated the site in the previously recorded location approximately 75 m south of the Fontana Powerhouse (CA-SBR-6699H). It is regulated by Southern California Edison. Due to this fact, the grounds were fenced off and not accessible. Although the sandbox was fenced off, PCR archaeologists were able to accurately assess the site condition. The site consists of the collapsed remains the sandbox filtration building. The site is in poor condition as it has collapsed since the previous recording in 1990 and is no longer.

Phase II Research

This site was leveled by Southern California Edison in June of 2008 due to public safety concerns.

Evaluation

No significance recommendation is possible as the site no longer exists.

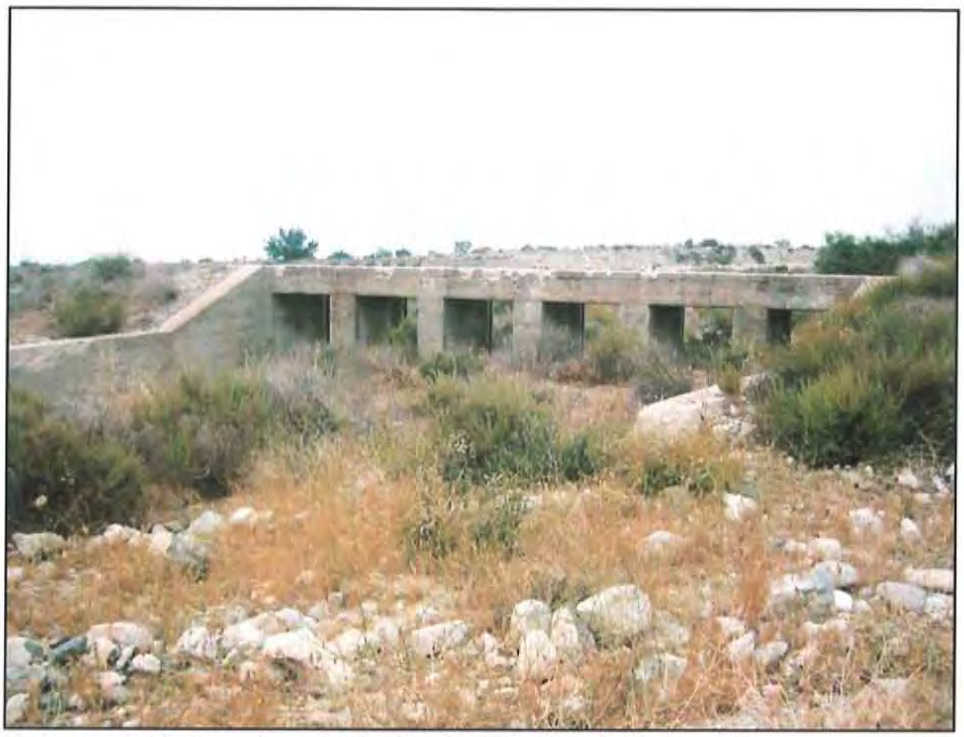
Impact Assessment

The site will not be affected by the proposed project.

CA-SBR-6705H

Previous Description

Site CA-SBR-6705H (Photographs 11 and 12, Figure 10, *Project Site Photographs,* on page 48) was initially recorded by as Van Wormer and Langenwalter in 1990 as two concrete weirs, with a grout and boulder spillway in between, located on the north and south sides of Lytle Creek Wash. PCR relocated the site. Overall, the site is the same as described by Van Wormer and Langenwalter (1990). The concrete weirs have been covered by spray paint graffiti. The spillway between the two concrete weirs has been improved with concrete and boulders.



Photograph 11: Overview of CA-SBR-6705H (Weir 3, North end), view southwest.

Photograph 12: Overview of CA-SBR-6705H (Weir 3, South end), view south.

PCR

Figure 10
Lytle Creek Ranch
Project Site Photographs

Source: PCR Services Corporation, 2008.

Photograph 13: Overview of northern spreading grounds of CA-SBR-6706H, view northwest.

Photograph 14: Overview of CA-SBR-6708H showing evidence of post flood event bulldozing, view east.

PCR

Figure 11
Lytle Creek Ranch
Project Site Photographs

Source: PCR Services Corporation, 2008.

The only disturbance indicated on the original site record is flood damage. Therefore it is possible that the graffiti and spillway repairs have been added since the original site recording in 1990. The site is in fair condition. Major disturbances are graffiti and remaining flood damage (Figure 10). The site boundary remains the same.

Phase II Research

Review of historic information indicates this structure is Weir No. 3 of the Fontana Spreading Grounds (previously recorded as PEL-89-12, Feature 2, Weir 3 in Langenwalter 1989, Van Wormer and Langenwalter 1990) and Dice et al. (2004). Information provided during the May 6 field visit by Mr. Long confirmed identification of the feature as a double weir and that a similar weir is located downstream near the intersection of Foothill and Rancho Avenues, outside of the project site. As the site is located within the channel of Lytle Creek, it is on property under the jurisdiction of the San Bernardino Flood Control District.

Evaluation

As SBR-6705H is part of the Fontana Spreading Grounds, it meets criteria of eligibility to the National Register and California Register established above for SBR-6698H as a contributing feature.

Criteria Findings:

a. The Fontana Spreading Ground is representative of the history of early water management in the upper Santa Ana drainage. Spreading ground technology was an early form of ground water recharge and flood control and management of water key to economic development of the area. Association of SBR-6705H with federal work relief programs of the 1930s is a data gap, but cannot be ruled out.

b. Available information has not indicated specific individuals instrumental in creation of spreading grounds.

c. SBR-6698H is a prime example of early water management construction in the Santa Ana drainage. The site appears to be one of few remaining examples of this period and type of construction. Integrity of selected remaining portions conveys the scope and style of construction.

d. Available information indicates that (Dice et al. 2004) indicates that the Fontana Spreading Ground was constructed according to an overall plan with individual walls built in response to local conditions. Therefore, distribution of features

contains retains information as water engineering skill and know-how of the early twentieth century.

SBR-6705H retains its historic location and setting and as such provides an anchor for the historic landscape of the Fontana Spreading Grounds. The feature is both recognizable as a historical resource and able to convey the reason for its significance. PCR recommends that this site be considered significant as a contributing feature of the Fontana Spreading Ground.

Impact Assessment

SBR-6705H is located within the channel of Lytle Creek in an area designated as open space (Figure A.4). Therefore, the site will not be subject to direct impacts from project development. As the site is recommended as significant, Recommendations for future treatment of the site are described in Chapter 6, Conclusions and Recommendations.

CA-SBR-6706H

Previous Description

Site SBR-6706H (Photograph 13, Figure 11, *Project Site Photographs,* on page 51) was initially recorded by Van Wormer and Langenwalter in 1990 and consists of earthen ditches and stacked-rock water diversion and control features and re-identified in 2004 by MBA (Dice et al. 2004:21).

PCR relocated the southern extension of site SBR-6706H. This part of the site is located in the eastern section of Neighborhood III northeast of Lytle Creek Wash. PCR identified stacked rock diversion walls and ditches which were part of the 1932 Fontana Spreading Grounds (Van Wormer and Langenwalter 1990). The site has been disturbed by wildfire, flooding, and overgrown vegetation. Although many of the stacked rock diversion walls are still relatively intact, many have been destroyed and reduced to rubble. Therefore the site is considered to be in fair to poor condition. The site boundaries within the project site remained the same; site boundaries for the area outside the project site were not evaluated.

Phase II Research

Archival research confirmed that this site is the northern extent of the Fontana Spreading Ground. The area covered by this site boundary appears to have included as much as 50 percent of the overall complex. Following evaluation by Dice et al. (2004) as not significant, the majority of the site was removed between 2004-2006 by subdivision development with the installation of streets, utility lines and site pads.

Evaluation

The evaluation made for this site (Dice, 2004) deemed the site not significant and subsequent actions have removed the majority of it. It noted the Dice (2204) did not evaluate the site in the context of water control features of the time period and did not evaluate it in relation to the remaining elements of the spreading ground. As developed above in reference to SBR-6698H, the Fontana Spreading Ground is representative of a the history of early water management and flood control in the upper Santa Ana drainage and may have associations with the federal work relief programs of the 1930s. Dice et al. (2004) also based the not significant evaluation on the low integrity of the remaining spreading ground features within the portion of the Fontana Spreading Ground defined by the SBR-6706H boundary. On the basis of PCR's Phase I field investigation and field revisit during the current assessment, the integrity of this site within the current project boundary is low and its ability to convey historic relationships is poor. On the basis of low integrity of the portion of SBR-6706H within the project site, PCR concurs with the conclusion of Dice et al. (2004) that SBR-6706H is not significant.

Impacts Assessment

SBR-6706H is located within area designated as open space (Figure A.4). As such, the proposed project does not present a direct impact to the site. As the site is recommended to be not significant, no future work is recommended.

CA-SBR-6708H

Previous Description

SBR-6708H (Photograph14, Figure 11, *Project Site Photographs,* on page 51) was initially recorded by Van Wormer and Langenwalter in 1990 as the remains of the Lytle Creek Land and Improvement Company Spreading Ground, consisting of the remains of a diversion box and stacked rock diversion features.

PCR relocated the spreading grounds comprised of ditches and stacked rock diversion walls. The remains of the diversion box were not identified. The stacked rock diversion walls were in poor condition and many were completely disarticulated. The site was noted as being in poor condition from flooding and overgrown vegetation. The site boundary remained the same.

Phase II Research

The field revisit to the site determined that the features of this area were partly confused with defensive dikes for SBR-6709H. Furthermore, the altered terrain is incoherent and appears

to resemble the remains of bulldozer work. It is clearly not the same construction or design technique of the Fontana Spreading Ground, represented by the intact portions of SBR-6698H to the west. Information provided by Leon Long during the May 6 field visit indicated that standard operating procedure for the San Bernardino Flood Control District is to re-grade and reconfigure the topography to minimize the potential damage of subsequent flood events. Based on the current condition of the site and this information, the actual age and historic associations of the identifiable features within this site location are questionable.

Evaluation

Based on the above description, SBR-6708H does not appear to meet the criteria for eligibility for either the National Register or the California Register. Papers identifying the site location as the Lytle Creek Ranch Spreading Ground have not been located. The lack of identifiable associations and the late twentieth century surface modification of the area render the site complete as recorded in 1990. The integrity of this site and its ability to convey historic relationships is poor. Site documentation compiled to date appears to have exhausted its information potential. PCR recommends that this site be considered not significant.

Impacts Assessment

SBR-6708H is located in areas designated for single-family residential and open space-recreational and so will be directly impacted by the proposed project (Figure A.4). As the site is recommended as not significant, no recommendations are made for future treatment.

CA-SBR-6709H

Previous Description

Site CA-SBR-6709H (Photograph 15, Figure 12, *Project Site Photographs,* on page 54) was initially recorded by Van Wormer and Langenwalter in 1990 as two concrete machinery mounts, a diversion weir, and a concrete masonry wall. PCR relocated the site and all of the previously recorded features. Features include two concrete machinery mounts, a diversion weir, and a concrete masonry wall. The site is disturbed by spray paint graffiti and it appears that that diversion weir has been used recently as a social gathering place as there is a sheet of modern trash throughout the site. The site is in fair to poor condition; the structures are still standing but have been disturbed by vandalism. The site boundary remains the same.

Photograph 15: Overview of CA-SBR-6709H, view northwest. Motor mount in background, water well head in foreground.

Photograph 16: Overview of Locus A of CA-SBR-6872H, view north. Motor mount in foreground, water well head in background.

PCR

Figure 12
Lytle Creek Ranch
Project Site Photographs

Source: PCR Services Corporation, 2008.

Photograph 17: Overview of Locus B of CA-SBR-6872H, view northeast. Motor mount in foreground, water well head in background.

Photograph 18: Overview of Locus C of CA-SBR-6872H, view north. Motor mount in foreground, water well head in background.

PCR

Figure 13
Lytle Creek Ranch
Project Site Photographs

Source: PCR Services Corporation, 2008.

Photograph 19: Overview of Locus D of CA-SBR-6872H, view north.

Photograph 20: Overview of Locus E of CA-SBR-6872H, view east.

PCR

Source: PCR Services Corporation, 2008.

Figure 14
Lytle Creek Ranch
Project Site Photographs

Photograph 21: Overview of CA-SBR-7201H, view north.

PCR

Figure 15
Lytle Creek Ranch
Project Site Photographs

Source: PCR Services Corporation, 2008.

Phase II Research

Information provided by Leon Long during the May 6 site revisit and comparison with other features in the area determined that this site is not a flood control structure but is a water well head and motor mount. This is one of several that are owned by the West San Bernardino Water District (Leon Long, personal communication) Due to lack of identifying markers, the specific number of this well could not be confirmed. This well is abandoned; however abandonment should not be confused with relinquishing water rights. Even though the well is not in use the districts usually drills a replacement well and retains rights of water ownership (Leon Long, personal communication). One of the features is a weir for water delivery, the same concept as LC-1H, but a more industrial and later design. The piers are motor mounts for the pumps and their height is for protection against floods, as is the height of the weir and well head

Evaluation

Based on the above description, SBR-6709H does not meet the criteria to be eligible for nomination to any of the above registers. The site is the property of the West San Bernardino County Water District. Due to lack of specific location data in the district files, the well number cannot be confirmed. Concrete collar well heads are common in the Santa Ana watershed as well as most other desert coastal streams where drilling was attempted in the streambeds. Between the several water agencies that have wells on Lytle Creek, this site is one of approximately 40 or more (Leon Long, personal communication). Due to the fact that all of the drive mechanisms and all of the pipeline connections have been removed, the integrity of this site and its ability to convey historic relationships is poor. Site documentation compiled to date appears to have exhausted its information potential. PCR recommends that this site be considered not significant.

Impact Assessment

SBR-6709H is located in an area designated for mixed use (Figure A.4) and so will be directly impacted by the proposed project. As the site is recommended as not significant, no recommendations are made for future treatment.

CA-SBR-6872H

Previous Description

SBR-6872H Locus A (Photograph 16, Figure 12, *Project Site Photographs*), Locus B and Locus C (Photographs 17-18, Figure 13, *Project Site Photographs*, on page 56), Locus D and Locus E (Photographs 19 and 20, Figure 14, *Project Site Photographs* on page 57) were

originally identified by Foster and others (1991) in the south central portion of Neighborhood II as five loci (A through E) containing historical-period concrete structures widely distributed across an area of approximately thirteen acres. PCR relocated the site and all five loci. All of the concrete structures remain intact and standing. All have been disturbed by spray paint graffiti and modern trash. No artifacts were observed in association with these concrete structures. The site is in fair to poor condition. The original site boundary does not appear to have included Loci D or E. PCR extended the site boundary to the north to include Loci D and E and contracted the site boundary in the south to reflect the re-identified distribution of Loci A, B, and C.

Phase II Research

Information gathered during the May 6 field visit determined that this site consist of four wells and a standpipe. Most of these are also owned by the West San Bernardino County Water District (WSBCWD) and abandoned (Leon Long, personal communication). They are of slightly different design configurations because they were built at different times and used different pumping mechanisms and/or drive systems. Therefore the site has five loci and should not be considered a polygon or site area. Locus A is WSBCWD well No.1, Locus B is WSBCWD well No. 3. The well at locus C is a WSBCW well but its number could not be confirmed. The well at Locus E is not a WSBCWD well because the electrical lines running to the locus indicate the use of an electrical motor for the pump, which was a system the WSBCW did not have. The stand pipe is simply an air pressure release for the water feed pipes from the well pumps to the raw water feed line. (Leon Long, personal communication).

Evaluation

Based on the above description, SBR-6872H does not appear to meet the criteria for eligibility for either the National Register or the California Register. The site is the property of the WSBCWD. Between the several water agencies that have wells on Lytle Creek, this site is one of approximately 40 or more. Concrete collar well heads are common in the Santa Ana watershed as well as most other desert coastal streams where drilling was attempted in the streambeds. (Leon Long, personal communication). Due to the fact that all of the drive mechanisms and all of the pipeline connections have been removed from all of the loci, the integrity of this site and its ability to convey historic relationships is poor. Documentation compiled to date appears to have exhausted its information potential of the loci. PCR recommends that these site loci be considered not significant.

Impact Assessment

SBR-6872H is located in areas designated primarily for single-family residential and open space-recreational and so will be directly impacted by the proposed project (Figure A.4).

As the site is recommended as not significant, no recommendations are made for future treatment.

CA-SBR-7201H

Previous Description

SBR-7201H (Photograph 21, Figure 15, *Project Site Photographs,* on page 60) was initially recorded by Brown and Gregory in 1992 as a group of historical-period concrete and iron structures representing two buildings, water-handling structures, and a wooden floor built between 1910 and 1920 located near the southeast boundary of Neighborhood II.

PCR relocated the site and all of the previously recorded features. PCR identified all of the features that were previously recorded, including remains of the possible water-handling features and wooden floor. The concrete of the concrete and iron structures is cracked and has been vandalized by spray paint graffiti. Overall, the site is in fair to poor condition. The site boundary remains the same.

Phase II Research

Information collected during the May 6 field revisit confirmed that the site is the remains of a well and attendant shack. Mr. Long identified a natural gas pipe extending from one slab. It would have been used to fuel a natural gas driven motor for the water pump. At this particular site there seemed to have been various pump drive systems employed through time, but it is very difficult define them based solely on the concrete platforms. This site was confirmed as WSBCWD well No.6 (Leon Long, personal communication). Previous maps of the site were confirmed to be accurate. Overall condition of the site is poor, remains of the shack are minimal and there are few remaining technological details of the pump systems associated with the well. All of the concrete slabs and piers are in a state of deterioration.

Evaluation

Based on the above description, SBR-7201H does not appear to meet the criteria for eligibility for either the National Register or the California Register. The site is the property of the West San Bernardino County Water District. Concrete collar well heads are common in the Santa Ana watershed as well as most other desert coastal streams where drilling was attempted in the streambeds. Between the several water agencies that have wells on Lytle Creek, this site is one of approximately 40 or more (Leon Long, personal communication). Due to the fact that all of the drive mechanisms and all of the pipeline connections have been removed and the remains of the shack are minimal, the integrity of this site and its ability to convey historic relationships

is poor. Documentation compiled to date appears to have exhausted its information potential of the loci. PCR recommends that these site loci be considered not significant.

Impact Assessment

SBR-7201H is located in an area designated for single-family residential use and so will be directly impacted by the proposed project (Figure A.4). As the site is recommended as not significant, no recommendations are made for future treatment.

6.0 CONCLUSIONS AND RECOMMENDATIONS

6.1 SUMMARY

The thirteen sites that were evaluated for identification and significance determinations as part of this assessment are all historical-period period sites dating between approximately 1912 and 1939. The sites fall into four general categories; contour ditches and weirs of spreading grounds, water wells and attendant features, water storage devices, and electrical power.

Field and archival research was used to gather additional contextual and condition information for each site, as presented in Chapter 5, Results. One site, SBR-6700H, has recently been removed due to safety concerns. Applying the criteria of significance for the National Register of Historic Places, the California Register of Historical Resources, and the Guidelines of the California Environmental Quality Act to the remaining 12 sites, nine are recommended to be not significant. Three sites, including SBR-6698H and SBR-6705H, both remains of the Fontana Spreading Ground, and SBR-6699H, the Fontana Power Plant, are recommended to be significant under one or more significance criteria and will require further treatment and mitigation. Evaluation findings are summarized in Table 3, *Site Significance Evaluations,* on page 63.

In summary, the flood control system exemplified by the remains of the Fontana Union Water Company Spreading Ground recorded as sites SBR-6698H and SBR-6705H cannot be confirmed to be unique, but do appear to be rare. Other spreading ground locations were planned and developed in the Santa Ana watershed (Post 1928); however none appear to have been documented in the historical record. The twin attempts at minimizing the damage cause by unpredictable flood events, and harnessing flood waters to recharge the water table have not been topics of detailed scientific inquiry. The initial attempts appear to have been locally conceived and privately funded by the farmers and orchard owners that were most directly affected by flood events. Clearly the interceding by the U.S. Army Corps of Engineers in flood prevention efforts beginning in the early twentieth century brought great relief to threatened agricultural areas throughout the United States. However it appears that the water control structures that remain at SBR-6698H and SBR-6705H illustrate a time period that has been overlooked in the historical record, and as such constitute a important resource in understanding early settler's adaptations to the limitations of water supply and requirements of agriculture in Southern California. For these reasons, PCR recommends these two sites as significant and eligible to the National Register and California Register.

Table 3

Site Significance Evaluations

Site No.	Identification	Previous Recommendation	California Register Recommendation	National Register Recommendation	Mitigation Recommendation
LC-1H	Water well irrigation weir	None	Not eligible	Not eligible	None
LC-9H	Surface runoff water supply tank	None	Not eligible	Not eligible	None
LC-10H	Water wellhead	None	Not eligible	Not eligible	None
LC-11H	Bulldozer cut	None	Not eligible	Not eligible	None
CA-SBR-6698H	Fontana Spreading Ground: contour ditches and walls	Eligible	Eligible	Eligible	Recommend National Register Nomination, HALS recording and preservation
CA-SBR-6699H	Fontana Powerhouse	Eligible	Eligible	Eligible	No direct impacts. Indirect impacts recommended to be less than significant.
CA-SBR-6700H	Fontana Powerhouse sandbox	Not Eligible	Not Eligible	Not Eligible	Site has recently been removed. None
CA-SBR-6705H	Fontana Spreading Grounds: Weir No. 3	Eligible	Eligible	Eligible	Recommend National Register Nomination, HALS recording and preservation
CA-SBR-6706H	Fontana Spreading Grounds	Eligible (Van Wormer and Langenwalter 1990)/Not Eligible (Dice et al. 2004)	Not Eligible	Not Eligible	None
CA-SBR-6708H	Undefined spreading ground features	Eligible	Not Eligible	Not Eligible	None
CA-SBR-6709H	Water wellhead and motor mount	None	Not Eligible	Not Eligible	None
CA-SBR-6872H	Four water wellheads and one standpipe	None	Not Eligible	Not Eligible	None
CA-SBR-7201H	Water	None	Not Eligible	Not Eligible	None

Source: PCR Services Corporation, 2008.

Site SBR-6699H, the Fontana Power Plant, has previously been recommended eligible to the National Register under Criteria A and C, which include its associations with the development area and its architectural styling characteristic of the early twentieth century. PCR's investigation confirmed that the site retains these characteristics and so PCR concurs with the previous evaluations.

6.2 RECOMMENDATIONS

Based on the application of the criteria of site significance on the evaluations in the sites in the descriptions above, the following sites are not significant and do not require mitigation: LC-1H, LC-9H, LC-10H, LC-11H, SBR-6706H, SBR-6708H, SBR-6709H, SBR-6872H, and SBR-7201H. Site SBR-6700H has already been removed by Southern California Edison and requires no further work.

SBR-6699H, the Fontana Power Plant, has been previously recommended eligible to the National Register and PCR concurs with these findings. The site is currently outside of the project site boundaries and, per the project development plan, is adjacent to an area proposed for mixed-use development (see Figure A.4). Modern development currently surrounds the site to the south and at a distance to the east. The criteria by which the SBR-6699H has been recommended eligible to the National Register are its associations with the history of the region (Criterion A) and its representations of a characteristic style (Criterion C). Development of the surrounding area with mixed-use development will not adversely affect the potential for the building to convey its significance. PCR understands that the building remains in use and is under the management of Southern California Edison. No further work is recommended.

Based on the application of the criteria of site significance on the evaluations in the sites in the descriptions above, the following sites are significant and do require further treatment or mitigation: SBR-6698H and SBR-6705H, the Fontana Spreading Ground

SBR-6698H and SBR-6705H

SBR-6698H and SBR-6705H contain substantial intact elements of the Fontana Union Water Company spreading grounds which are water control features of a bygone era. The three intact areas of the Fontana Spreading Ground delineated in Figure A.2 retain integrity of form and setting. Impacts to the site from the proposed project (Figure A.4) indicate that project will not directly affect the northern intact section and does include complete removal of the two southern intact areas, which are the largest and best preserved sections. Therefore, PCR recommends the following measures for this site:

Cult-1 The Applicant shall retain a qualified cultural resources consultant to prepare and submit a National Register nomination form for the Fontana Spreading Ground, incorporating SBR-6698H and SBR-6705H. A qualified cultural

resources consultant is defined as meeting the Secretary of the Interior Professional Qualification Standards for Archaeology or Architectural History. Copies of the nomination form shall be submitted to the City of Rialto, the California Historical Resources Information System San Bernardino Archaeological Information Center (CHRIS-SBAIC), and the California State Archives.

Cult-2 Prior to the issuance of a demolition/construction permit, intact portions (including the intact portions delineated in Figure A.2, but may include other portions if they are identified during preparation of the National Register nomination) that will be directly impacted (that is, removed) by project development shall be documented by means of a Historic American Landscape Survey (HALS) recordation, Level II. This level of documentation includes large-format archival-quality black-and-white photographs linked a detailed site plan and a written narrative. Completion of the HALS recordation shall be implemented prior to the commencement of construction activities. This documentation shall be prepared by a qualified architectural historian or historic landscape architect and a photographer experienced in Historic American Building Survey (HABS)/HALS photography. The overall landscape layout, structural elements and features, as well as the property setting and contextual views shall be documented. Original archival prints and negatives of the photographs shall be submitted to the Library of Congress. Original archival prints shall also be submitted to the California State Archives. Archival copies of the documentation shall be distributed to the CHRIS-SBAIC and the Rialto Public Library. Recordation would reduce the adverse impacts of the proposed project by retaining important historical information and images, and recording existing physical conditions in archival format, which are important to address project impacts that would detract from the property's eligibility for listing in the National Register of Historic Places under Criteria A, C and D.

Alternative to Cult-2

Cult-3 The Applicant shall develop and incorporate into the project planning a preservation plan for a representative portion or portions of the southern intact sections of SBR-6698H. The preservation plan shall be developed by a qualified archaeologist or architectural historian. A qualified archaeologist or architectural are defined as meeting the Secretary of the Interior Professional Qualification Standards for Archaeology or Architectural History. The preservation plan shall include a detailed map of the intact portions of SBR-6698H, place the portion or portions in perpetual open space, and present interpretive information about the site and its history accessible to the public. Interpretive information shall include appropriate informative signage and public access. The preservation plan shall be reviewed by the Applicant, the City, and the California Office of Historic Preservation prior to implementation.

7.0 CERTIFICATION

CERTIFICATION: I hereby certify that the statements furnished above and in the attached exhibits present the data and information required for this archaeological report, and that the facts, statements, and information presented are true and correct to the best of my knowledge and belief.

DATE: June 25, 2007

SIGNED: Marcy Rockman

Marcy Rockman, Ph.D., RPA
Acting Director of Archaeological and Paleontological Resources/Principal Archaeologist
PCR Services Corporation

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APPENDIX A: PROJECT SITE MAPS

Confidential

Contains archaeological site location information. Not for public distribution.

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Appendix D

LYTLE CREEK RANCH

PROJECT SITE MAPS

CONFIDENTIAL: NOT FOR PUBLIC DISSEMINATION

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APPENDIX B: PERSONNEL

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Marcy Rockman, Ph.D., RPA, ACTING DIRECTOR, PRINCIPAL ARCHAEOLOGIST

Education

- Ph.D., Anthropology, University of Arizona, Tucson, Arizona, 2003
- M.A., Anthropology, University of Arizona, Tucson, Arizona, 1995
- B. Sc., Geology, (Magna cum Laude), College of William and Mary, Williamsburg, Virginia, 1993

Continuing Education

- Riverside County Archaeology and Cultural Sensitivity Training Program, 2007
- CEQA, Cultural Resources, UCLA Extension,2006
- SB 18 Consultation, 2005
- Section 106, Principles and Practice, SRI Foundation, 2004

Professional Affiliations

- Society for American Archaeology Government Affairs Committee
- Society for American Archaeology
- Society for Historical Archaeology
- Archaeological Institute of America
- Research Associate, Cotsen Institute of Archaeology, University of California, Los Angeles

Expertise

Marcy Rockman has 15 years of experience in the fields of anthropology and archaeology. Her broad education and professional experience has given her a unique perspective and insight into the history of landscapes and natural resource use, environmental and historical archaeological excavations, geological investigations, mapping and evaluation, archaeology and public policy, and Old World prehistory.

Dr. Rockman is an experienced teacher and has authored or co-authored seven articles for scientific journals and books published domestically and abroad. These publications have included title s such as "Landscape Learning in Relation to Evolutionary Theory" and "Colonization of Unfamiliar Landscapes: Archaeology of Adaptation." Dr. Rockman has more than five years of undergraduate teaching experience including classroom, laboratory, and field instruction.

Experience

Dr. Rockman has extensive research experience in the fields of archaeology and geography. Her international work includes surveyed and test excavations at Late Bronze Age and Early Iron Age settlements in Armenia, a geophysical survey of Roman sites in the Tiber Valley in Italy, and survey and modeling of Late Paleolithic flint use in England and France.

Her field work includes projects in cooperation with the U.S. Army Corps of Engineers, the U.S. Air Force, and local governments. She developed a Geographic Information Systems (GIS)-based landscape use model of archaeological survey data for the Barry M. Goldwater Air Force Range and directed fieldwork and major report preparation for several excavation projects in southern California. She co-authored innovative four-field anthropological studies of ethnicity and group affiliation for repatriation projects pursuant to the Native American Grave Protection and Repatriation Act (NAGPRA). Other technical specialties include historical context development and lithic source analysis. Her regional experience includes a wide range of construction and land management projects across the Western United States including locations in Arizona, Colorado, Utah, Texas and Wyoming, as well as California.

Presentations: Dr. Rockman has presented her research at over 20 scientific conferences in the U.S., Canada, England, and Puerto Rico, and frequently presents her ongoing research in public lectures through the University of California, Los Angeles.

John D. Gooding, SENIOR ARCHAEOLOGIST

Education

- M.A., Anthropology, Northern Arizona University, Flagstaff, Arizona, 1976
- B.S., Anthropology, Colorado State University, Fort Collins, Colorado, 1969

Continuing Education

- Cultural Resources Protection under CEQA, NEPA and Other Legislative Mandates, UCLA Extension, 2008

Professional Affiliations

- Society for American Archaeology

Expertise

John Gooding is an archaeologist with over 35 years of experience throughout the western United States. He is experienced in both historic and pre-historic archaeology, and has led major excavations and the excavation of human burials. Mr. Gooding's Master's thesis focused on hunter-gatherer subsistence patterns. He specializes in assessing the techno-functionality of stone tools. His technical analysis of bone awls excavated from Anasazi dwellings in the Durango South Project was the first analysis of its kind.

Among Mr. Gooding's accomplishments include his two gubernatorial appointments to the Colorado State Historical Preservation Review Board of the Colorado State Historical Society and recipient of a Fulbright Research Fellowship in El Salvador. Mr. Gooding has published over 20 reports, and presented seven papers during his career.

Experience

Mr. Gooding has over 15 years of experience preparing reports compliant with the National Environmental Policy Act's (NEPA) Section 106 requirements. He served as the Principal Investigator for all archaeological matters for the Colorado Department of Transportation (CDOT) for 12 years. His position at CDOT allowed him to work in coordination with the U.S. Forest Service and the Bureau of Land Management (BLM). In addition to his work with federal agencies, Mr. Gooding has extensive experience working with Native American Groups and addressing Native American Graves Protection and Repatriation Act (NAGPRA) procedures and concerns.

While with PCR, Mr. Gooding's has peer reviewed a Phase I report for Dailey Ranch, a proposed development near Cajalco Creek in Riverside County, California, prepared a number of proposals, and provided technical oversight for ongoing projects.

Prior to joining PCR, Mr. Gooding prepared an assessment of the archaeology of Vail Pass Camp. He prepared the report discussing a base-camp in the southern Rockies that would potentially be impacted by the inclusion of a rest area. Although the rest area would ultimately be developed around the site, the site was excavated and an interpretive center was established as a mitigation measure. Mr. Gooding prepared the report for CDOT, and led the excavation of the base-camp.

Bureau of Land Management: While with CDOT, Mr. Gooding prepared the first joint report between the BLM and the Colorado Division of Highways. The report addressed the required mitigation for the destruction of the Sisyphus Shelter, a significant cultural site, by the construction of Interstate 70. Excavation of the shelter complex, examination of the features discovered, and extensive analysis concluded that the Sisyphus were hunter-gatherers of the Uncompahgre Complex occupying the northern Colorado Plateau.

Kyle Garcia, ASSOCIATE ARCHAEOLOGIST

Education

- B.A., Physical Anthropology, University of California, Santa Barbara, California, 2004

Continuing Education

- Cultural Resources Protection Under CEQA and Other Legislative Mandates, UCLA Extension, 2008
- Riverside County Archaeology and Cultural Sensitivity Training Program, 2007
- 40-Hour HAZWOPER Training, 2007

Professional Affiliations

- Society for American Archaeology
- Society for California Archaeology
- Pacific Coast Archaeological Society
- Orange County Natural History Museum

Expertise

Kyle Garcia has over five years of experience in the academic and professional field of archaeology. His coursework and consulting career have given him the opportunity to attain a general knowledge of archaeological resources in coastal, interior and island settings. Mr. Garcia specializes in faunal analysis and has worked in faunal laboratories at the University of California, Santa Barbara and the Santa Barbara Museum of Natural History. He has managed projects, conducted surveys, constructions monitoring, impact analyses, and site assessments. Mr. Garcia has also evaluated resources for the California and National Register of Historic Places, conducted test excavations, historic building research, technical report writing, client/agency coordination, Native American coordination, artifact processing, laboratory management, and site recordation.

Experience

Mr. Garcia has contributed his services and expertise to over 100 projects at PCR subject to requirements of the California Environmental Quality Act (CEQA), Section 106 of the National Historic Preservation Act (NHPA), the National Environmental Quality Act (NEPA), and other federal, state and local regulations. These projects included infrastructure, utility, parks, mixed-use, residential, industrial, and commercial developments that served a variety of public and private sector clients throughout California and Arizona.

Mr. Garcia has also gained valuable experience with recording historic and prehistoric archaeological sites with Garmin, Magellan, and sub-meter Trimble GeoXT Global Positioning System (GPS) units. During his employment at PCR, he has worked with Geographic Information Systems (GIS) software such as ArcPad, ArcGIS, and ArcView, and developed methods for using these products to accurately and efficiently record archaeological sites. Also during his tenure at PCR, Mr. Garcia has been cross-trained in paleontological mitigation monitoring and assisted in the excavations of a Miocene whale fossil near Irvine, California.

Specific Project Experience: Mr. Garcia has served as Project Manager or Deputy Project Manager for over 25 Southern California Edison (SCE) projects that were subject to requirements of CEQA, Section 106 of the NHPA, and other local ordinances. These projects included deteriorated pole replacements, conduit and vault installations, and distribution circuit installations (above ground and underground) located throughout the service area of SCE. Mr. Garcia not only managed the budgets and supervised the work for these projects, but also conducted most of the record searches, surveys, report writing, site recordation, and client/agency coordination for these projects. In addition, Mr. Garcia supervised and participated in the emergency on-call archaeological survey and monitoring services for SCE property that was affected by the Devore Heights, Corral and Santiago Fires located in Devore, Malibu and eastern Orange County, California, respectively. These projects entailed rapid response services including close-interval surveys, construction monitoring, and sensitivity assessments for SCE property in areas damaged by the fires.

Presentations: Mr. Garcia presented a paper at the 72nd Annual Meeting for the Society of American Archaeology Conference in Austin, Texas in 2007. The paper focused on prehistoric 'yoni' features encountered on a project site proposed to be developed in western Riverside County, California. The project was subject to requirements of CEQA and Section 106 of the NHPA.

Margarita J. Wuellner, Ph.D., ACTING DIRECTOR, PRINCIPAL ARCHITECTURAL HISTORIAN

Education

- Ph.D., Art History, University of California, Los Angeles, California, 2005
- M.A., Architectural History, University of Virginia, Charlottesville, Virginia, 1991
- Certificate of Historic Preservation, University of Virginia, Charlottesville, Virginia, 1991
- B.A., Art History, Oberlin College, Oberlin, Ohio, 1983

Professional Affiliations

- Society of Architectural Historians
- California Preservation Foundation
- National Trust Forum, Center for Leadership, National Trust for Historic Preservation
- Documentation and Conservation of Buildings, Sites and Neighborhoods of the Modern Movement

Expertise

Margarita J. Wuellner, Ph.D., has over 19 years of experience in the practice of architectural history, historic preservation, and cultural resources management in California, the United States and abroad. She has an extensive background in art and architecture from the eighteenth through twenty-first century. She is a specialist in the study of visual culture, Modernism, urbanism, and cultural landscape. Her qualifications and experience meet and exceed the Secretary of the Interior's Professional Qualification Standards in History and Architectural History.

Dr. Wuellner has received numerous awards and fellowships for her work including the Samuel H. Kress Foundation Fellowship, Art History; American Council of Learned Societies Fellowship; and Edward A. Dickson Graduate Fellowship, University of California.

Experience

Historic Preservation and Cultural Resources Management: Dr. Wuellner has extensive experience in the management, preservation and treatment of historic properties for compliance with Sections 106 and 110 of the National Historic Preservation Act (NHPA), National Environmental Protection Act (NEPA), Section 4(*f*) of the Department of Transportation Act, California Environmental Quality Act (CEQA), and local preservation ordinances. Dr. Wuellner is experienced in the assessment of projects for conformance with the Secretary of the Interior's Standards and has assisted clients with State Historic Preservation Office consultation, Programmatic Agreements, and Memorandum of Agreements.

Dr. Wuellner has over 15 years of experience as a principal investigator, project manager, and technical lead for international, national and regional firms, including EDAW, Inc. and Parsons, Inc. She gained her professional training and experience with John Milner Associates in Alexandria, Virginia, and Land and Community Associates in Charlottesville, Virginia. Since returning to Los Angeles in 1995, she has conducted a wide variety of regional and local projects for compliance with CEQA and local preservation ordinances. These projects have included the completion of city-wide and county-wide surveys, as well as evaluation of regional resources.

Surveys and Historic Contexts: Dr. Wuellner has surveyed thousands of properties and conducted extensive research to document and evaluate the significance of historic resources at the local, state, and national levels. She has designed and implemented a variety of large-scale state-wide, county-wide, and city-wide surveys throughout the United States, as well as transportation, military, industrial, urban, and rural surveys. Dr. Wuellner has conducted numerous projects in California and metropolitan Los Angeles for state and local agencies and private clients. She continues to work on a national basis and recently completed the innovative South Texas Ranching Study for the Texas Department of Transportation (TxDot). Dr. Wuellner is currently conducting two large-scale surveys under contract to the Los Angeles Community Redevelopment Agency. These surveys are evaluating historical resources in communities in East Los Angeles, the Wilshire District/Miracle Mile, and Koreatown.

Professional Publications: Dr. Wuellner has authored over 100 technical reports representative of a full spectrum of historical resources investigations. She has prepared technical reports and historical resources sections for incorporation into Environmental Assessments/EIRs/EISs and other NEPA documents in addition to other stand-alone documents such as National Register nominations and historic preservation plans.

Dr. Wuellner is experienced in the preparation and implementation of mitigation recommendations to reduce potential impacts to historic resources. She has demonstrated experience in the preparation of Historic Structure Reports (HSRs); Historic Buildings Maintenance and Treatment Plans; Historic Preservation Management Plans; Historic American Building Surveys (HABS); Historic American Landscape Surveys (HALS); and Cultural Landscape Reports (CLRs).

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