Appendix C
Traffic Impact Analysis

URBAN
CROSSROADS

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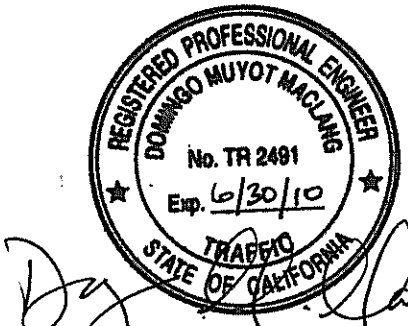

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DEEP CREEK TENTATIVE TRACT 16569
TRAFFIC IMPACT ANALYSIS (REVISED)
SAN BERNARDINO COUNTY, CALIFORNIA

October 8, 2009 (Revised)
August 26, 2009 (Revised)
March 27, 2008 (Revised)
November 12, 2007 (Revised)
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DEEP CREEK TENTATIVE TRACT 16569
TRAFFIC IMPACT ANALYSIS (REVISED)
SAN BERNARDINO COUNTY, CALIFORNIA

1.0 INTRODUCTION

This report summarizes the traffic impact analysis conducted to assess the potential impacts of the proposed development on the roadway system in the study area. The report has been revised to reflect the new opening year of the project; 2015 is now the anticipated opening year of the project (instead of 2009). The report has been revised repeatedly in response to comments received from various local agencies who have received the report. The letters responding to each set of comments are included in Appendix "N" of this report. The proposed development is located in the County of San Bernardino. The Deep Creek (TT 16569) project is proposed to include 202 single family dwelling units. The general location of the project site is presented on Exhibit 1-A.

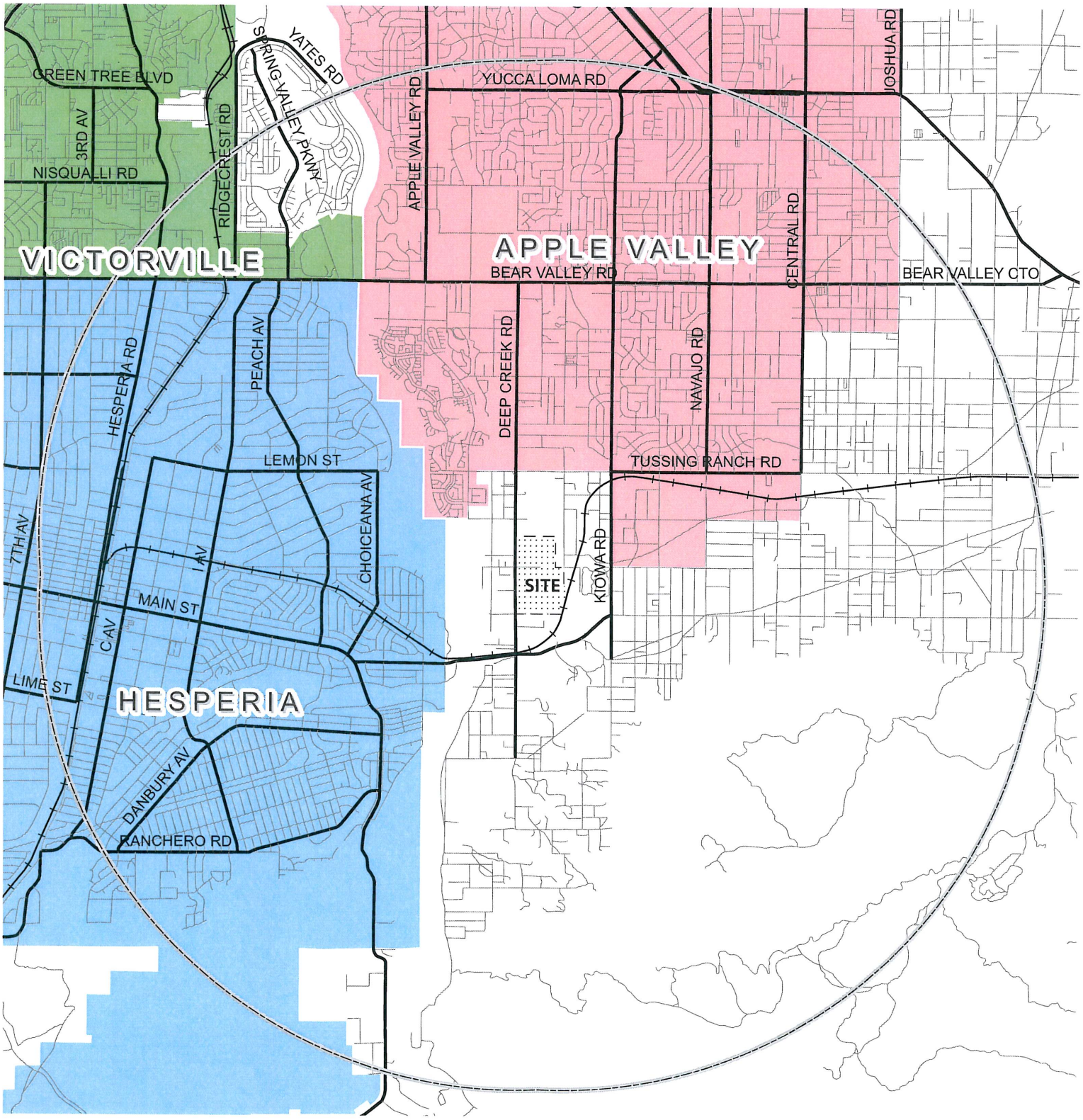
Exhibit 1-B depicts the study area limits of the report. Intersection analysis locations have been selected based (at a minimum) on where anticipated project passenger car equivalent (PCE) volumes equal or exceed 50 two way trips during the AM or PM peak hour. The study area for the traffic analysis was determined in consultation with County staff and includes additional intersections (where less than 50 peak hour project trips are anticipated) to ensure that potential project impacts are considered.

The introduction to this report presents an overview of the project and provides a brief description of the study area. The analysis methodologies used to evaluate the impacts of the project are described and the definitions of roadway system deficiencies and significant project impacts are presented in the context of the County of San Bernardino CMP and CEQA requirements.

Subsequent sections of the report will describe the project in detail and provide a complete description of existing and projected traffic conditions within the study area.

EXHIBIT 1-A

5-MILE RADIUS



LEGEND:

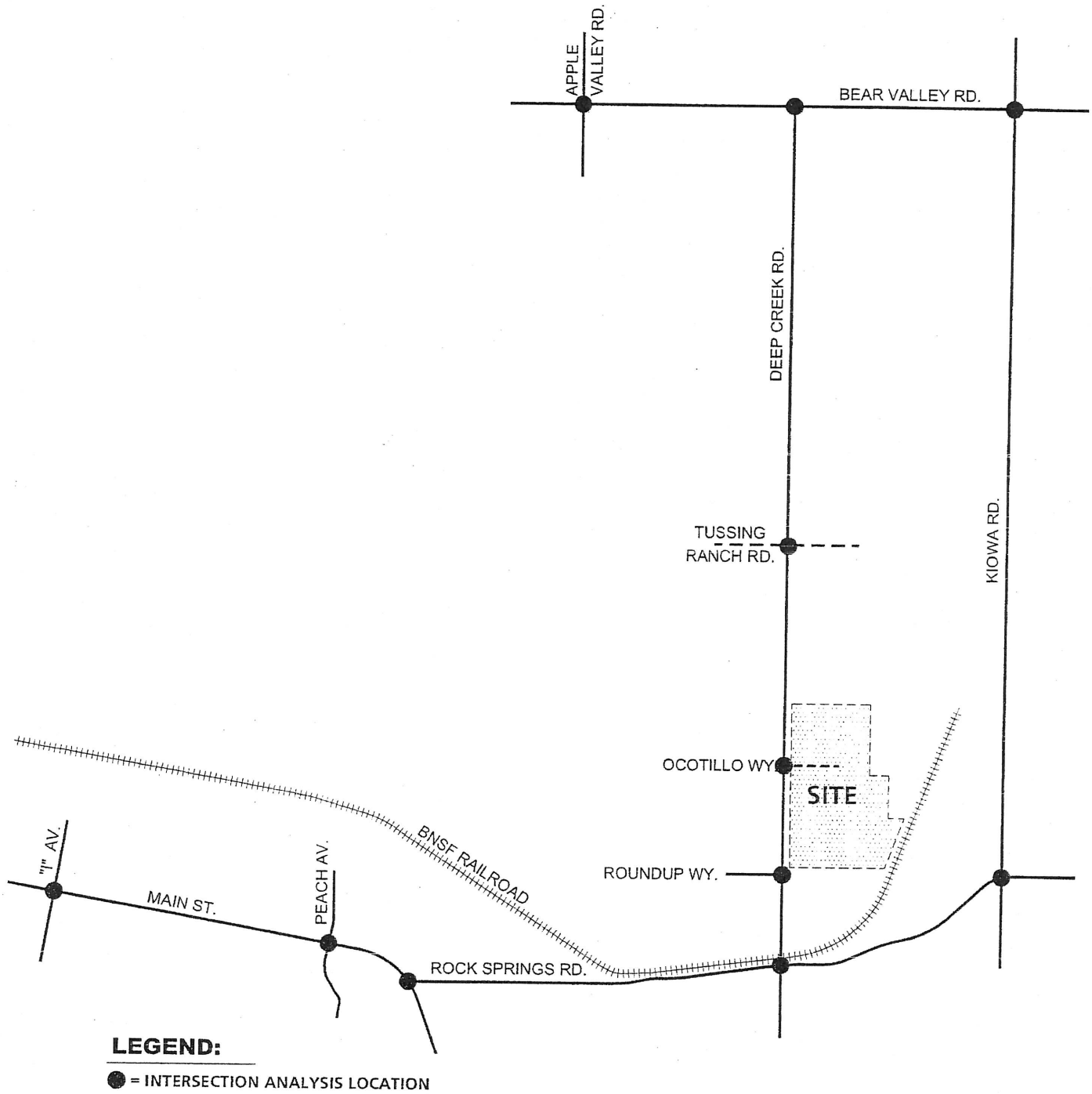
= 5-MILE RADIUS

N

URBAN CROSSROADS

EXHIBIT 1-B

LOCATION MAP



1.1 Project Overview

The project site is located in unincorporated San Bernardino County. The project is located east of Deep Creek Road and north of Roundup Way, between Deep Creek Road and the Burlington Northern and Santa Fe (BNSF) Railway tracks (see Exhibit 1-B).The approximately 249 acre project site is proposed to include 202 single family dwelling units. Exhibit 1-C illustrates the site plan.

Additional detailed discussion of the project's traffic generation characteristics will be provided in subsequent sections of this report.

1.2 Study Area

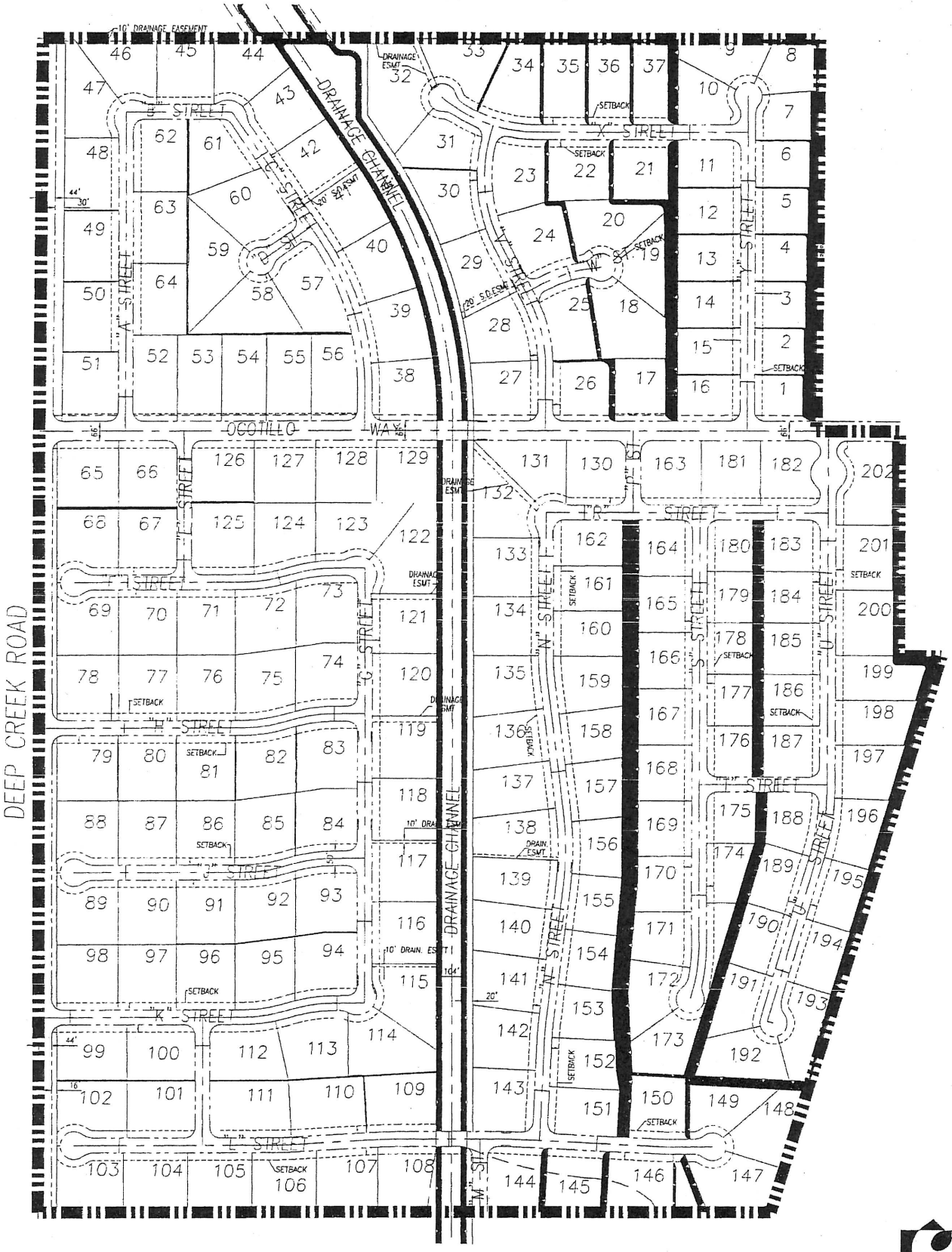
The overall study area evaluated in this study was previously presented on Exhibit 1-B. The roadway elements, analyzed in accordance with the County of San Bernardino CMP methodologies, are dependent on both the analysis year (project Interim Year or 2030 Horizon Year) and project generated traffic volumes.

Regional access to the site is provided by the Interstate 15 (I-15) Freeway. Local access is provided by various arterial roadways in the vicinity of the site. The east-west roadways which will be most affected by the project include Bear Valley Road, Main Street, and Rock Springs Road. North-south roadways expected to provide local access include Deep Creek Road and Kiowa Road.

A series of scoping discussions were conducted with the County of San Bernardino to define the desired (local agency required) analysis locations for each future analysis year. The analysis locations were determined by the projected 2030 project related traffic volumes. This information will be presented in subsequent sections of this report.

EXHIBIT 1-C

SITE PLAN



1.3 Analysis Methodologies

This section of the report presents the methodologies used to perform the traffic analyses summarized in this report. The following analysis years are considered in this report:

- Existing Conditions - Based on the Urban Crossroads Inc. letter report dated July 24, 2009, the traffic volume growth trends in the study area are generally negative from 2007 to 2009. County of San Bernardino staff reviewed this letter report and concurred they are aware of these traffic volume trends. Therefore, the 2007 data presented in this traffic study is considered to be representative of / conservative with respect to 2009 traffic volumes.
- Interim Year – 2015
- CMP Horizon Year - 2030

The overall methodologies used to develop future traffic volume forecasts, and the explicit traffic operations analysis methodologies are summarized herein. The primary section of interest to the non-technically oriented reviewer is Section 1.4.2 (Definition of Significant Impact).

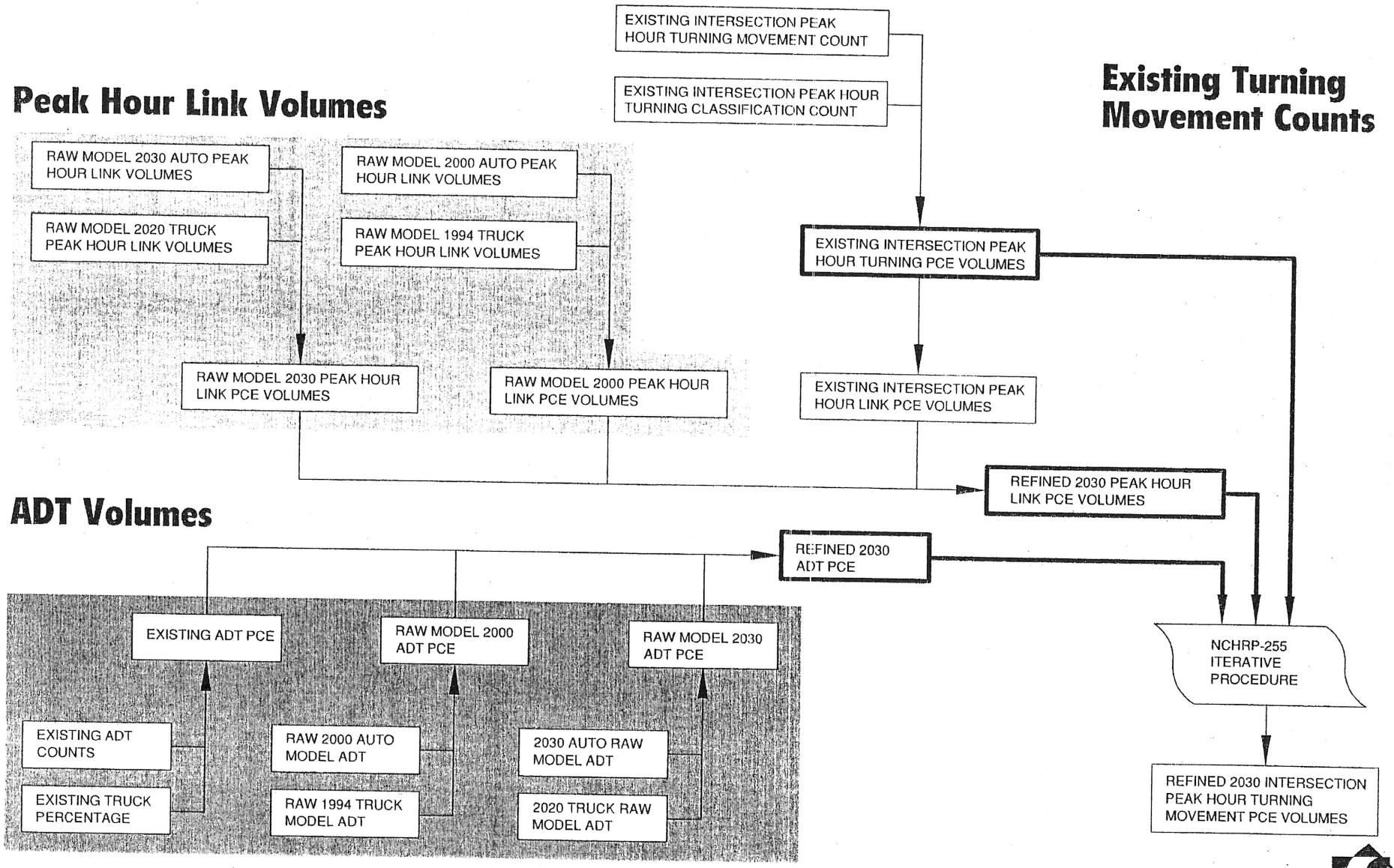
1.3.1 Overall Analysis Methodology

As described previously, traffic conditions are evaluated in this report for both existing conditions and two future horizon years. Urban Crossroads, Inc. conducted the actual traffic counts to quantify existing traffic conditions. The analysis considers the weekday AM and PM peak hours of traffic.

Exhibit 1-D illustrates the overall 2030 peak hour turning movement volume refinement process. The Horizon Year (2030) without project traffic volumes

EXHIBIT 1-D

2030 PEAK HOUR TURNING MOVEMENT PCE VOLUME REFINEMENT PROCESS



have been derived from the subregional travel demand model currently being used for long range planning in San Bernardino County.

This model is commonly referred to as the Comprehensive Transportation Plan (CTP) traffic model. The CTP traffic model was the only approved travel demand forecasting tool within the study area at the time this study was initiated. Although other subarea models, such as the Victor Valley Area Transportation Study (VVATS) model have subsequently been developed, this study continues to use the CTP traffic model as an appropriate and defensible starting point for developing long range future forecasts in the vicinity of the project.

This procedure is applied independently for the passenger car and truck model components of the CTP traffic model. There are several differences between the procedures for the passenger car model and the truck model. One difference is the factors used to determine the peak hour volumes from the CTP traffic model peak period traffic assignments and the passenger car equivalent factors. The passenger car model uses an AM peak period to peak hour factor of 0.38 and a PM peak period to peak hour factor of 0.28.

The truck model uses an AM peak period to peak hour factor of 0.333 and a PM peak period to peak hour factor of 0.25. The passenger car model does not require a passenger car equivalent (PCE) factor (e.g., PCE factor is equal to 1.0), and the truck model uses a PCE factor of 1.5 for buses/recreational vehicles, 2.0 for 3 axle units, and 3.0 for 4 or more axle units.

The CTP passenger car model has a base (validation) year of 2000 and a horizon (future forecast) year of 2025. The difference in model volumes (2025 – 2000) defines the growth in traffic over the 25 year period. Since

the existing conditions traffic count data was collected in 2007, the overall model growth needs to be adjusted in order to reflect the growth from 2007 to 2030 (23 years). A factor of .92 (23/25) has therefore been applied to the overall model growth to determine the incremental growth that was added to the existing count data to determine the refined 2030 roadway segment daily and peak hour approach and departure traffic volumes.

The CTP truck model has a base (validation) year of 1994 and a horizon (future forecast) year of 2020. However, SANBAG has directed that all analysis assume that the 1994 base year is functionally equivalent to 2000 conditions. The difference in model volumes (2020 – 2000[1994]) defines the growth in traffic over the 20 year period to 2020 conditions. A factor of 1.25 is then applied to represent 2025 conditions (25 years of growth). Since the existing conditions traffic count data was collected in 2007, the overall model growth needs to be adjusted in order to reflect the growth from 2007 to 2030 (23 years). A factor of **.92** (23/25) has therefore been applied to the overall model growth to determine the incremental growth that was added to the existing count data to determine the refined 2030 roadway segment daily and peak hour approach and departure traffic volumes. To maintain a conservative worst case analysis, the factor of .92 was <u>not</u> revised to .84 (21/25) to reflect growth from 2009 to 2030.

The refined future peak hour approach and departure volumes obtained from these calculations are then entered into a spreadsheet program consistent with the National Cooperative Highway Research Program (NCHRP Report 255), along with initial estimates of turning movement proportions. A linear programming algorithm is used to calculate individual turning movements which match the known directional roadway segment forecast volumes computed in the previous step. This program computes a likely set of intersection turning movements from intersection approach

counts and the initial turning proportions from each approach leg. A refinement step completed for this analysis was to compare the resulting 2030 volumes to Interim Year (2015) volumes and adjust the 2030 volumes to reflect reasonable growth beyond 2015 (if necessary).

The Interim Year 2015 without project traffic volumes are estimated based on the two volume calculations/methodologies:

- Calculation 1: Interpolation of volumes from Existing (2009) to initial refined 2030 peak hour volumes to obtain 2015 volumes.

- Calculation 2: Existing (2009) traffic volumes plus the 2009 to 2015 area-wide background growth (3% per year) volumes plus the known cumulative development volumes. A 3% annual growth rate has been applied as background growth from 2009 to 2015. When the ambient background growth of 3% per year is added to the additional cumulative project traffic, the resulting total annual compounded growth rate from 2009 to 2015 is approximately 6-7%.

The resulting volumes from 'Calculation 1' were compared with 'Calculation 2' and the highest (largest in quantity) turning movements from each calculation were selected for each intersection to represent 2015 Without Project conditions. Subsequently, the resulting 2015 volumes were then compared with the initial refined 2030 volumes. The Raw Model (2030) volumes were adjusted upwards, if necessary, to ensure that no negative growth had occurred at any of the study intersections.

Project traffic volumes for all future conditions projections were estimated using the manual approach. The trip generation calculation is based on the most recent Institute of Transportation Engineers Trip Generation Rates,

7th Edition. The San Bernardino Associated Governments (SANBAG) maintained transportation model has been used to evaluate the distribution and likely travel routes of the project traffic for 2015 and 2030 conditions. A select zone (trip distribution) analysis for the Deep Creek (TT 16569) development was performed using the SANBAG model for 2030 conditions. Similarly, the interim 2015 trip distribution was developed using the same trip distribution data and a review of near term development patterns, existing traffic patterns, etc. The resulting trip distributions were then submitted to County of San Bernardino staff for review and approval.

The project only traffic forecasts have been generated by applying the trip generation, distribution and traffic assignment calculations. Project traffic volumes were then added to the refined future year CTP traffic model volumes. Flow conservation checks and forecast adjustments were performed as necessary to ensure that all future Interim Year (2015) and 2030 traffic volume forecasts are reasonable. Additionally, per request by County of San Bernardino staff, all Interim Year 2015 cumulative projects generating less than 250 PM peak hour trips have been added to the adjusted 2030 volumes. The larger projects (generating more than 250 peak hour trips) are already included in the traffic model. The result of this traffic forecasting procedure is a series of traffic volumes suitable for traffic operations analysis.

1.3.2 Traffic Operations Analysis

The current technical guide to the evaluation of traffic operations is the 2000 Highway Capacity Manual (HCM) (Transportation Research Board Special Report 209). The HCM defines level of service as a qualitative measure which describes operational conditions within a traffic stream, generally in

terms of such factors as speed and travel time, freedom to maneuver, traffic interruptions, comfort and convenience, and safety. The criteria used to evaluate LOS (Level of Service) conditions vary based on the type of roadway and whether the traffic flow is considered interrupted or uninterrupted.

The definitions of level of service for uninterrupted flow (flow unrestrained by the existence of traffic control devices) are:

- LOS "A" represents free flow. Individual users are virtually unaffected by the presence of others in the traffic stream.

- LOS "B" is in the range of stable flow, but the presence of other users in the traffic stream begins to be noticeable. Freedom to select desired speeds is relatively unaffected, but there is a slight decline in the freedom to maneuver.

- LOS "C" is in the range of stable flow, but marks the beginning of the range of flow in which the operation of individual users becomes significantly affected by interactions with others in the traffic stream.

- LOS "D" represents high-density but stable flow. Speed and freedom to maneuver are severely restricted, and the driver experiences a generally poor level of comfort and convenience.

- LOS "E" represents operating conditions at or near the capacity level. All speeds are reduced to a low, but relatively uniform value. Small increases in flow will cause breakdowns in traffic movement.

- LOS "F" is used to define forced or breakdown flow. This condition exists wherever the amount of traffic approaching a point exceeds the amount which can traverse the point. Queues form behind such locations.

Uninterrupted flow is generally found only on limited access (freeway) facilities in urban areas.

The definitions of level of service for interrupted traffic flow (flow restrained by the existence of traffic signals and other traffic control devices) differ slightly depending on the type of traffic control.

The level of service is typically dependent on the quality of traffic flow at the intersections along a roadway. The HCM methodology expresses the level of service at an intersection in terms of delay time for the various intersection approaches. The HCM uses different procedures depending on the type of intersection control. The levels of service determined in this study are calculated using the HCM methodology.

For signalized intersections, average total delay per vehicle for the overall intersection is used to determine level of service. Levels of service at signalized study intersections have been evaluated using an HCM intersection analysis program.

For all way stop (AWS) controlled intersections, the ability of vehicles to enter the intersection is not controlled by the occurrence of gaps in the flow of the main street. The AWS controlled intersection has been evaluated using the HCM methodology for this type of multi-way stop controlled intersection configuration. The level of service for this type of intersection

analysis is also based on average total delay per vehicle for the overall intersection.

The study area intersections which are stop sign controlled with stop-control on the minor street only have been analyzed using the two-way stop-controlled unsignalized intersection analysis methodology of the HCM. For these intersections, the calculation of level of service is dependent on the occurrence of gaps occurring in the traffic flow of the main street. Using data collected describing the intersection configuration and traffic volumes at these locations to calculate average intersection delay; the level of service has been calculated. The level of service criteria for this type of intersection analysis is based on total delay per vehicle for the worst minor street movement(s).

The levels of service are defined in terms of average delay for the intersection analysis methodology as follows:

LEVEL OF SERVICE	AVERAGE TOTAL DELAY PER VEHICLE (SECONDS)	
	SIGNALIZED	UNSIGNALIZED
A	0 to 10.00	0 to 10.00
B	10.01 to 20.00	10.01 to 15.00
C	20.01 to 35.00	15.01 to 25.00
D	35.01 to 55.00	25.01 to 35.00
E	55.01 to 80.00	35.01 to 50.00
F	80.01 and up	50.01 and up

Signalized intersections are considered deficient (LOS "F") if the overall intersection critical volume to capacity (V/C) ratio equals or exceeds 1.0,

even if the level of service defined by the delay value is below the defined LOS standard. The V/C ratio is defined as the critical volumes divided by the intersection capacity. A V/C ratio greater than 1.0 implies an infinite queue.

The LOS analysis for signalized intersections has been performed using optimized signal timing. This analysis has included an assumed lost time of two seconds per phase. Signal timing optimization has considered pedestrian safety and signal coordination requirements. Appropriate time allowance for pedestrians has also been considered in the signalized intersection analysis. The following formula has been used to calculate the pedestrian minimum times for all HCM runs:

[(Curb to Curb distance) / (4 feet/second)] + 5 seconds

Saturation flow rates recommended by the County of San Bernardino CMP guidelines have been utilized for all of the traffic operations analysis in this report.

The peak hour traffic volumes have been adjusted to peak 15 minute volumes for analysis purposes using the existing observed peak 15 minute to peak hour factors for all scenarios analyzed.

1.4 Definition of Deficiency and Significant Impact

The following definitions of deficiencies and significant impacts have been developed in accordance with the Town of Apple Valley, City of Hesperia, and County of San Bernardino CMP requirements.

1.4.1 Definition of Deficiency

The definition of an intersection deficiency has been obtained from the City of Hesperia, the Town of Apple Valley, and the County of San Bernardino

General Plan requirements. The City of Hesperia requirements indicate that peak hour intersection operations of LOS "D" or better are generally acceptable. Therefore, any intersection in the City of Hesperia operating at LOS "E" or "F" will be considered deficient. The Town of Apple Valley and the County of San Bernardino CMP requirements indicate that peak hour intersection operations of LOS "C" or better are generally acceptable. Therefore, any intersection in the Town of Apple Valley or unincorporated San Bernardino County operating at LOS "D" to "F" will be considered deficient.

The identification of an intersection deficiency has been further evaluated to include the following:

- Evaluation of the mitigation measures required to restore traffic operations to an acceptable level of service with respect to county and local jurisdiction LOS standards.

- Estimation of the cost required to implement the improvements required to restore traffic operations to an acceptable level of service as described above.

- Calculation of the project share of new traffic and improvement cost on the impacted facility during peak hours of traffic.

This study incorporates each of these aspects for all locations where an intersection deficiency is identified.

2.0 PROJECT DESCRIPTION AND TRAFFIC CONTRIBUTION TEST

This section describes the project land uses and traffic characteristics for each of the future horizon years analyzed. The traffic contribution test used to determine the analysis locations is also presented in this section.

2.1 Project Description

The project site is located in unincorporated San Bernardino County. The project is located north of Roundup Way, between Deep Creek Road and the Burlington Northern and Santa Fe (BNSF) Railway tracks (see Exhibit 1-A).

The approximately 249 acre project site is proposed to include 202 single family dwelling units. Exhibit 1-C illustrates the site plan.

Regional access to the site is provided by the Interstate 15 (I-15) Freeway. Local access is provided by various arterial roadways in the vicinity of the site. The east-west roadways which will be most affected by the project include Bear Valley Road, Main Street, and Rock Springs Road. North-south roadways expected to provide local access include Deep Creek Road and Kiowa Road.

Additional detailed discussion of project's traffic generation characteristics will be provided in subsequent sections of this report.

2.2 Project Traffic

The traffic related to the project has been calculated in accordance with the following accepted procedural steps:

- Trip Generation
- Trip Distribution
- Traffic Assignment

These steps are described in detail below.

2.2.1 Project Trip Generation

The trip generation calculation is based on the most recent Institute of Transportation Engineers Trip Generation Rates, 7th Edition. Table 2-1 indicates the proposed trip generation rates for each TAZ. As indicated in Table 2-2, the proposed development is projected to generate 1,933 trip-ends per day with 152 vehicles per hour during the AM peak hour and 204 vehicles per hour during the PM peak hour.

2.2.2 Project Trip Distribution and Assignment

The Interim Year (2015) and Horizon Year (2030) project only traffic volumes will be derived from the subregional travel demand model currently being used for long range planning in San Bernardino County. This model is commonly referred to as the Comprehensive Transportation Plan (CTP) model.

The CTP model has been used to evaluate the distribution and likely travel routes of the project traffic. A select zone (trip distribution) analysis was performed using the model under 2030 horizon year conditions. (The select zone analysis plots provided by SANBAG are provided in Appendix "E" of this report.) Interim Year (2015) project trip distribution patterns have been developed separately and reflect anticipated near term development patterns and the existing/near term funded roadway system. Exhibit 2-A illustrates the project's interim year (2015) trip distribution. The 2030 long-range project traffic distribution percentages are shown on Exhibit 2-B.

The 2015 and 2030 project only traffic forecasts have been generated by applying the trip generation, distribution and traffic assignment calculations. The project traffic volumes are the criteria determining the limits of the required analysis. Both 2015 and 2030 conditions have been considered in determining the limits of the study area.

TABLE 2-1

TRIP GENERATION RATES[1]

NAME	LAND USE	ITE CODE	QUANTITY	UNITS[2]	PEAK HOUR						DAILY
					AM			PM			
					IN	OUT	TOTAL	IN	OUT	TOTAL	
TT 16569	Single Family Residential	210	202	DU	0.19	0.56	0.75	0.64	0.37	1.01	9.57

[1] Source: ITE (Institute of Transportation Engineers) Trip Generation Manual, 7th Edition, 2003. Land Use Code 210

[2] DU = Dwelling Units

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TABLE 2-2

PROJECT TRIP GENERATION

				PEAK HOUR						
				AM			PM			
	LAND USE	QUANTITY	UNITS[1]	IN	OUT	TOTAL	IN	OUT	TOTAL	DAILY
TT 16569	Single Family Residential	202	DU	38	113	152	129	75	204	1,933
TOTAL				**38**	**113**	**152**	**129**	**75**	**204**	**1,933**

[1] DU = Dwelling Units

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EXHIBIT 2-A

INTERIM YEAR PROJECT TRIP DISTRIBUTION

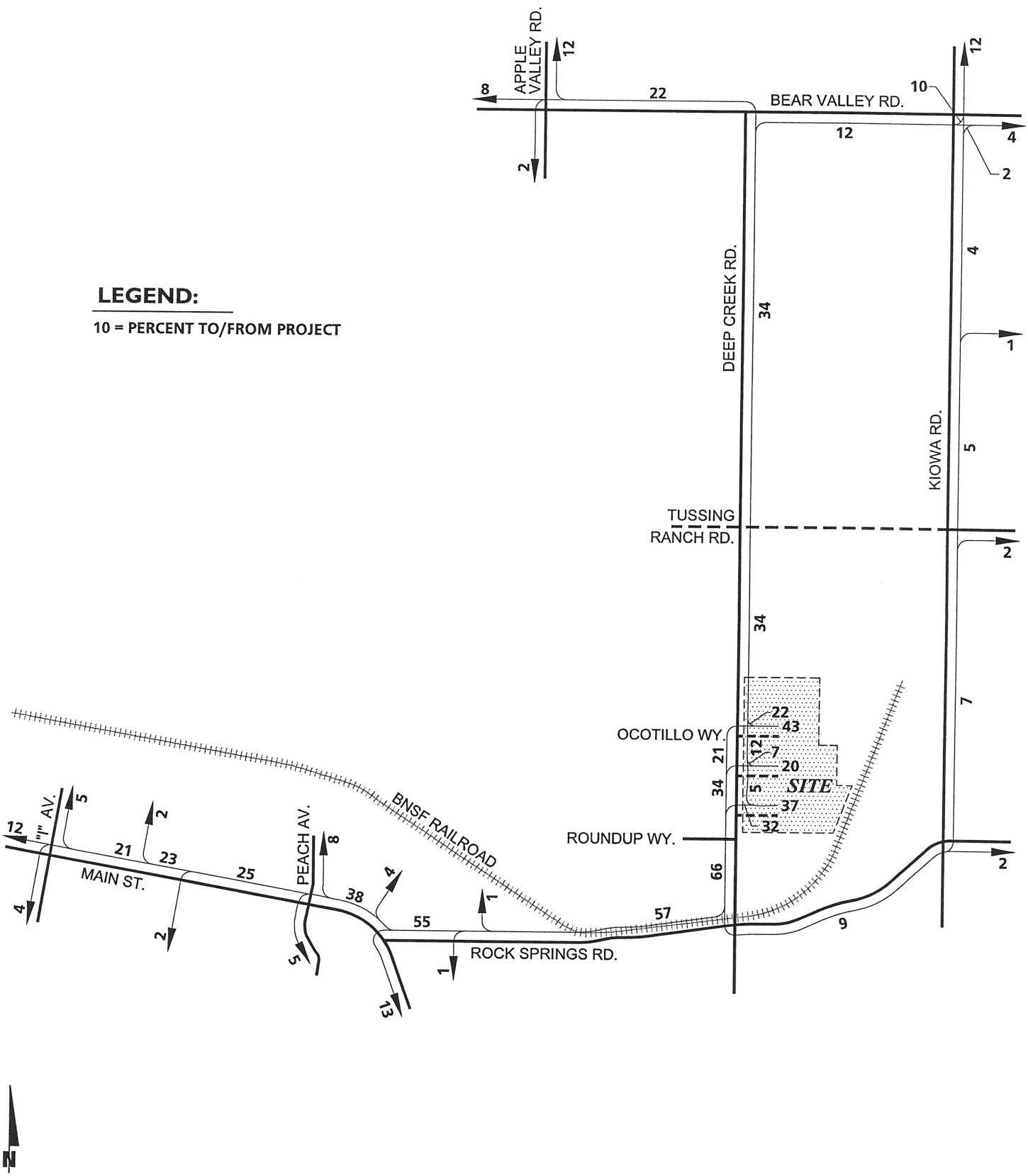
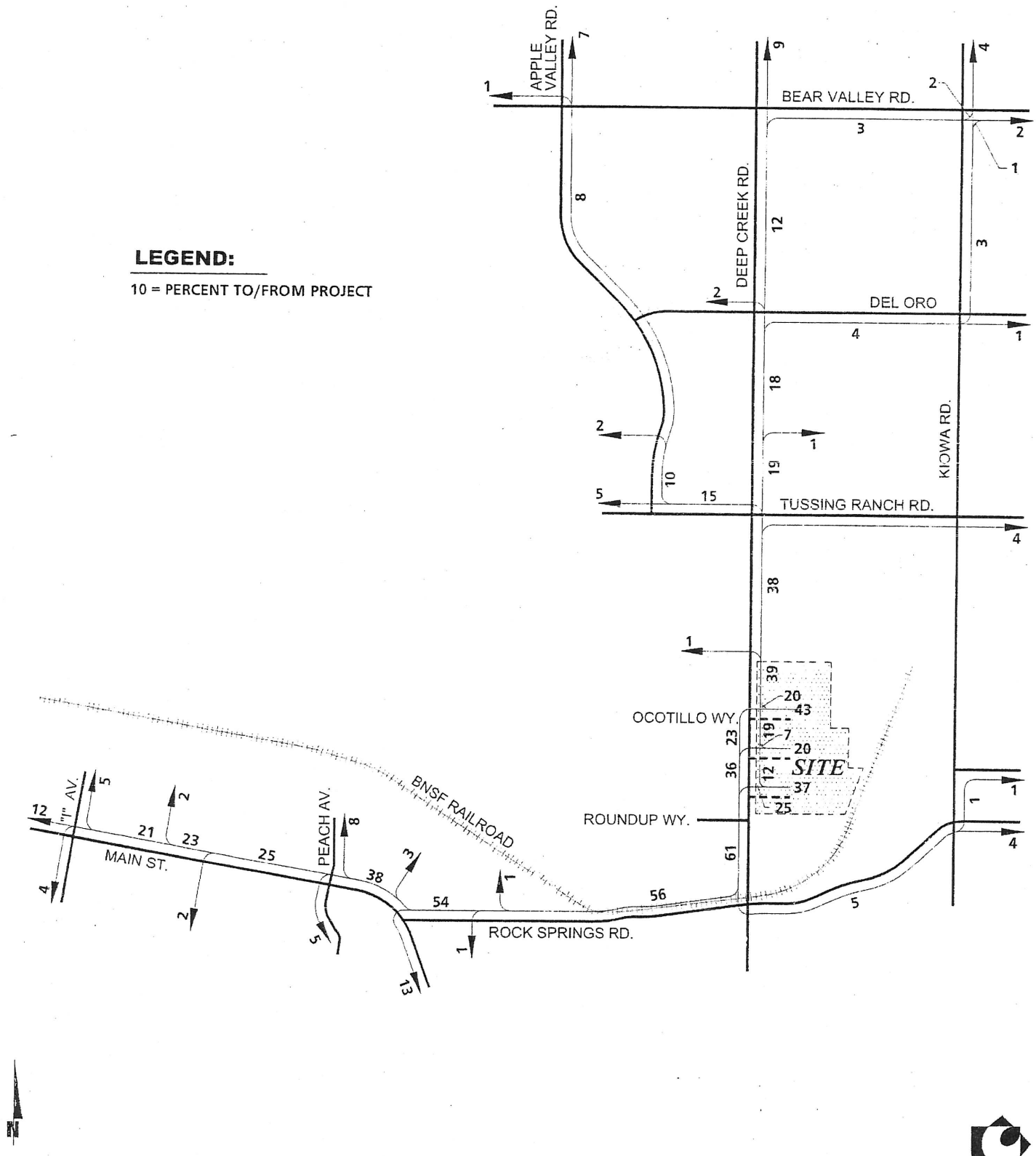


EXHIBIT 2-B

LONG RANGE (2030) PROJECT TRIP DISTRIBUTION



2.2.3 Project Only Traffic Volume Forecasts

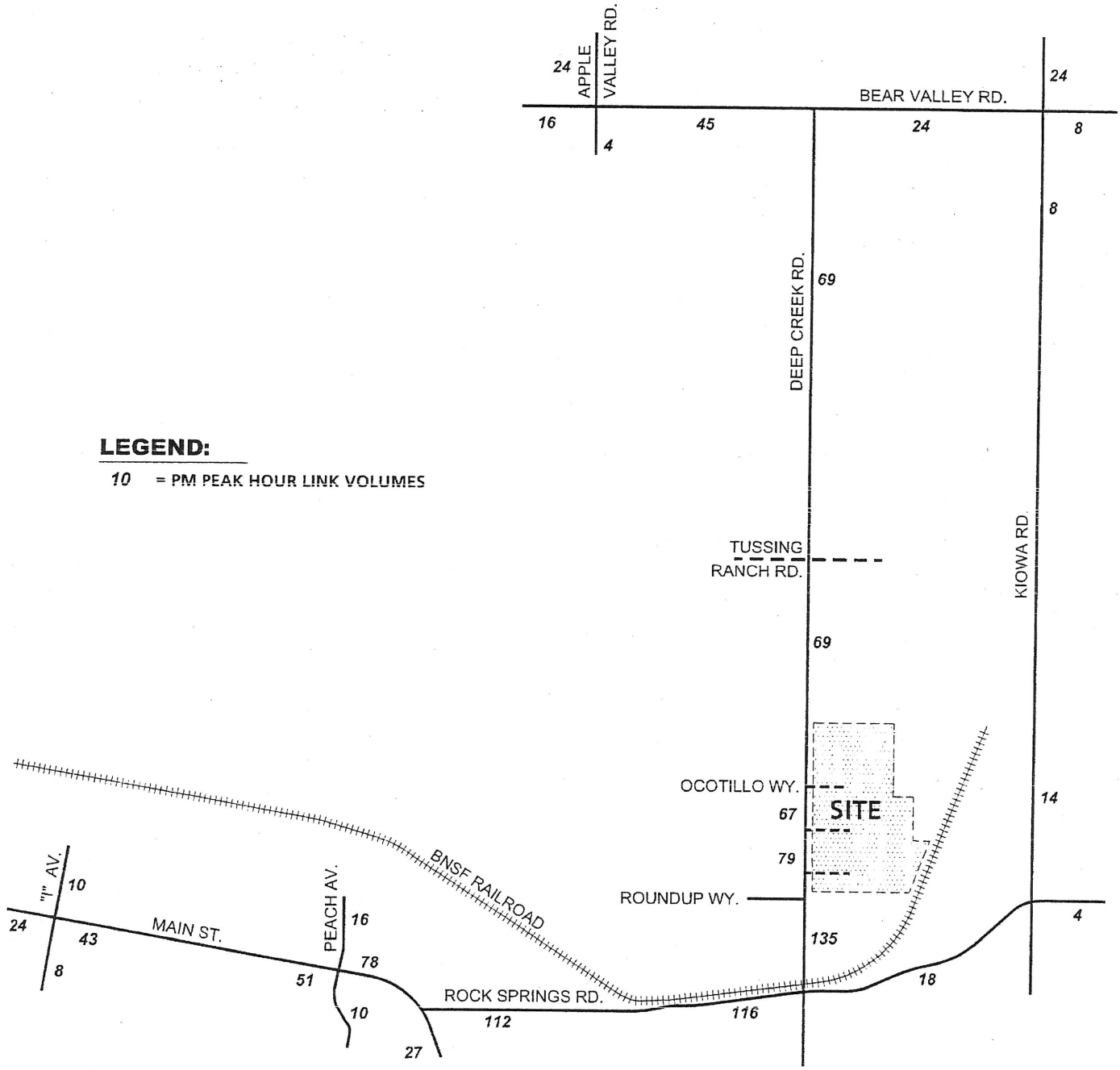
The project only traffic forecasts have been generated by applying the trip generation, distribution and traffic assignment calculations. The project traffic volumes are the criteria determining the limits of the required Horizon Year (2030) analysis. Intersection analysis locations have been selected based on where anticipated project passenger car equivalent (PCE) volumes equal or exceed 50 two way trips during the AM or PM peak hour. The resulting study area for the traffic analysis was determined in consultation with County staff. Exhibit 2-C illustrates the Interim Year project traffic contribution test PM peak hour volumes for the Deep Creek (TT 16569) proposed project. Similarly, Exhibit 2-D shows the 2030 project traffic contribution test for the project. The project PM peak hour trip generation is higher than the project AM peak hour trip generation, therefore only PM peak hour volumes have been examined for the traffic contribution test.

Only freeway segments with 100 or more two-way (total) trips and within 5 miles of the project site potentially require analysis. The I-15 Freeway is more than five (5) miles away from the project site and the project is anticipated to contribute far less than the 100 trips required for freeway segment analysis. Therefore, no freeway segments were analyzed. Exhibit 1-B (previously presented) illustrates the resulting final Horizon Year (2030) analysis locations that been approved by the locally responsible agency (County of San Bernardino). Overall, 11 intersection locations have been analyzed.

The project only traffic forecasts have been developed by applying the trip generation, distribution, and traffic assignment calculations. The Interim year ADT volumes attributable to the project only are presented on Exhibit 2-E. The Interim Year AM peak hour project only traffic forecasts are depicted on Exhibit 2-F, while Exhibit 2-G presents the Interim year PM peak hour project only traffic forecasts. The 2030 ADT volumes

EXHIBIT 2-C

INTERIM YEAR PROJECT TRAFFIC LINK TEST



LEGEND:

10 = PM PEAK HOUR LINK VOLUMES

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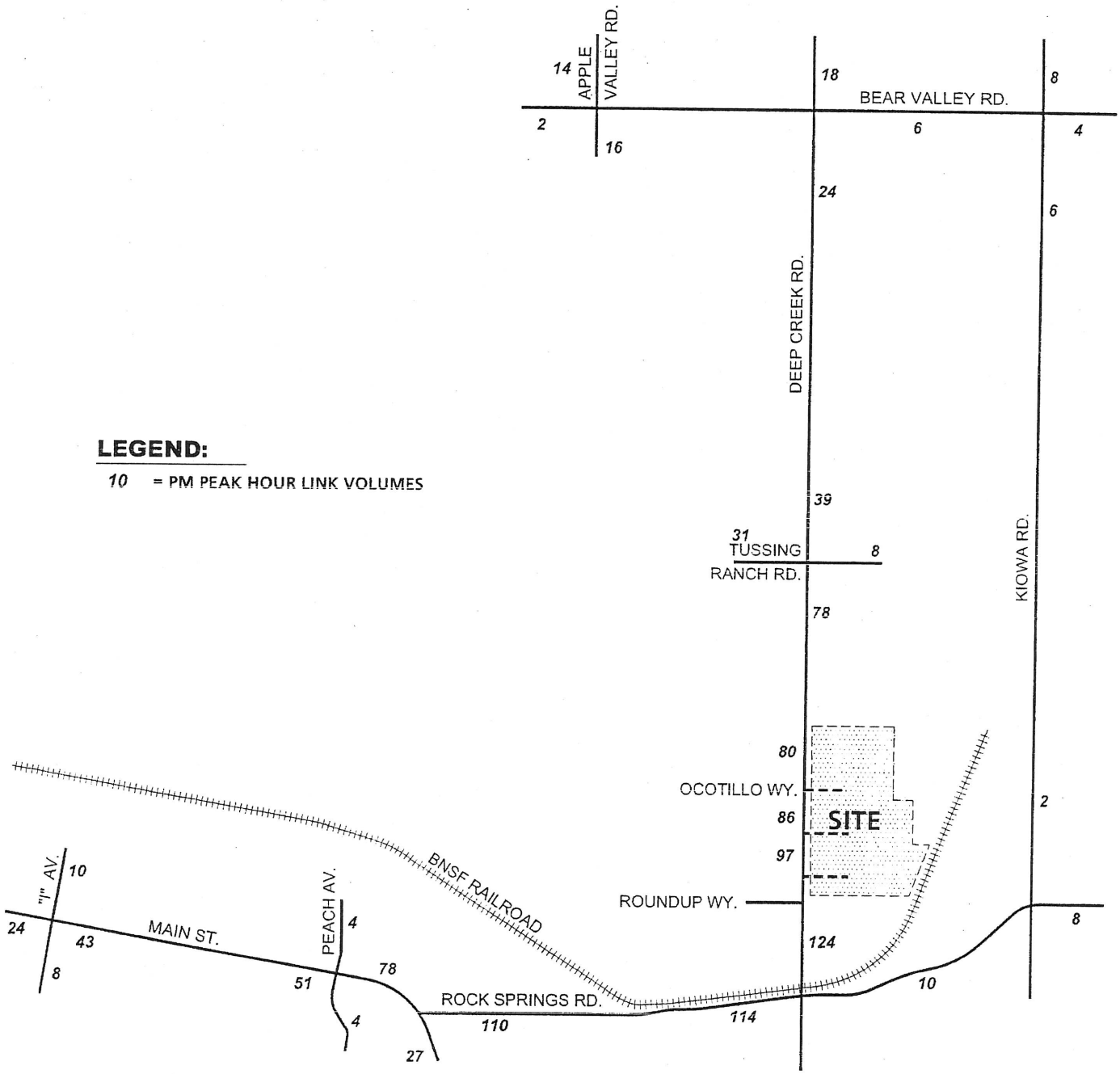
EXHIBIT 2-D

2030 PROJECT TRAFFIC LINK TEST



LEGEND:

10 = PM PEAK HOUR LINK VOLUMES

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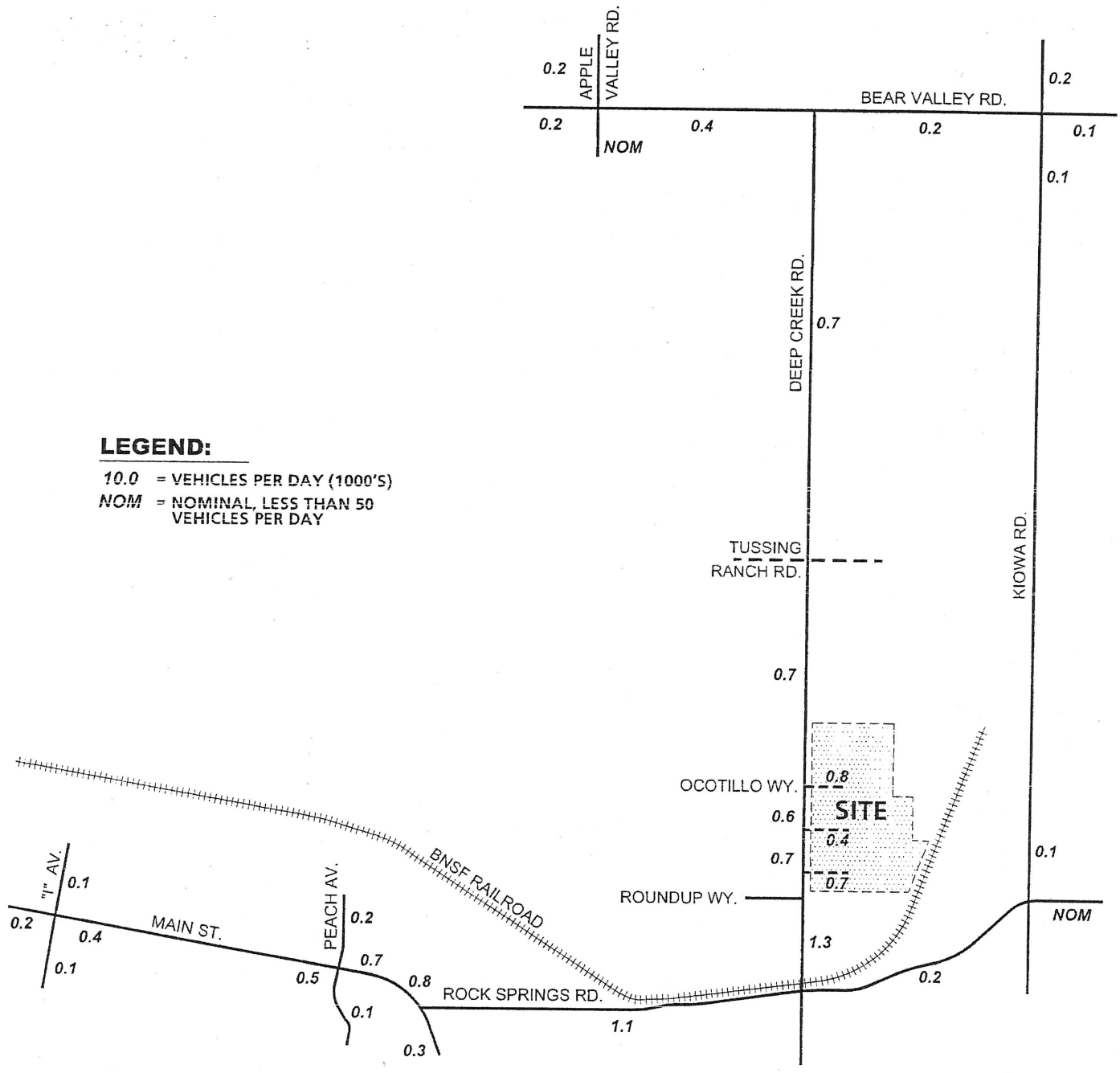
EXHIBIT 2-E

INTERIM YEAR PROJECT ONLY AVERAGE DAILY TRAFFIC (ADT)



LEGEND:

10.0 = VEHICLES PER DAY (1000'S)
NOM = NOMINAL, LESS THAN 50 VEHICLES PER DAY

N

EXHIBIT 2-F

INTERIM YEAR PROJECT ONLY AM PEAK HOUR INTERSECTION VOLUMES

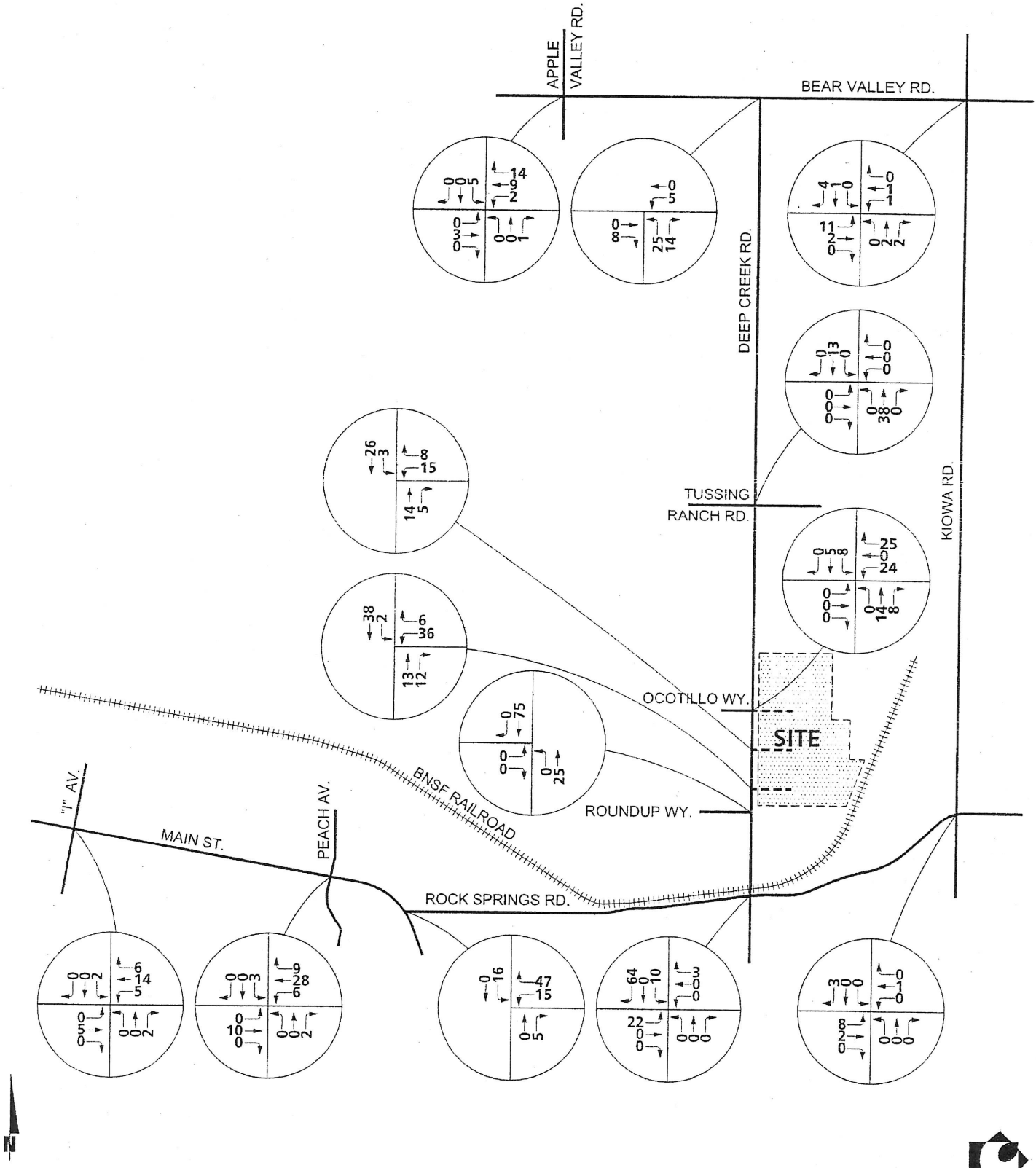
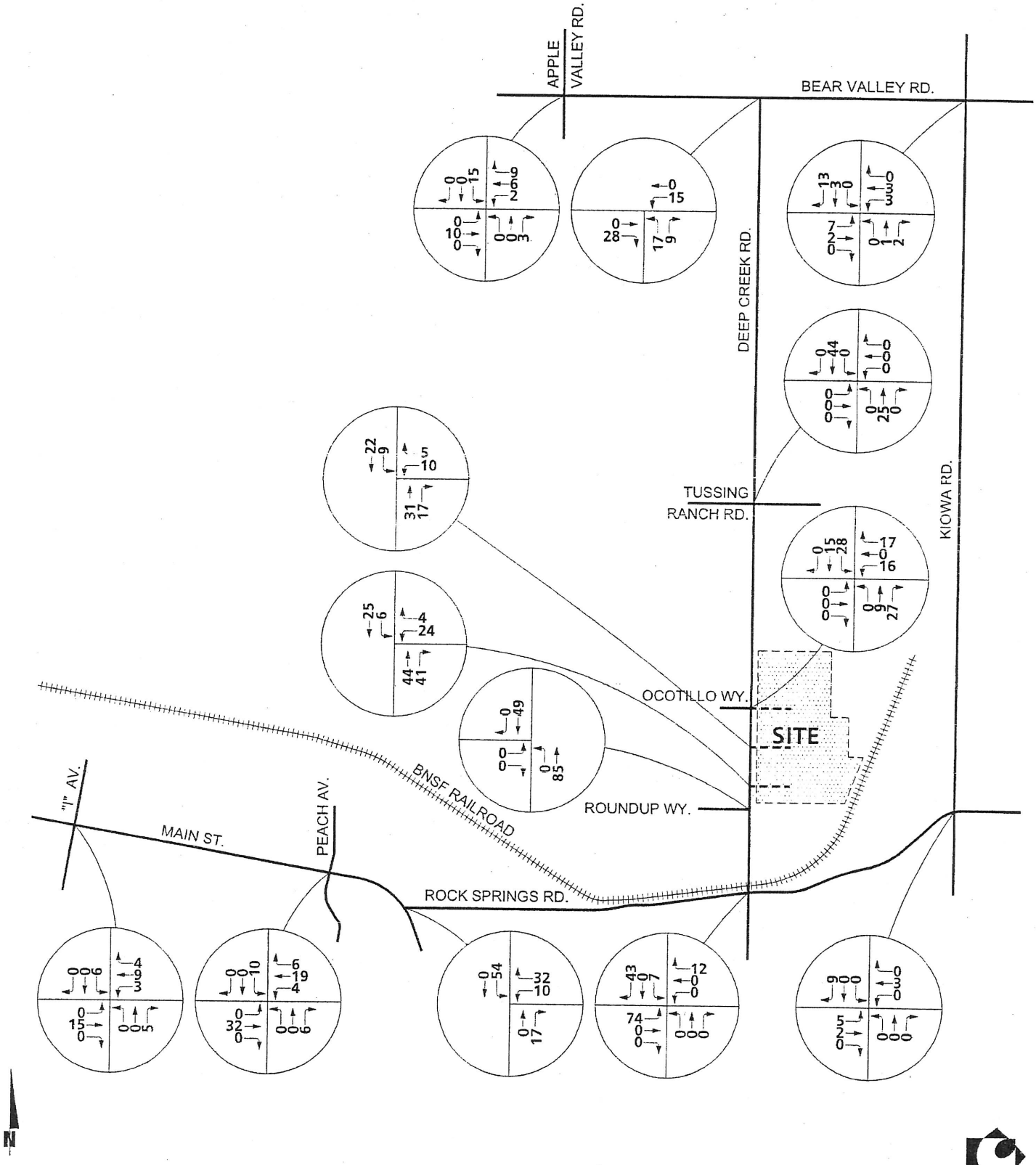


EXHIBIT 2-G

INTERIM YEAR PROJECT ONLY PM PEAK HOUR INTERSECTION VOLUMES



attributable to the project only are presented on Exhibit 2-H. The 2030 AM peak hour project only traffic forecasts are depicted on Exhibit 2-I, while Exhibit 2-J presents the 2030 PM peak hour project only traffic forecasts.

EXHIBIT 2-H

2030 PROJECT ONLY AVERAGE DAILY TRAFFIC (ADT)

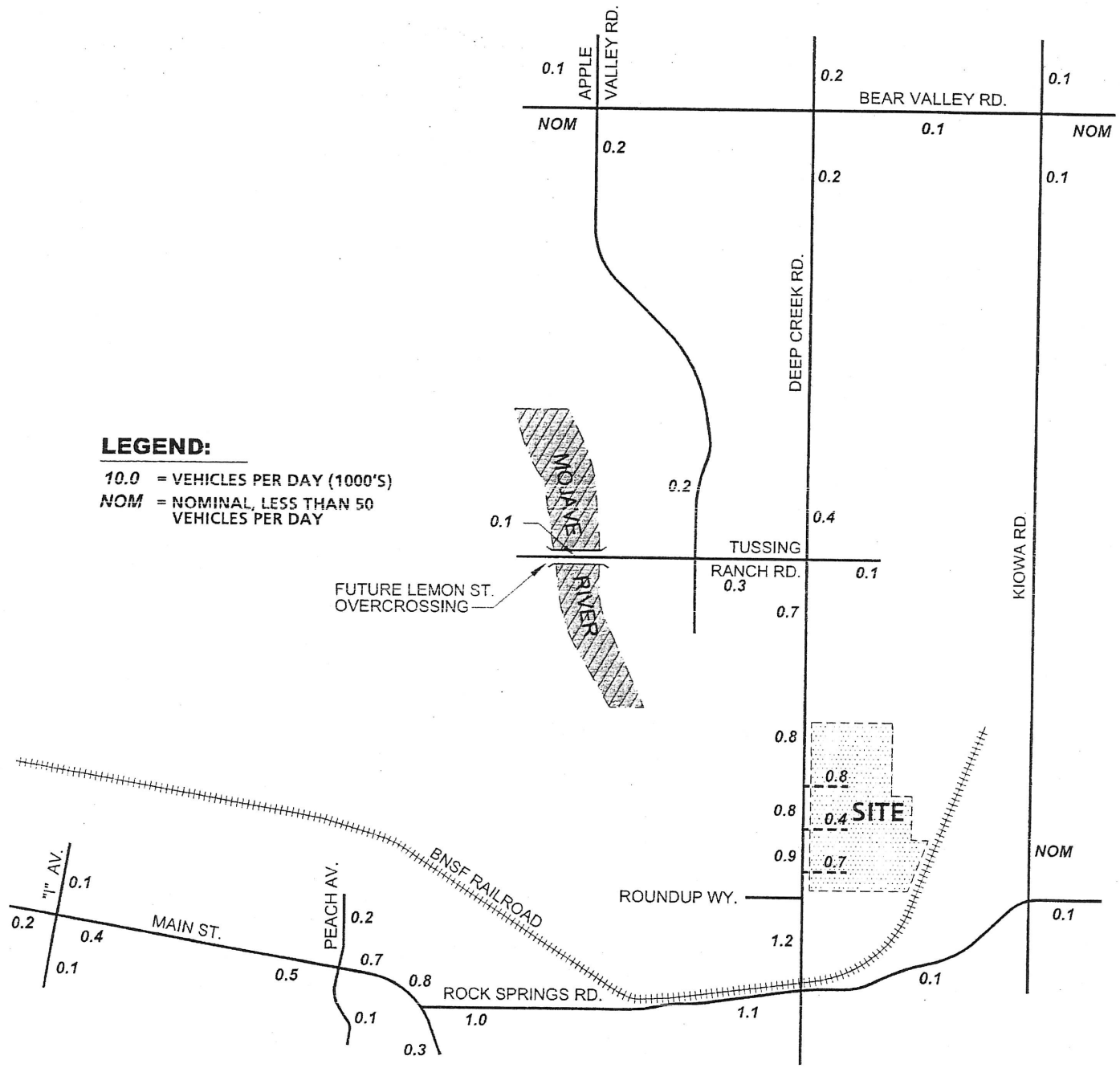


EXHIBIT 2-I

2030 PROJECT ONLY AM PEAK HOUR INTERSECTION VOLUMES

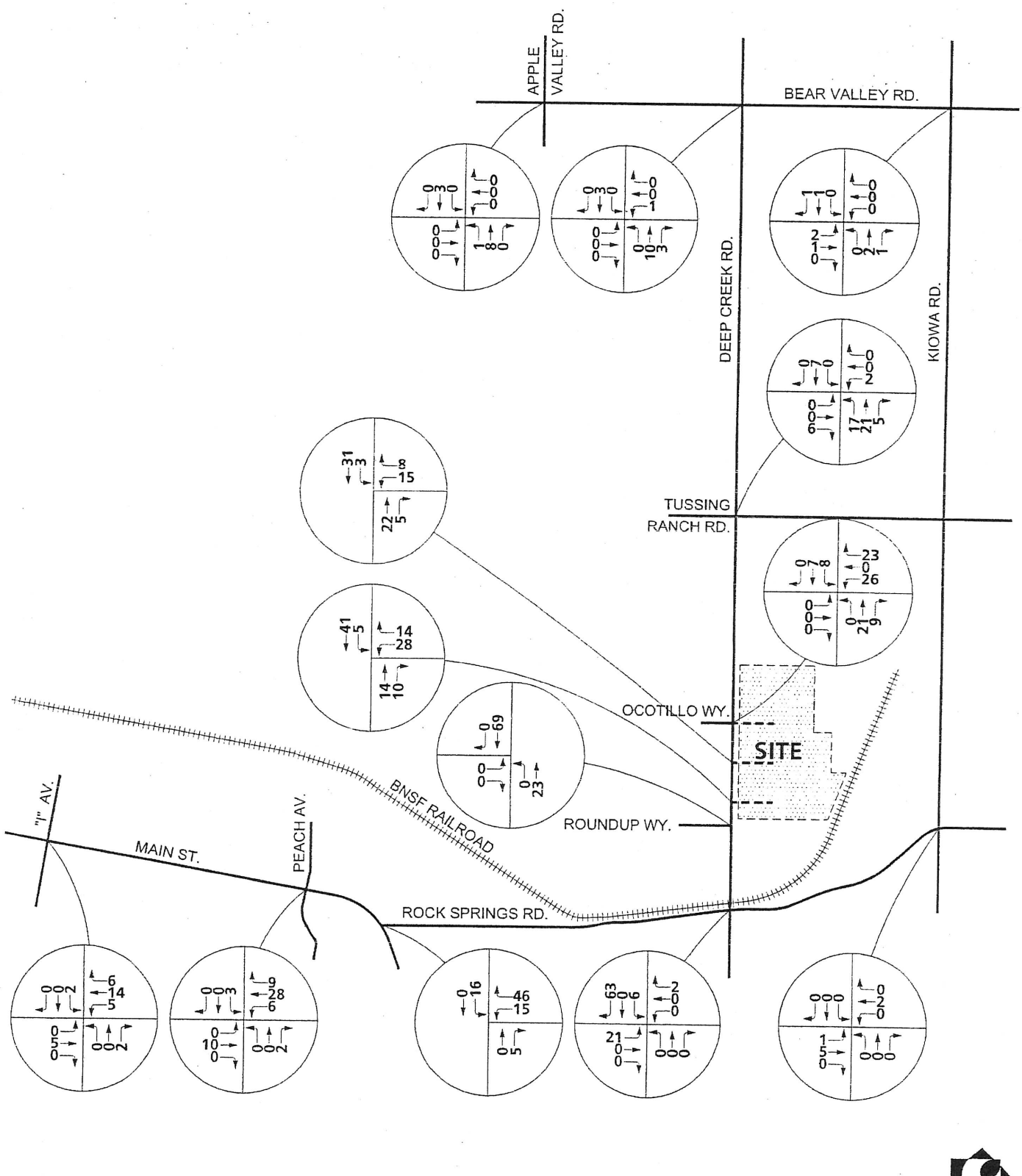
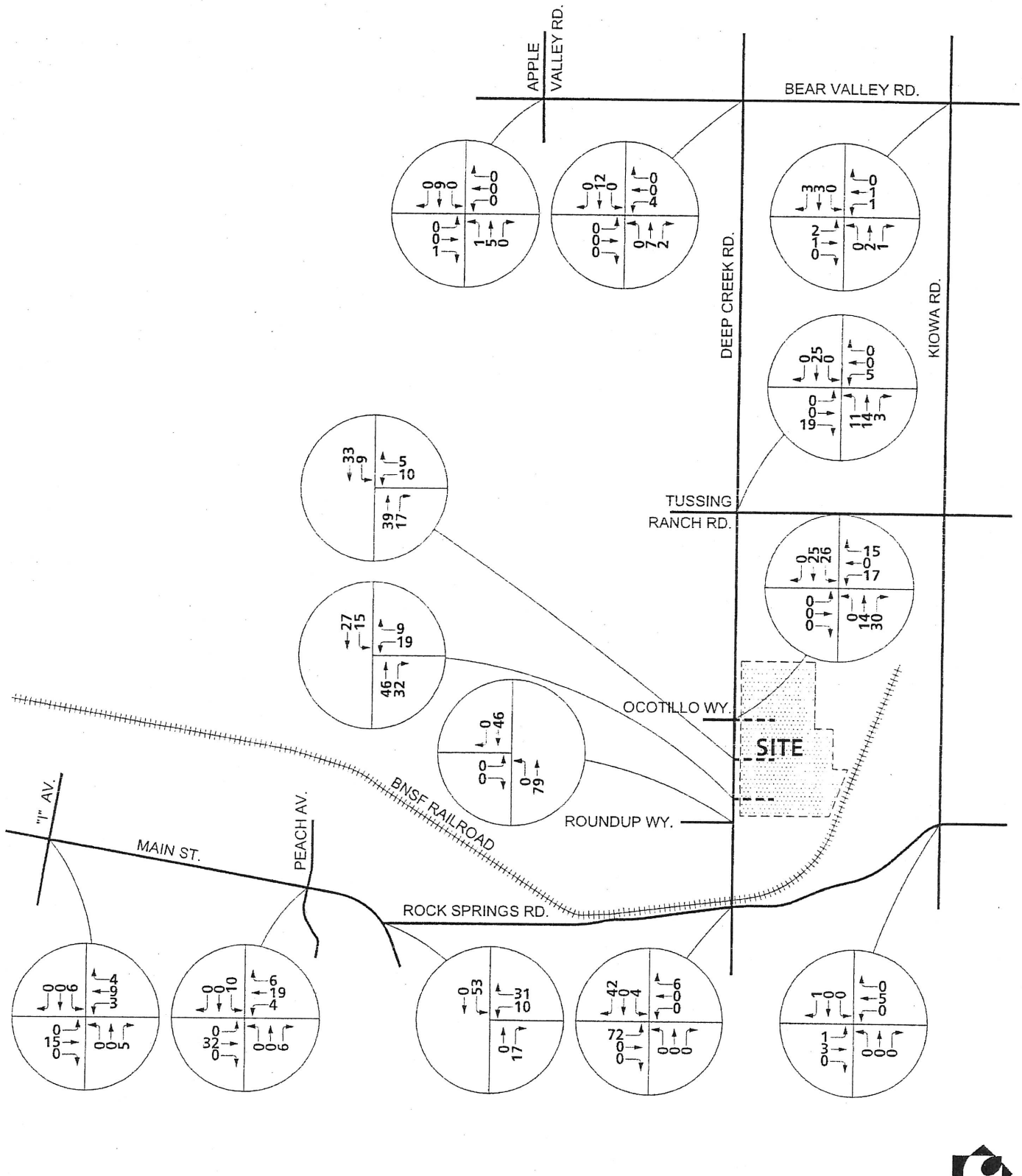


EXHIBIT 2-J

2030 PROJECT ONLY
PM PEAK HOUR INTERSECTION VOLUMES



3.0 EXISTING CONDITIONS

This section of the report summarizes existing roadway and traffic conditions in the study area. All CMP Horizon Year (2030) analysis locations which exist today have been analyzed. The number of through travel lanes for existing roadways and intersection controls are presented, along with existing traffic count data collected for this study. This data was used to analyze existing traffic operations in the study area. Existing plans for roadway improvements are also described in this section.

3.1 Existing Roadway System and Daily Traffic Volumes

The existing intersection controls and the number of through travel lanes for the existing roadways within the study area are presented on Exhibit 3-A. As shown on Exhibit 3-A, Bear Valley Road is a four lane divided roadway. Main Street varies from a two lane undivided road to a four lane divided road in the study area. Deep Creek Road is a two lane undivided roadway throughout the study area.

Exhibit 3-B depicts the current average daily traffic (ADT) volumes in the study area. Existing ADT volumes are based upon traffic data collected by Urban Crossroads, Inc. (see Appendix "A" and Appendix "B") or estimated based on peak hour data. Data was originally collected in 2007. As part of this update, new daily traffic count data (including 15 minute count intervals to enable peak hour volume trend analysis as well) was collected in 2009. Based on the Urban Crossroads Inc. letter report dated July 24, 2009, the traffic volume growth trends in the study area are generally negative from 2007 to 2009. County of San Bernardino staff reviewed this letter report and concurred they are aware of these traffic volume trends. Therefore, the 2007 data presented in this traffic study is considered to be representative of / conservative with respect to 2009 traffic volumes.

The estimated ADT volumes have been calculated by Urban Crossroads, Inc. using the following formula for each intersection leg:

EXHIBIT 3-A

EXISTING NUMBER OF THROUGH LANES AND INTERSECTION CONTROLS

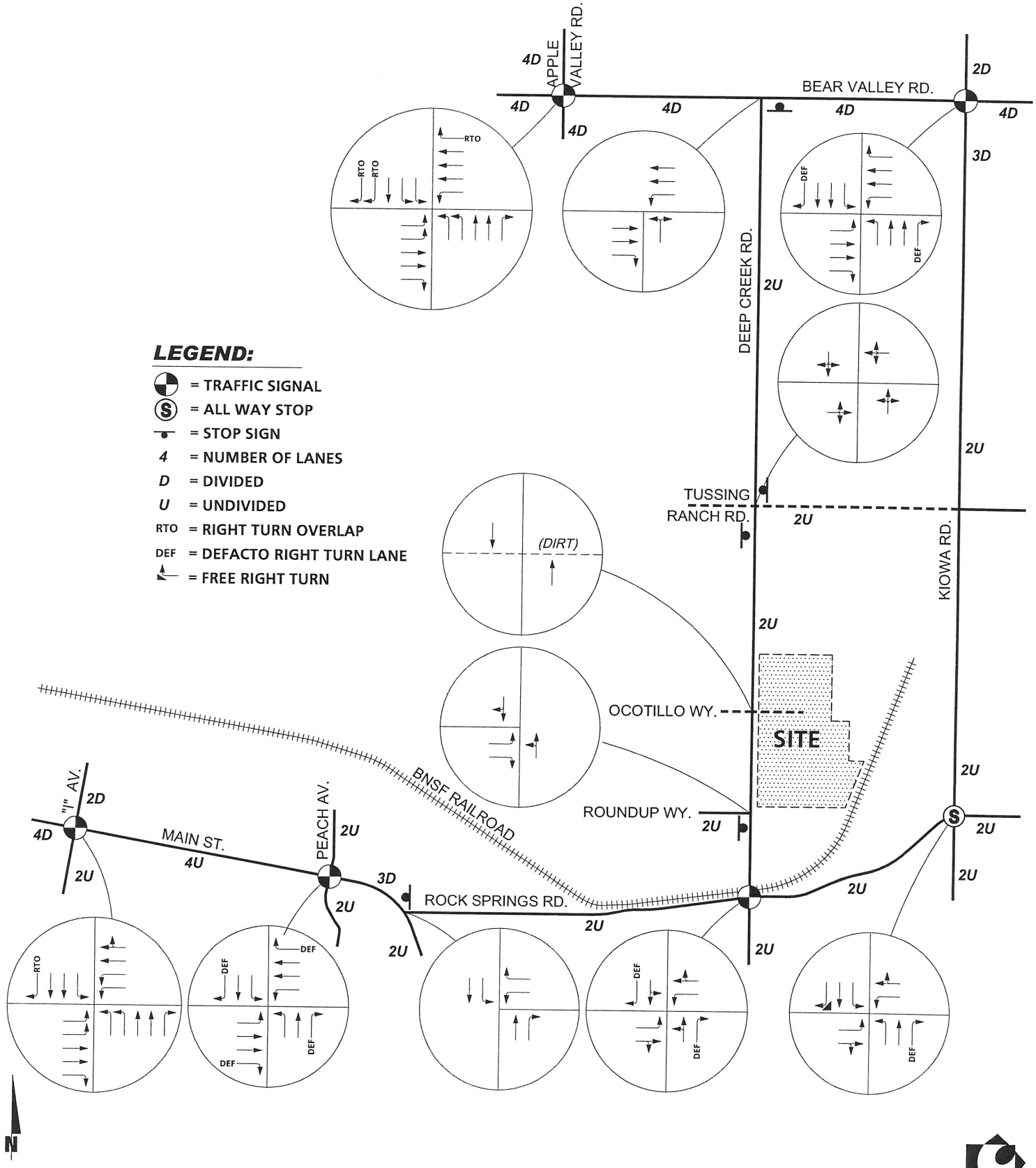
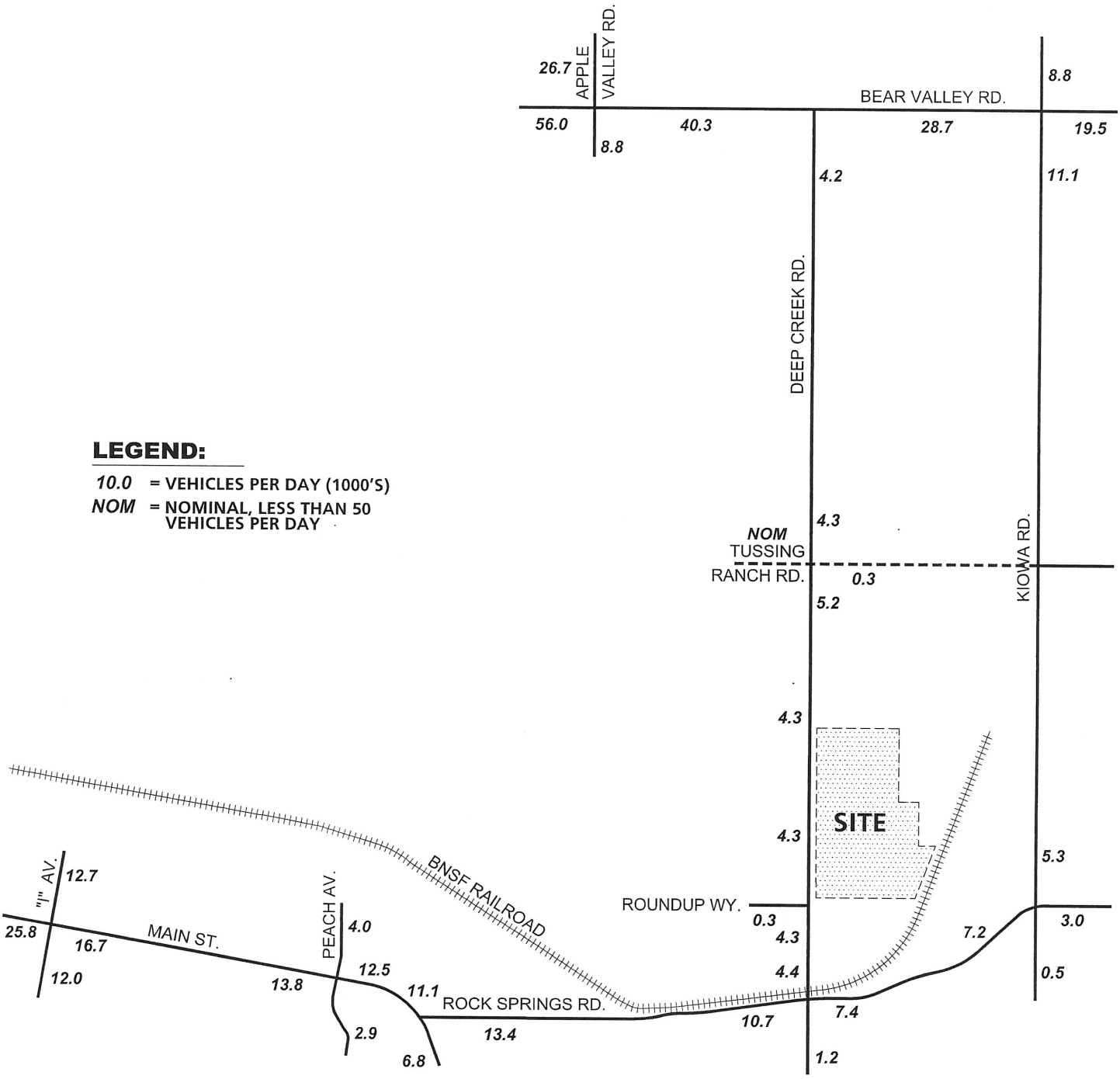


EXHIBIT 3-B

EXISTING AVERAGE DAILY TRAFFIC (ADT)



LEGEND:

10.0 = VEHICLES PER DAY (1000'S)
NOM = NOMINAL, LESS THAN 50 VEHICLES PER DAY

N

URBAN CROSSROADS

(AM Peak Hour (Approach + Exit Volume) +PM Peak Hour (Approach + Exit Volume)) / (8% + 10%) = Daily Leg Volume.

In the above formula, the constants of 8% and 10% are estimated AM and PM Peak Hour to ADT ratios that generate a peak hour to ADT factor of 5.55 (see Appendix "A" for ADT worksheets). The highest daily traffic volumes in the study area occur on Bear Valley Road. The daily traffic volume on Bear Valley Road exceeds 56,000 vehicles per day (VPD) west of Apple Valley Road. The daily traffic volume on Deep Creek Road adjacent to the project site is 4,300 VPD.

3.2 Existing Peak Hour Traffic Volumes

Existing intersection level of service calculations are based upon manual AM and PM peak hour turning movement counts conducted specifically for Urban Crossroads, Inc., as shown on Exhibit 3-C and Exhibit 3-D. Peak period traffic count worksheets are included in Appendix "B". The AM peak hour traffic volumes were determined by counting the two hour period between 7 - 9 AM in the morning. Similarly, the PM peak hour traffic volumes were identified by counting the two hour period from 4 - 6 PM in the evening. The count includes the vehicle classification as shown below per the requirements of SANBAG and the San Bernardino CMP.

- passenger cars (PCE factor = 1.0)
- buses/recreational vehicles (PCE factor = 1.5)
- 3 axles (PCE factor = 2.0)
- 4 or more axles (PCE factor = 3.0)

The overall existing count volumes illustrated on the exhibits and used for the analysis for the study are calculated passenger car equivalent (PCE) volumes. Explicit peak hour factors have been calculated using the data collected for this effort as well.

EXHIBIT 3-C

EXISTING AM PEAK HOUR INTERSECTION VOLUMES

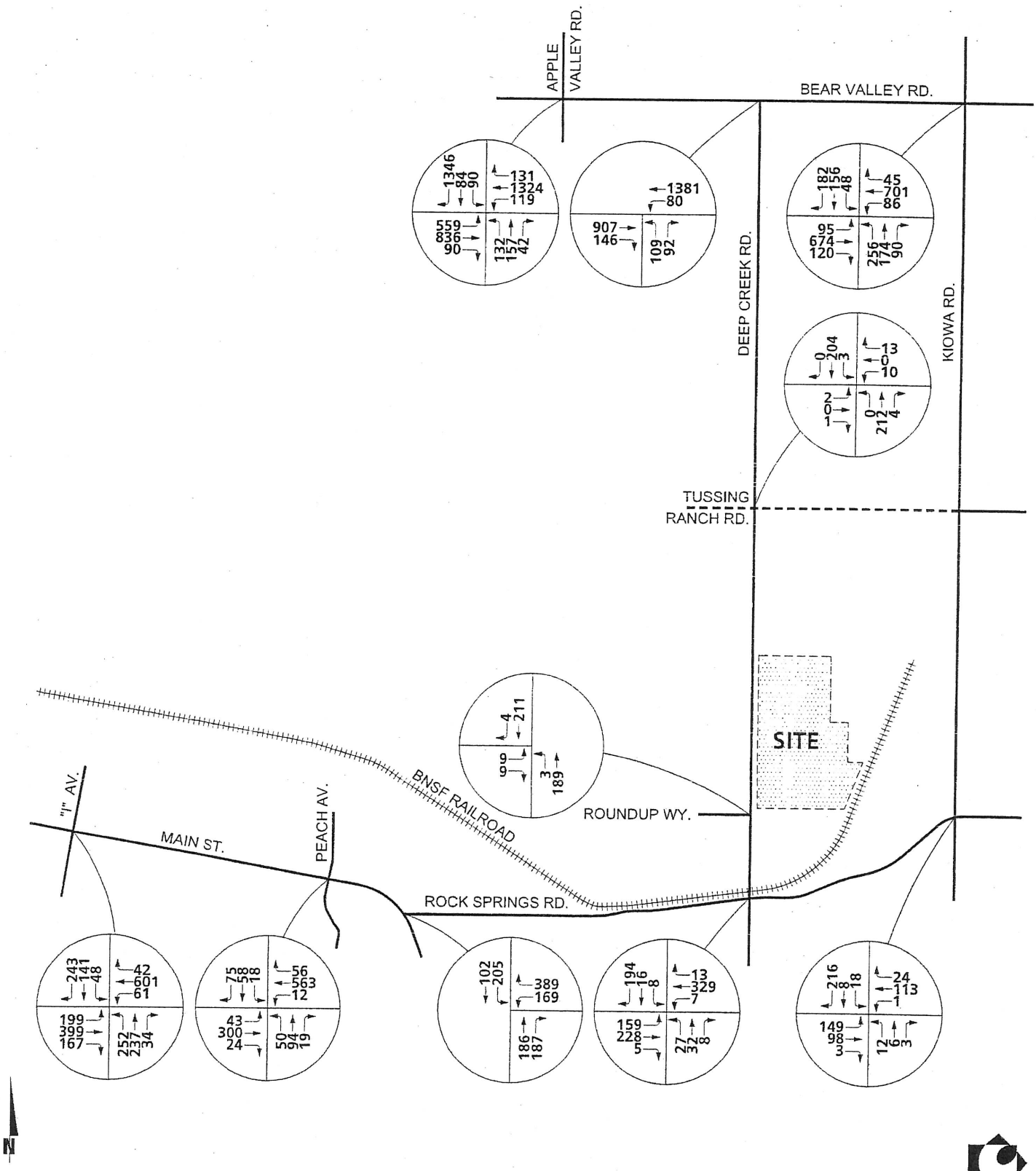
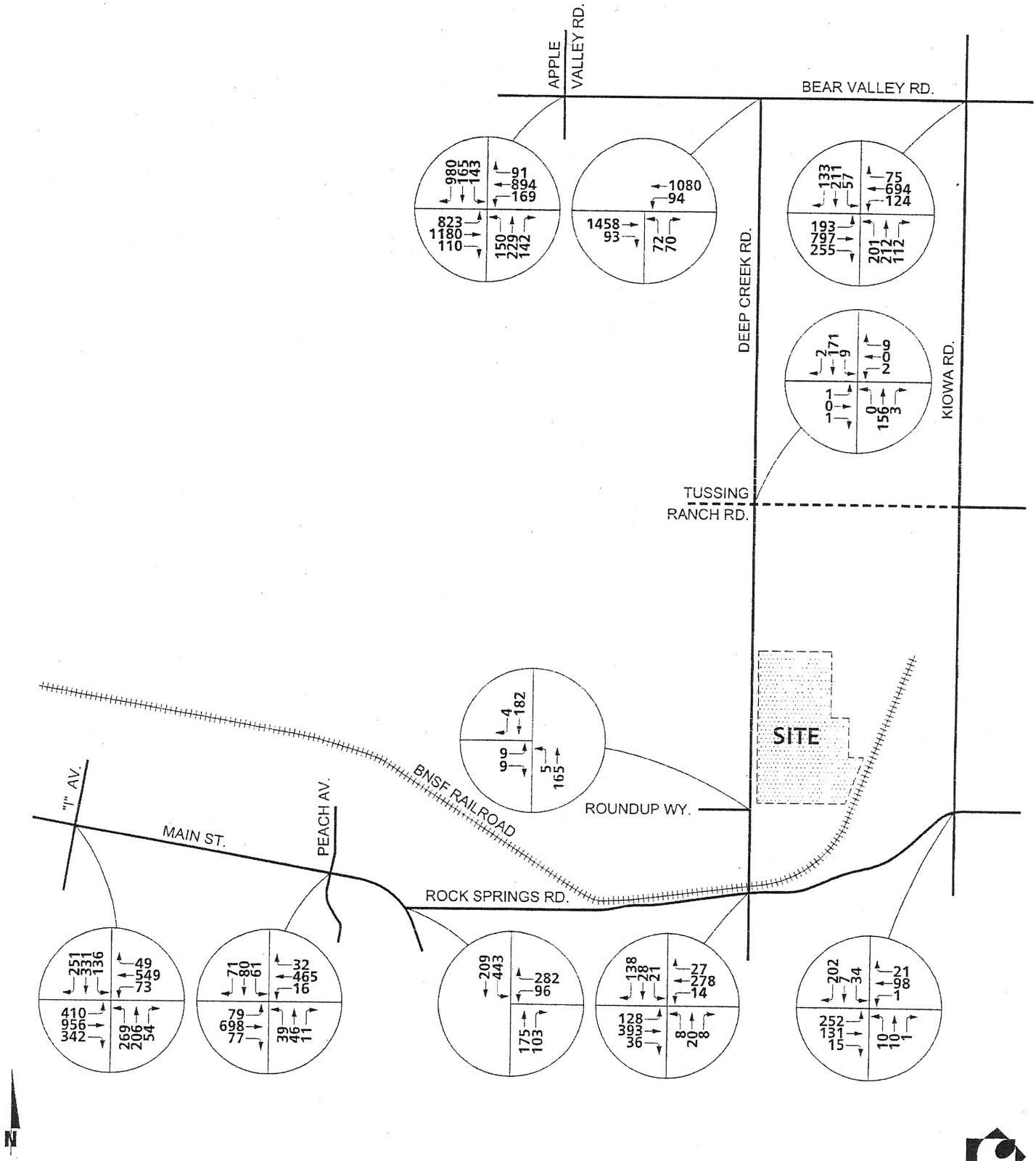


EXHIBIT 3-D

EXISTING PM PEAK HOUR INTERSECTION VOLUMES



3.3 Existing Traffic Operations

Existing peak hour traffic operations have been evaluated for both the AM and PM peak hours of traffic throughout the study area. The results of this analysis are summarized in Table 3-1, along with the existing intersection geometrics and control devices at each analysis location. As indicated in Table 3-1, the study area intersections currently operate at acceptable levels of service during the peak hours except the following intersections per the various local jurisdictions' criteria:

Main Street (NS) at:

- Rock Springs Road (EW)

Apple Valley Road (NS) at:

- Bear Valley Road (EW)

Deep Creek Road (NS) at:

- Bear Valley Road (EW)

Kiowa Road (NS) at:

- Bear Valley Road (EW)

The operations analysis worksheets for existing conditions are included in Appendix "C".

Traffic signals appear to currently be warranted at the following study area intersections (see Appendix "D"):

Main Street (NS) at:

- Rock Springs Road (EW)

Deep Creek Road (NS) at:

- Bear Valley Road (EW)

TABLE 3-1

EXISTING CONDITIONS INTERSECTION ANALYSIS SUMMARY

INTERSECTION	TRAFFIC CONTROL[3]	INTERSECTION APPROACH LANES[1]												DELAY[2] (SECS.)		LEVEL OF SERVICE	
		NORTH-BOUND			SOUTH-BOUND			EAST-BOUND			WEST-BOUND						
		L	T	R	L	T	R	L	T	R	L	T	R	AM	PM	AM	PM
"I" Avenue (NS) at:																	
• Main Street (EW)	TS	2	2	1	1	2	1>	2	2	1	2	2	0	30.8	35.3	C	D
Peach Avenue (NS) at:																	
• Main Street (EW)	TS	1	1	1	1	1	1	1	2	1	1	2	1	21.1	19.7	C	B
Main Street (NS) at:																	
• Rock Springs Road (EW)	CSS	0	1	1	1	1	0	0	0	0	1	0	1	45.9	--[4]	E	F
Apple Valley Road (NS) at:																	
• Bear Valley Road (EW)	TS	2	2	1	2	1	2>	2	2	1	1	3	1>	42.3	42.3	D	D
Deep Creek Road (NS) at:																	
• Bear Valley Road (EW)	CSS	0	1	0	0	0	0	0	2	1	1	2	0	--[4]	--[4]	F	F
• Tussing Ranch Road	CSS	0	1	0	0	1	0	0	1	0	0	1	0	11.0	10.1	B	B
• Ocotillo Way	--	DOES NOT EXIST												--	--	--	--
• South Project Access	--	DOES NOT EXIST												--	--	--	--
• Roundup Way	CSS	0	1	0	0	1	0	1	0	1	0	0	0	11.6	11.2	B	B
• Rock Springs Road (EW)	TS	0.5	0.5	1	0.5	0.5	1	1	1	0	1	1	0	25.3	19.4	C	B
Kiowa Road (NS) at:																	
• Bear Valley Road (EW)	TS	1	2	1	1	2	1	1	2	1	1	2	1	37.6	36.2	D	D
• Rock Springs Road (EW)	AWS	1	1	1	1	1	1>>	1	1	0	1	1	0	9.0	10.2	A	B

1 When a right turn is designated, the lane can either be striped or unstriped. To function as a right turn lane there must be sufficient width for right turning vehicles to travel outside the through lanes.

L = Left; T = Through; R = Right; > = Right Turn Overlap Phase; >> = Free Right Turn Lane

2 Delay and level of service calculated using the following analysis software: Traffix, Version 7.8 R5 (2007). Per the 2000 Highway Capacity Manual, overall average intersection delay and level of service are shown for intersections with traffic signal or all way stop control. For intersections with cross street stop control, the delay and level of service for worst individual movement (or movements sharing a single lane) are shown.

3 CSS = Cross Street Stop
TS = Traffic Signal
AWS = All Way Stop

4 -- = Delay High, Intersection Unstable, Level of Service "F".

U:\UcJobs_04100-04500_04400\04476\Excel\[04476-16.xls]T 3-1

Kiowa Road (NS) at:

- Rock Springs Road (EW)

3.4 Planned Transportation Improvements and Relationships to General Plan

The long range transportation system within the study area is expected to undergo significant improvement, based on the long range circulation plan of the County of San Bernardino and other nearby local jurisdictions. The County of San Bernardino General Plan Circulation Element and roadway cross-sections are shown on Exhibit 3-E and Exhibit 3-F. The City of Hesperia General Plan Circulation Element and roadway cross-sections are depicted on Exhibit 3-G and 3-H, respectively. The Town of Apple Valley General Plan Circulation Element and roadway cross-sections are depicted on Exhibit 3-I and 3-J, respectively.

As indicated on these exhibits, Bear Valley Road's roadway classification is not consistent for all three jurisdictions. Although Bear Valley Road's classification 'type' (roadway naming) is inconsistent, all three jurisdictions illustrate Bear Valley Road with a General Plan right of way cross-section of 120 feet and 3 travel lanes in each direction. It should also be noted that, in the County of San Bernardino General Plan Circulation Element, Deep Creek Road is a "Secondary Highway" with an 88 foot right of way. However, the Town of Apple Valley's General Plan Circulation Element indicates that Deep Creek Road is a "Secondary Roadway" with an 80 foot right of way. In both cases, the configuration provides for 2 through lanes in each direction.

3.4.1 Funded Roadway Improvements Unrelated to the Project

No other committed sources of funding for additional improvements necessary to correct existing deficiencies or serve future increases in traffic are in place. The analyses contained in this report, therefore, assumed no additional funded.

EXHIBIT 3-E

COUNTY OF SAN BERNARDINO GENERAL PLAN CIRCULATION ELEMENT

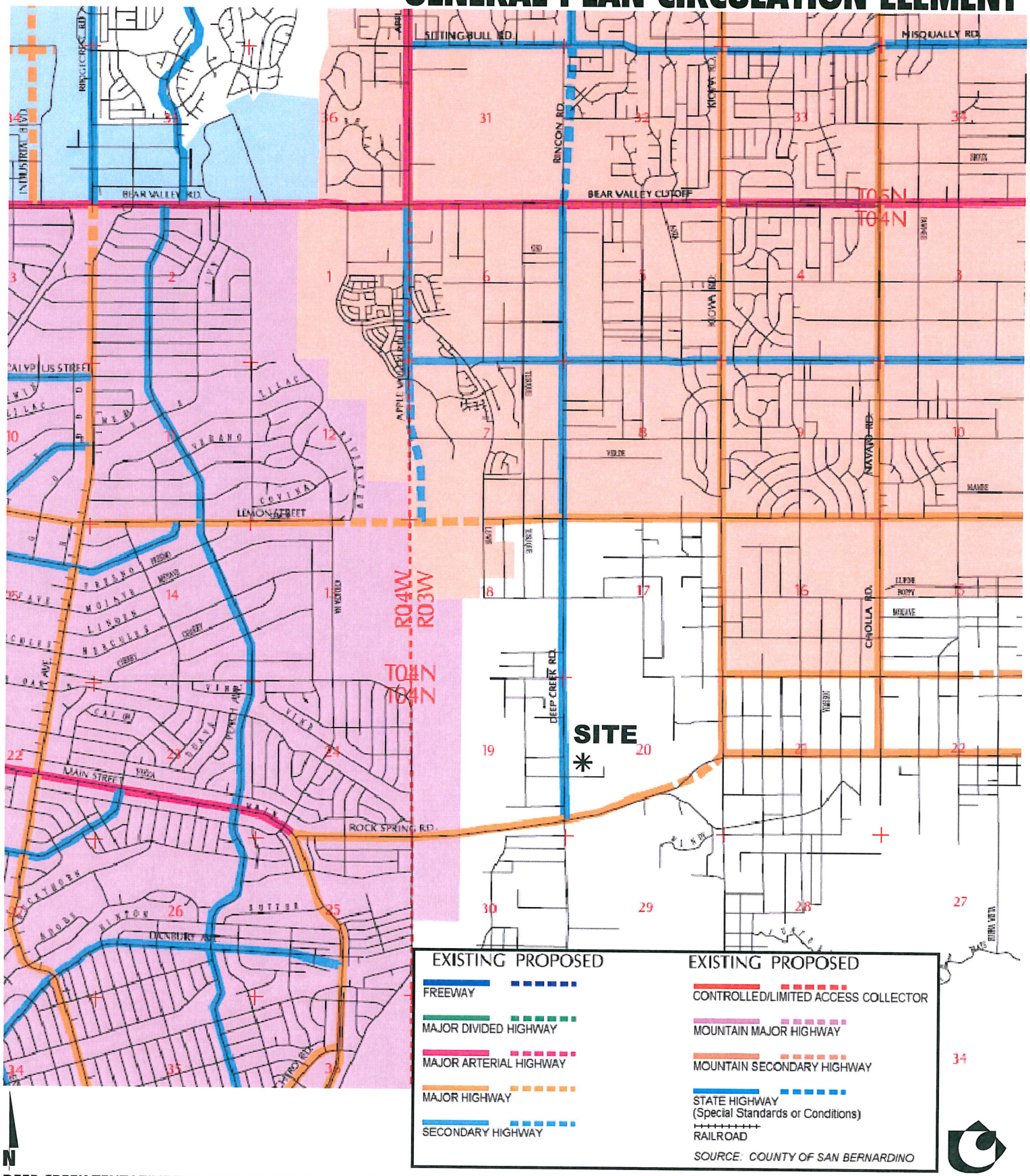
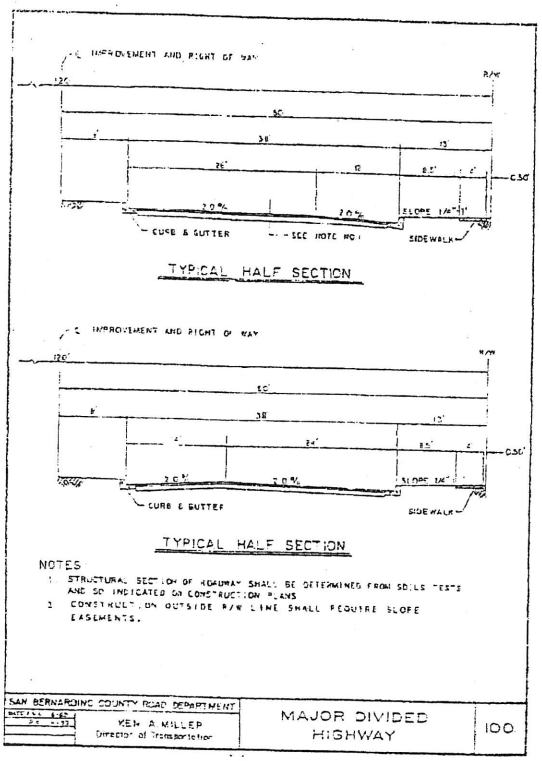
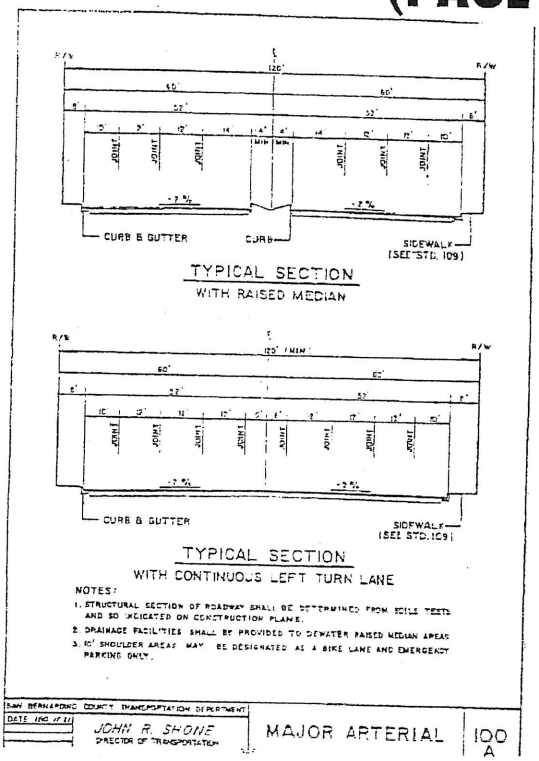
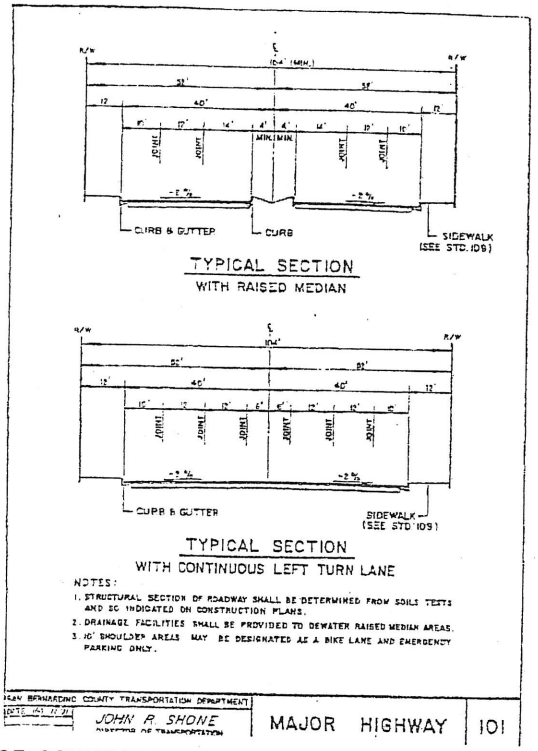


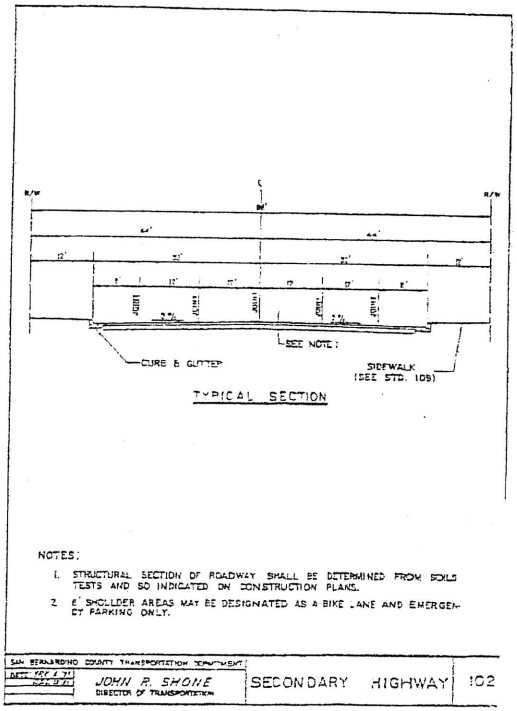
EXHIBIT 3-F

COUNTY OF SAN BERNARDINO GENERAL PLAN ROADWAY CROSS-SECTIONS (PAGE 1 OF 2)





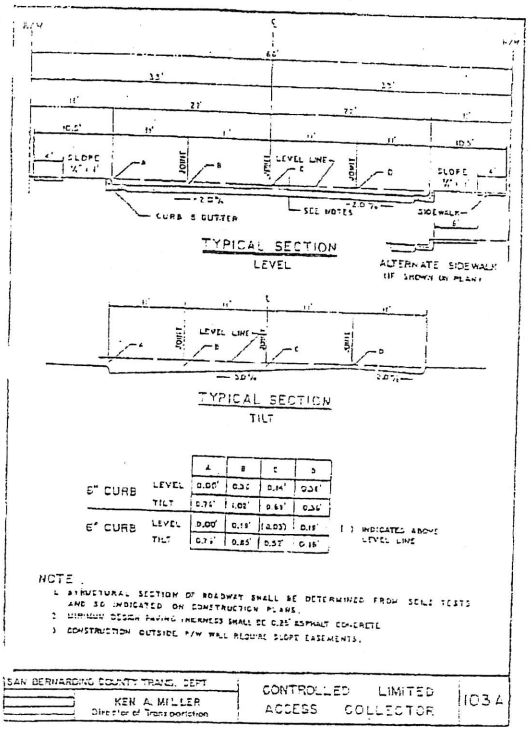


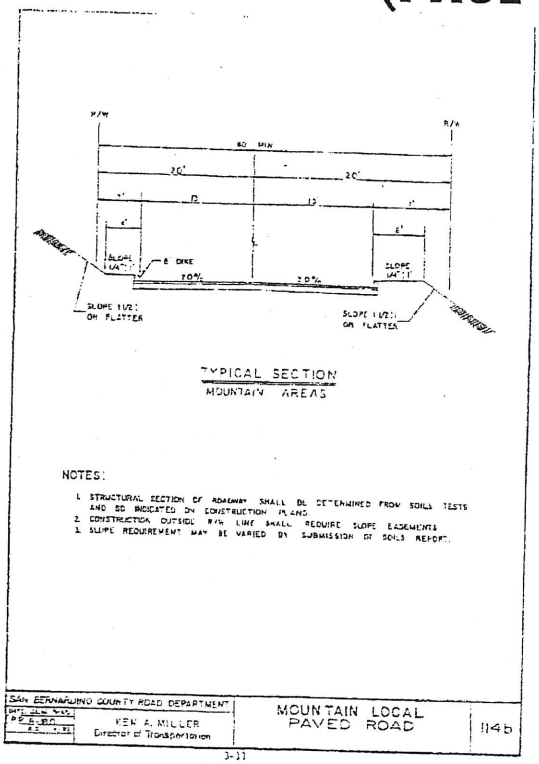


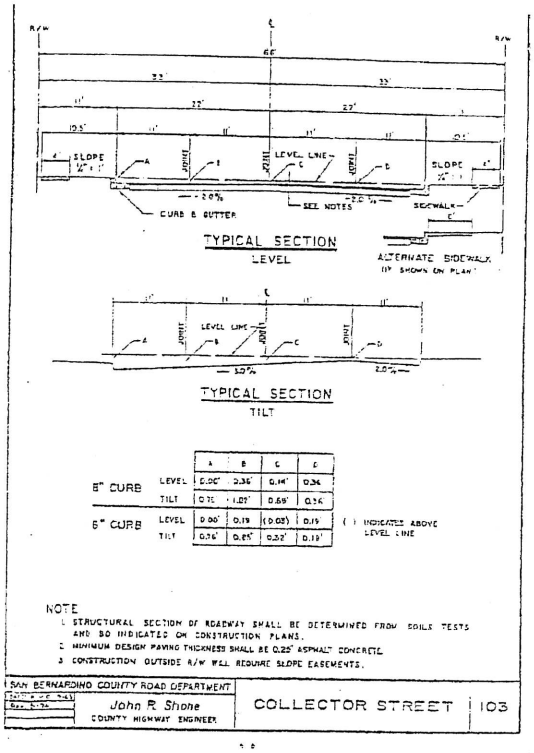
SOURCE: COUNTY OF SAN BERNARDINO

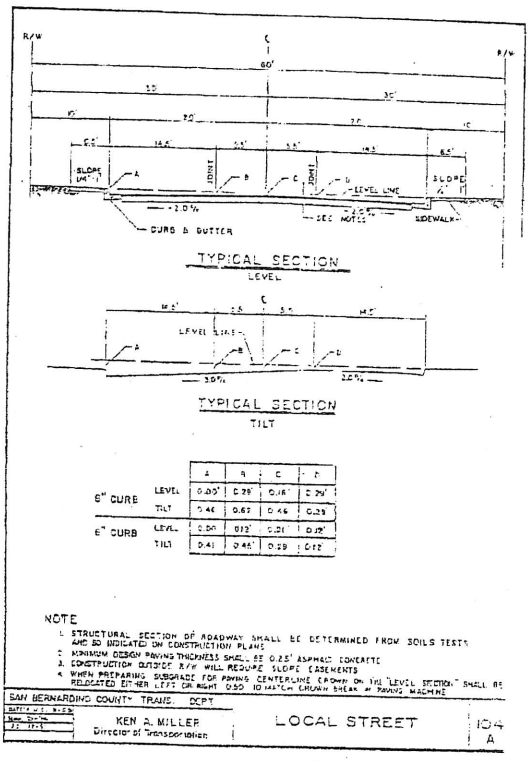
EXHIBIT 3-F

COUNTY OF SAN BERNARDINO GENERAL PLAN ROADWAY CROSS-SECTIONS (PAGE 2 OF 2)





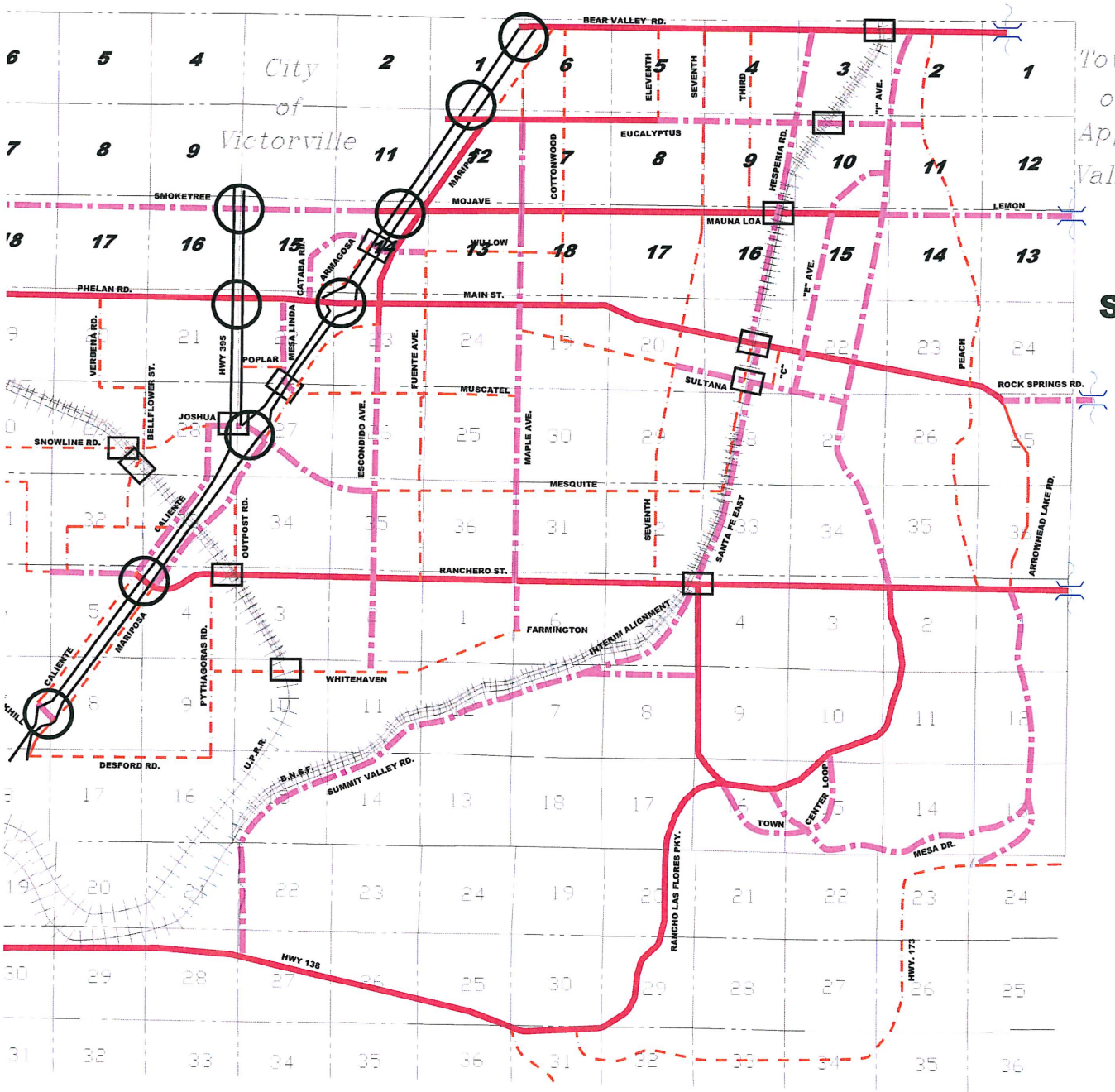




SOURCE: COUNTY OF SAN BERNARDINO

EXHIBIT 3-G

CITY OF HESPERIA
GENERAL PLAN CIRCULATION ELEMENT



LEGEND:

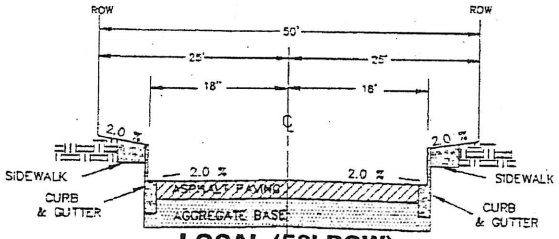
- FREEWAY
- MAJOR ARTERIAL — CURB - 104' — ROW - 120'
- ARTERIAL — CURB - 84' — ROW - 100'
- SECONDARY ARTERIAL — CURB - 64' — ROW - 80'
- RAILROAD
- CITY BOUNDARY
- FREEWAY INTERCHANGE
- GRADE SEPARATION
- RIVER CROSSING
- SPHERE OF INFLUENCE

N

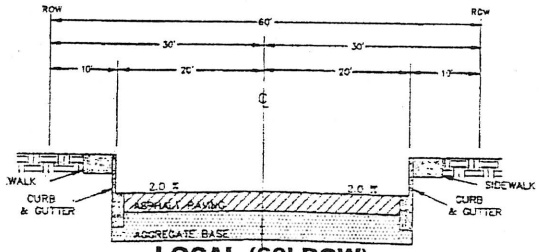
SOURCE: CITY OF HESPERIA

EXHIBIT 3-H

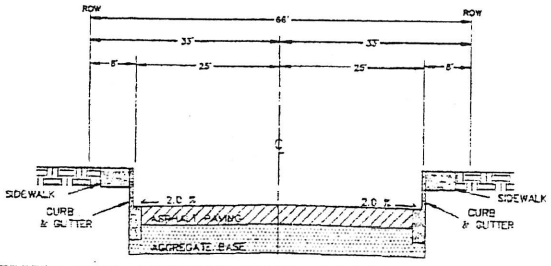
CITY OF HESPERIA
GENERAL PLAN ROADWAY CROSS-SECTIONS



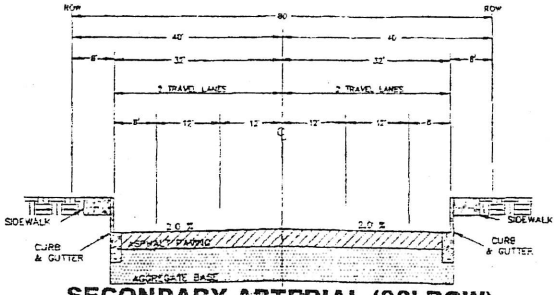
LOCAL (50' ROW)



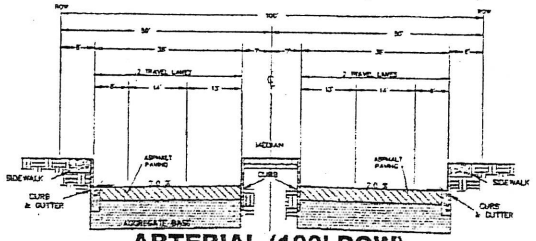
LOCAL (60' ROW)



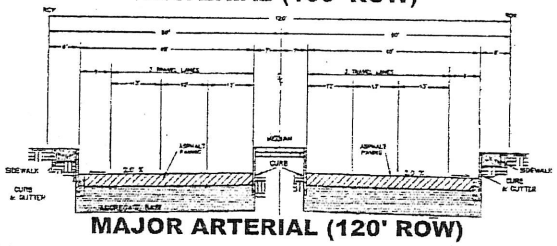
COMMERCIAL / INDUSTRIAL COLLECTOR (66' ROW)



SECONDARY ARTERIAL (80' ROW)



ARTERIAL (100' ROW)

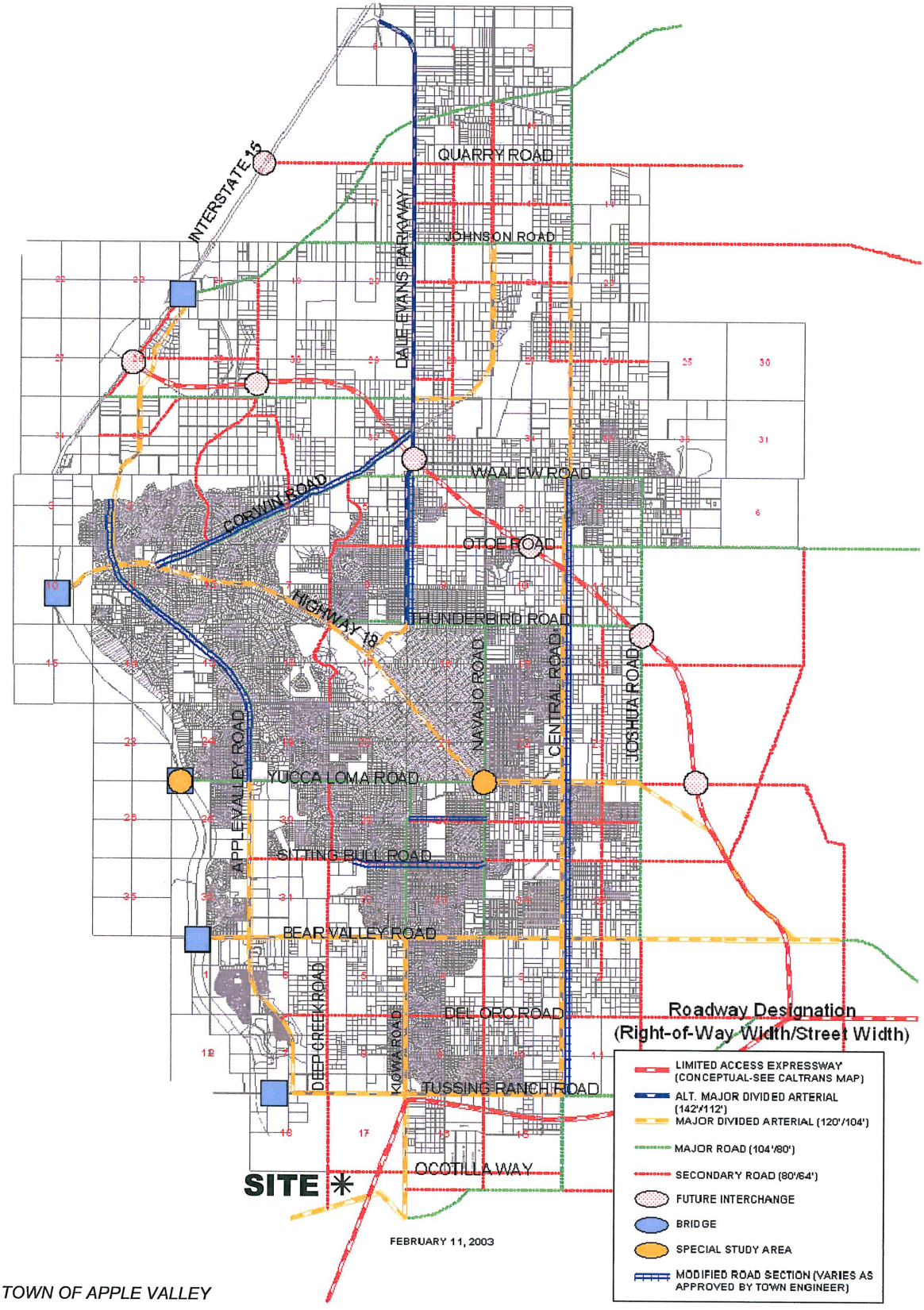


MAJOR ARTERIAL (120' ROW)

SOURCE: CITY OF HESPERIA

EXHIBIT 3-I

TOWN OF APPLE VALLEY
GENERAL PLAN CIRCULATION ELEMENT

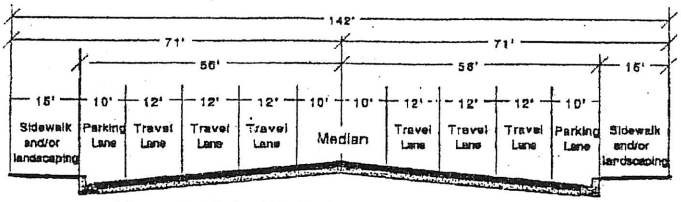


SOURCE: TOWN OF APPLE VALLEY

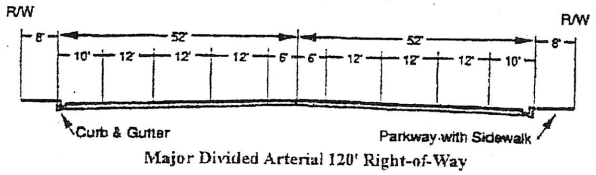
N

EXHIBIT 3-J

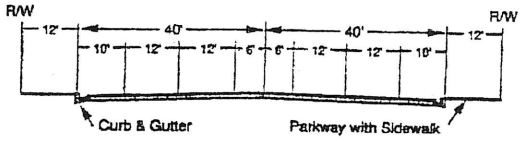
TOWN OF APPLE VALLEY
GENERAL PLAN ROADWAY CROSS-SECTIONS



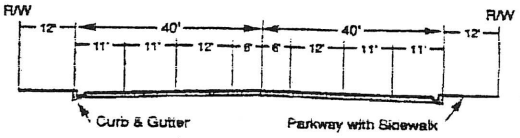
Alternate Major Divided Arterial 142' Right-of-Way



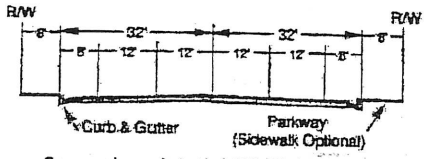
Major Divided Arterial 120' Right-of-Way



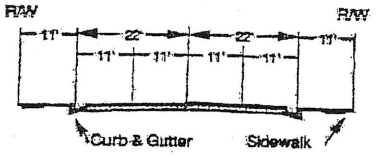
Major Highway 104' Right-of-Way



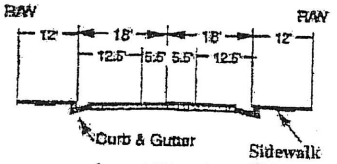
Major Highway 104' Right-of-Way
(Modified Section)



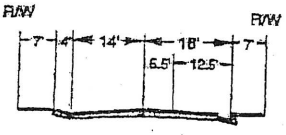
Secondary Arterial 80' Right-of-Way



Industrial and Commercial Local Street
66' Right-of-Way



Local Street
60' Right-of-Way



Rural Local Street
50' Right-of-Way

SOURCE: TOWN OF APPLE VALLEY

However, a number of other major regional transportation improvements unrelated to the project are moving forward and are at least partially funded through the South/East Apple Valley Local Area Transportation Facilities Plan or other funding sources such as Measure "I" sales tax revenues. The long range traffic model reflects these reasonably foreseeable transportation improvements.

Roadways that fall into this category and directly affect the study area include the extension of Tussing Ranch Road (Lemon Street) and Yucca Loma Road across the Mojave River. As indicated in Chapter 5 of this report, the Tussing Ranch Road (Lemon Street) crossing is essential in maintaining acceptable traffic conditions along Bear Valley Road. The roadway deficiencies and required improvements associated with not constructing the Tussing Ranch Road (Lemon Street) crossing would exceed the long range (General Plan) improvements for Bear Valley Road. Interim Year intersection analysis (presented in subsequent sections of this report) indicate that 4 through lanes in each direction along Bear Valley Road (improvements exceeding County of San Bernardino planned improvements) may be required if the Tussing Ranch Road (Lemon Street) crossing is not constructed. Both of the crossings will provide relief to Bear Valley Road, and the Tussing Ranch Road (Lemon Street) crossing will also provide relief to the Rock Springs Road crossing of the Mojave River. Project fair share contribution calculations towards such improvements have been included in Chapter 6 of this report as appropriate (for Tussing Ranch Road / Lemon Street).

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4.0 FUTURE DAILY TRAFFIC CONDITIONS

This chapter of the report describes the development of the future year traffic volume forecasts and presents the resulting daily traffic volumes which will be used for traffic operations analysis. Future traffic conditions without the project are presented first, followed by the future with project traffic volumes. Traffic signal warrant analysis for future conditions has also been presented in this chapter.

4.1 Future With and Without Project Traffic Conditions

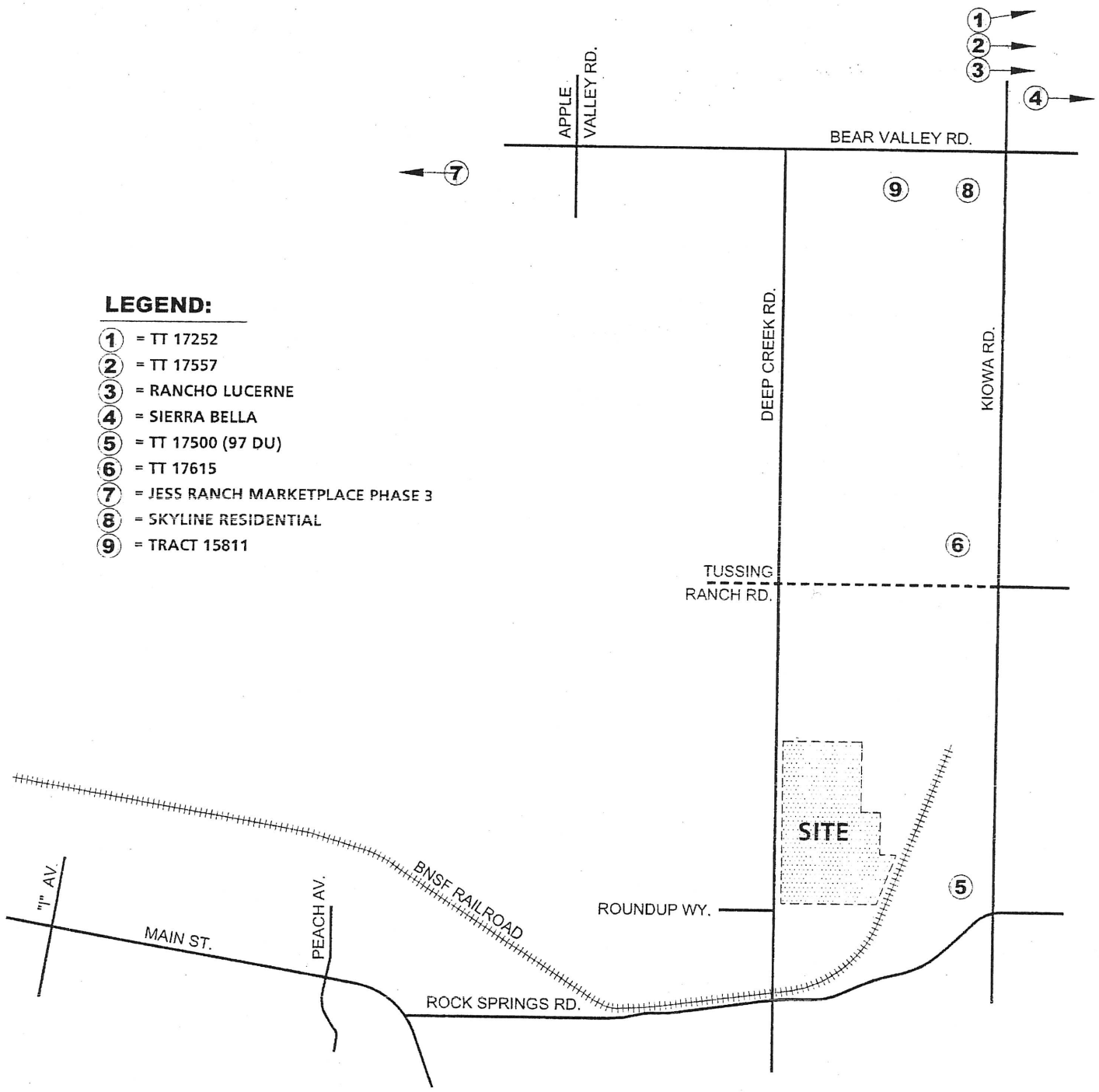
The Town of Apple Valley, City of Hesperia, and the County of San Bernardino were contacted in order to determine if there were any projects planned within the study area that would have an impact on future traffic volumes at the study intersections. Based on these discussions, the following 9 projects were identified:

1. Tentative Tract Map No. 17252
2. Tentative Tract Map No. 17557
3. Rancho Lucerne
4. Sierra Bella
5. Tentative Tract Map No. 17500
6. Tentative Tract Map No. 17615
7. Jess Ranch Marketplace
8. Skyline Residential
9. Tract 15811

The previously mentioned other developments which have been approved, built but not occupied at the time that the traffic count data was collected, or are being processed concurrently are illustrated on Exhibit 4-A. Some of these project, such as the Jess Ranch Marketplace, may have been built and occupied subsequent to collection of the traffic count data in 2007. Based on the 2009 traffic count data presented previously, the current economic situation is depressing traffic volumes

EXHIBIT 4-A

OTHER DEVELOPMENT LOCATION MAP



NOTE: PORTIONS OF TT 17500 ARE ALSO LOCATED SOUTH OF ROCK SPRINGS ROAD.

in the study area. Therefore, the cumulative projects list has been retained unchanged to ensure a conservative worst case analysis indicative of more typical economic conditions. This is consistent with the approach taken with respect to the traffic count data. Table 4-1 indicates the 2015 trip generation rates for other developments in the project's vicinity that may add traffic to the intersection analysis locations. Table 4-2 provides the 2015 other developments project trip generation summary. As indicated in Table 4-2, other developments in 2015 are projected to generate 66,471 trip-ends per day during the typical weekday. The AM peak hour volumes for the other developments are 4,594 vehicles, and 6,583 vehicles per hour will be generated during the PM peak hour. Exhibits 4-B through 4-J illustrate the other developments' trip distributions. This represents a conservative worst case scenario, as some of the larger cumulative development projects (such as Rancho Lucerne) may not be completely occupied by 2015.

The 2015 without project peak hour traffic volumes are estimated based on the two volume calculations/methodologies:

- Calculation 1: Interpolation of volumes from Existing (2009) to initial refined 2030 peak hour volumes to obtain 2015 volumes.

- Calculation 2: 2009 existing traffic volumes plus the 2009 to 2015 area-wide background growth (3% per year) volumes plus the known cumulative development volumes. A 3% annual growth rate has been applied as background growth from 2009 to 2015. When the ambient background growth of 3% per year is added to the additional cumulative project traffic, the resulting total annual compounded growth rate from 2009 to 2015 is approximately 6-7%.

The resulting volumes from 'Calculation 1' were compared with 'Calculation 2' and the highest (largest in quantity) turning movements from each calculation were selected for each intersection to represent 2015 Without Project conditions. These calculations are presented in Appendix "G". The 2015 Without Project daily traffic

TABLE 4-1

2015 OTHER DEVELOPMENT TRIP GENERATION RATES[1]

LAND USE	ITE CODE	UNITS[2]	PEAK HOUR AM IN	AM OUT	AM TOTAL	PM IN	PM OUT	PM TOTAL	DAILY
Other Development Trip Rates:									
Single Family Detached Residential	210	DU	0.19	0.56	0.75	0.65	0.36	1.01	9.57
Fast Food Restaurant W/Drive Thru	934	DU	27.09	26.02	53.11	18.01	16.63	34.64	496.12
Shopping Center	820	TSF	0.63	0.40	1.03	1.80	1.95	3.75	42.94
Movie Theatre With Matinee	444	SEATS	0.00	0.00	0.00	0.03	0.05	0.08	0.36
Health/Fitness Club	492	TSF	0.51	0.70	1.21	2.07	1.98	4.05	32.93

[1] Sources: Tentative Tract 17252 Traffic Study dated April 2005 (prepared by LSA Associates), Tentative Tract Map NO. 17557 TIA dated June 1, 2006 (prepared by Kunzman Associates), and Sierra Bella Traffic Impact Analysis dated May 25, 2006 (prepared by Kunzman Associates).
Trip rates for the Rancho Lucerne project have been obtained from the Tentative Tract Map No. 17557 TIA dated June 1, 2006 (prepared by Kunzman Associates).
Trip rates for the Jess Ranch Marketplace project have been obtained from the Jess Ranch Marketplace TIA (prepared by RBF) provided by the Town of Apple Valley.

[2] DU = Dwelling Units
TSF = Thousand Square Feet

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TABLE 4-2

OTHER DEVELOPMENT LAND USE AND TRIP GENERATION SUMMARY

NAME	LAND USE	TOTAL DEVELOPMENT	UNITS[1]	PEAK HOUR AM IN	AM OUT	AM TOTAL	PM IN	PM OUT	PM TOTAL	DAILY
Tentative Tract Map No. 17252	Single Family Residential	130	DU	25	73	98	85	47	131	1,244
Tentative Tract Map No. 17557	Single Family Residential	205	DU	39	115	154	133	74	207	1,962
Rancho Lucerne[2]	--	--	--	910	2,520	3,430	3,080	1,740	4,820	45,800
Sierra Bella	Single Family Residential	280	DU	53	157	210	182	101	283	2,680
Tentative Tract Map No. 17500	Single Family Residential	97	DU	18	54	73	63	35	98	928
Tentative Tract No. 17615	Single Family Residential	44	DU	9	25	34	29	16	45	421
Jess Ranch Marketplace [3]	Fast Food Restaurant W/Drive Thru	10	TSF	271	260	531	180	166	346	4,961
	ITE Pass-by Reduction (-49% AM, 50% PM)			*-133*	*-127*	*-260*	*-90*	*-83*	*-173*	*-433*
	Shopping Center	116	TSF	73	46	119	208	226	434	4,972
	ITE Pass-by Reduction (-34% PM)			*N/A*	*N/A*	*N/A*	*-71*	*-77*	*-148*	*-148*
	Movie Theatre With Matinee	2,000	SEATS	0	0	0	60	100	160	720
	Health / Fitness Club	42	TSF	21	29	51	87	83	170	1,383
JESS RANCH MARKETPLACE TOTAL				**232**	**208**	**440**	**374**	**415**	**790**	**11,455**
Skyline Residential	Single Family Residential	172	DU	33	96	129	110	64	174	1,646
Tract 15811	Single Family Residential	35	DU	7	20	26	23	13	35	335
TOTAL TRIPS				**1,326**	**3,268**	**4,594**	**4,079**	**2,505**	**6,583**	**66,471**

[1] DU = Dwelling Units

[2] Trip generation for the Rancho Lucerne project have been obtained from the Tentative Tract Map No. 17557 TIA dated June 1, 2006 (prepared by Kunzman Associates)

[3] Trip generation for the Jess Ranch Marketplace have been obtained from the Jess Ranch Marketplace TIA (prepared by RBF) provided by the Town of Apple Valley

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EXHIBIT 4-B

TT 17252 TRIP DISTRIBUTION

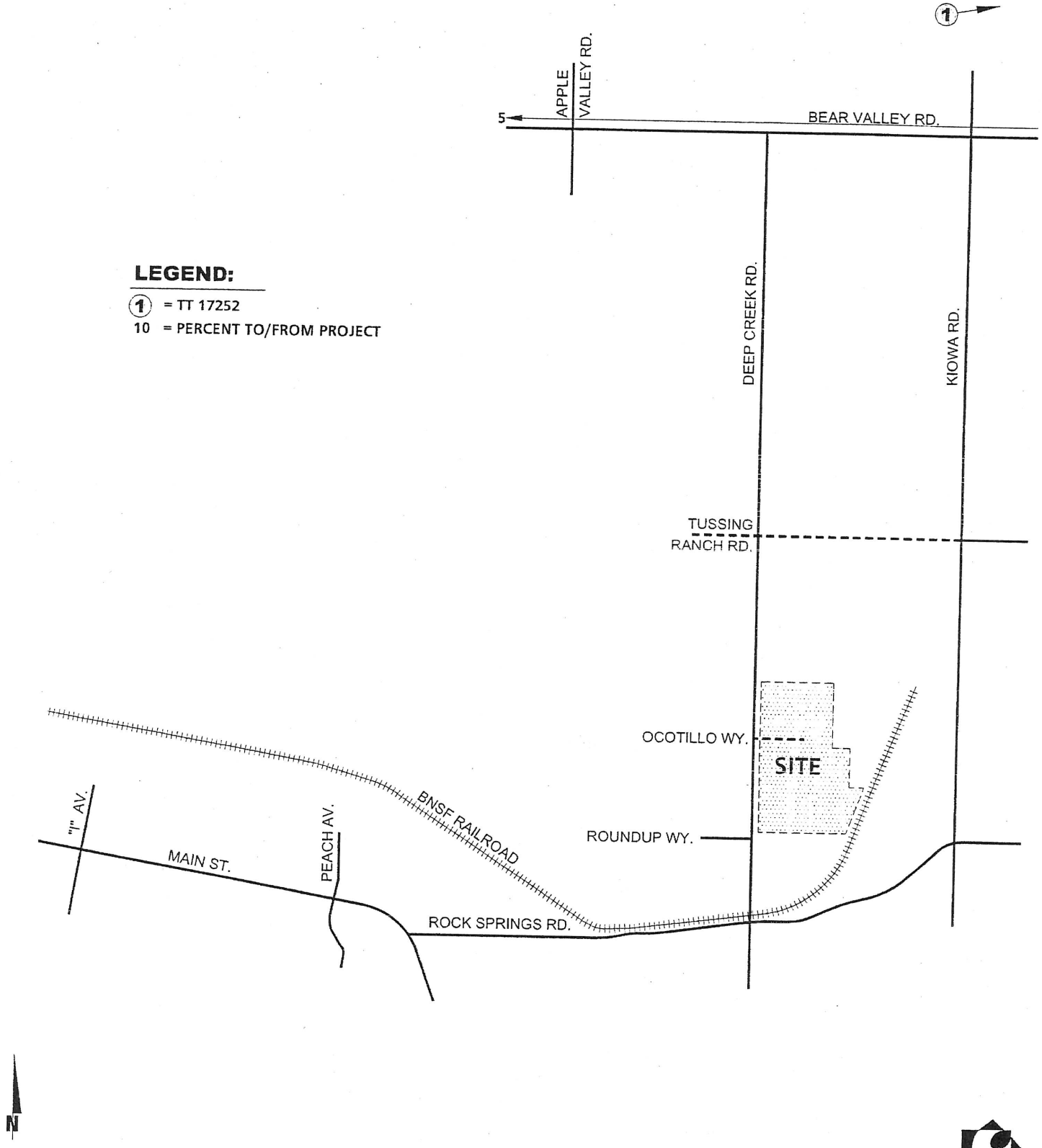


EXHIBIT 4-C

TT 17557 TRIP DISTRIBUTION

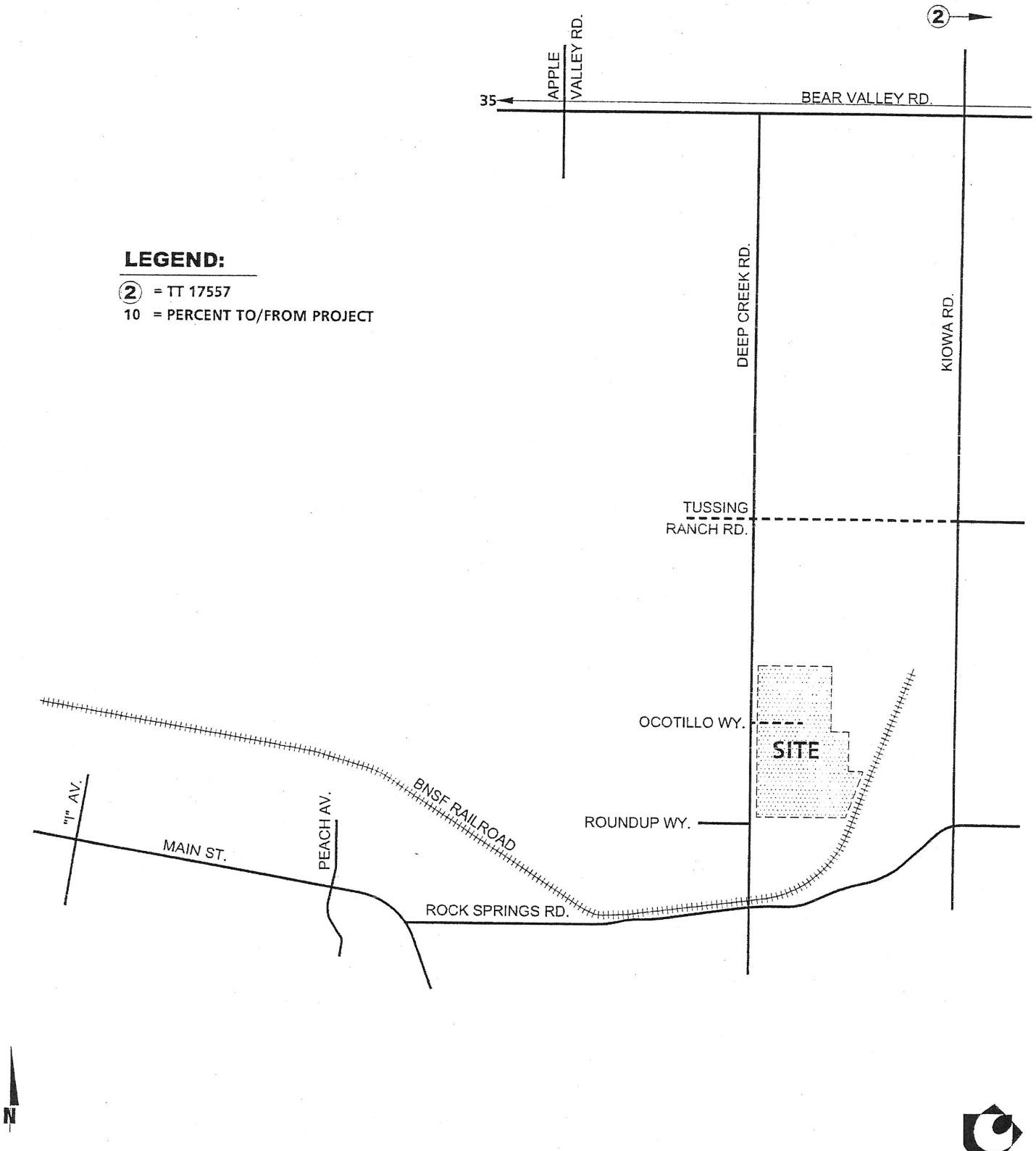


EXHIBIT 4-D

RANCHO LUCERNE TRIP DISTRIBUTION

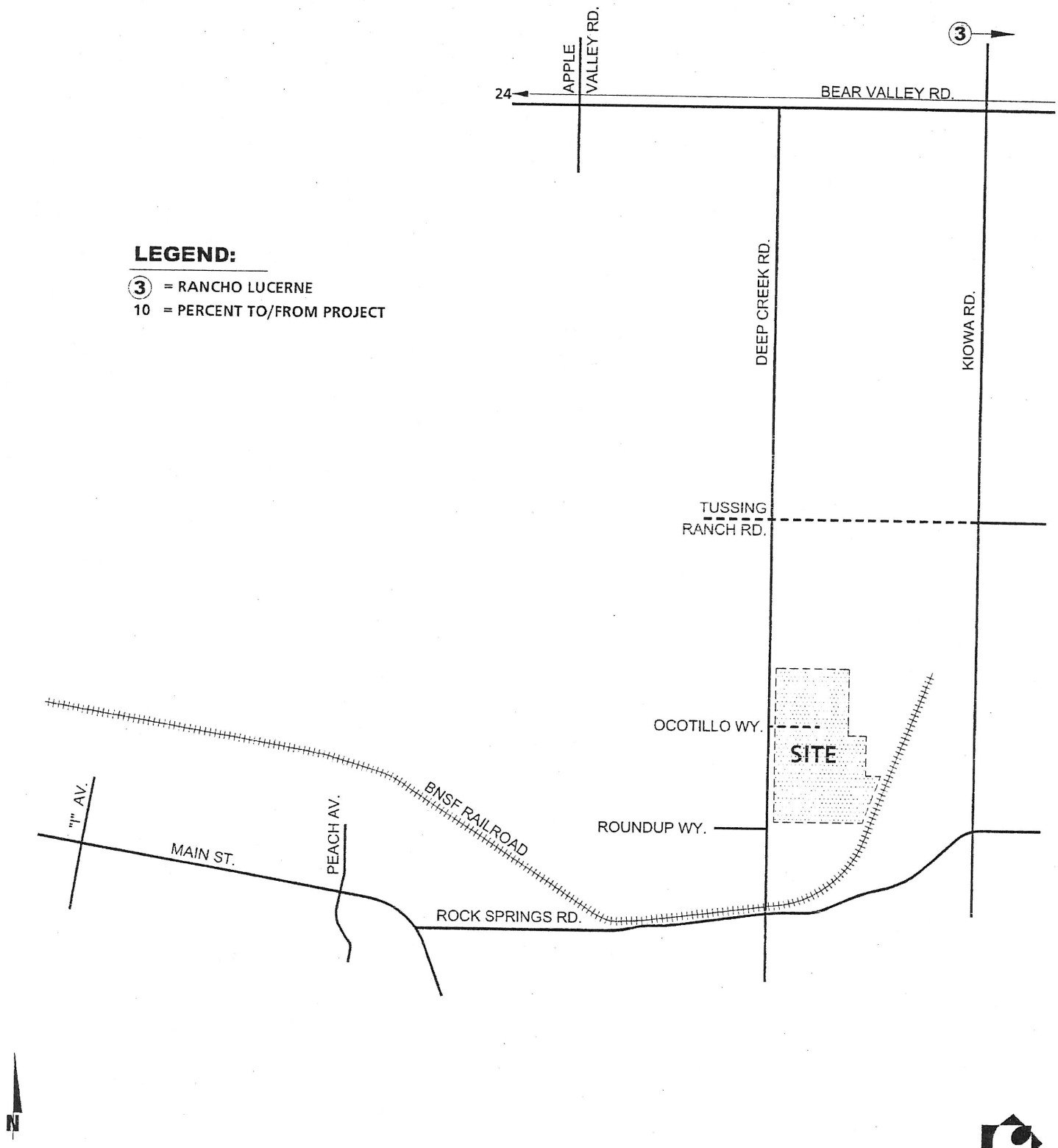


EXHIBIT 4-E

SIERRA BELLA TRIP DISTRIBUTION

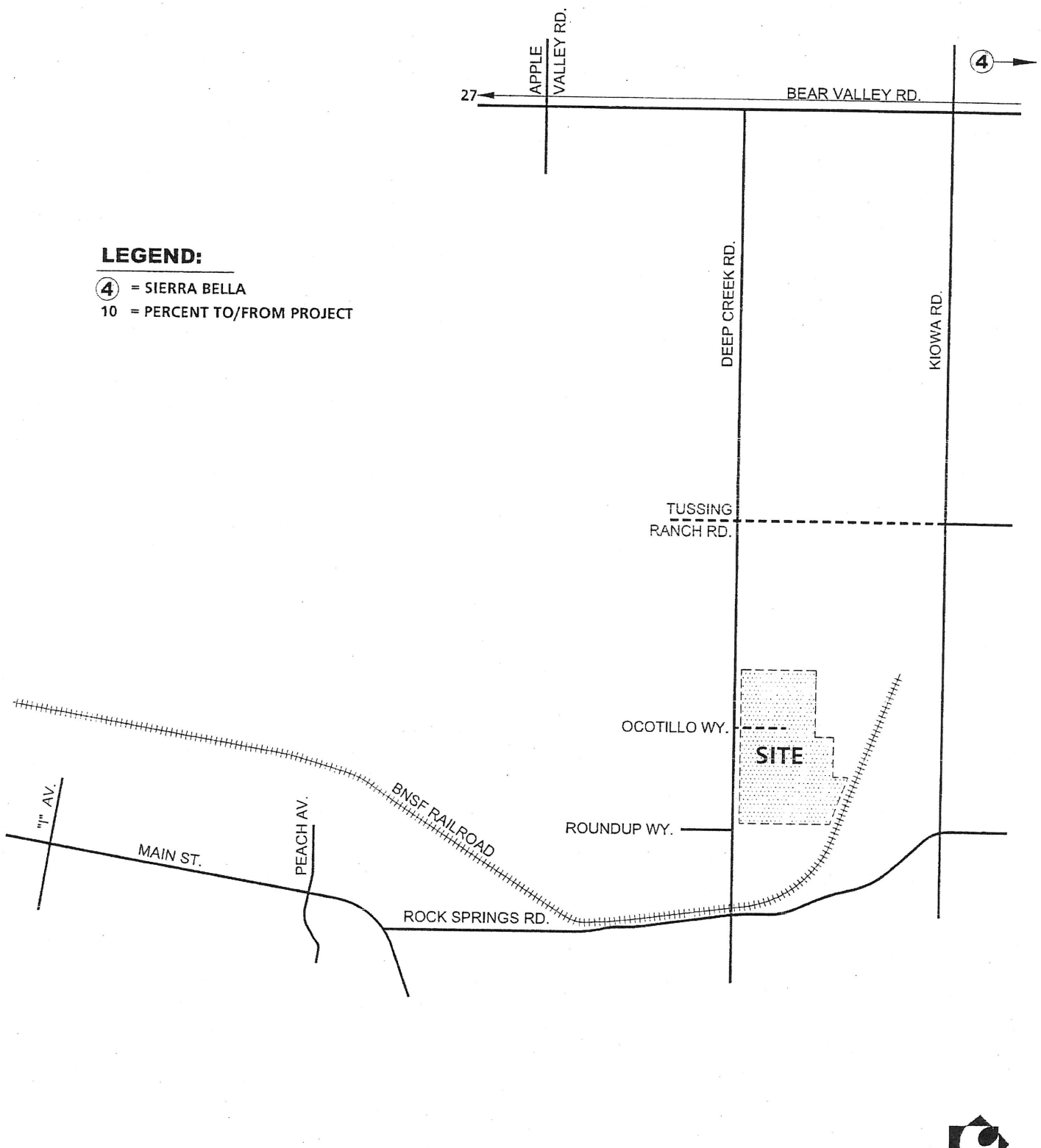
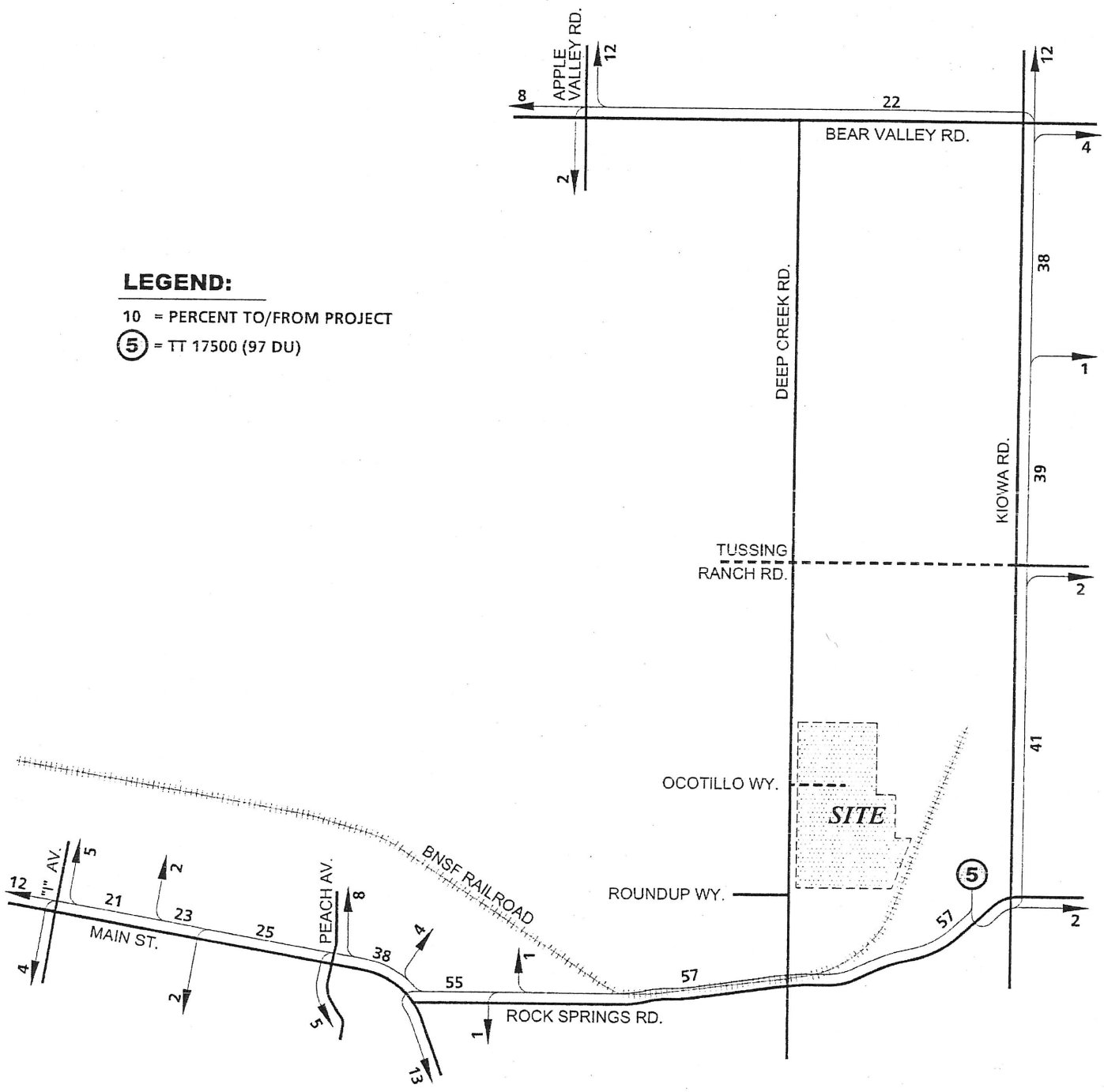


EXHIBIT 4-F

TT 17500 (97 DU) TRIP DISTRIBUTION



NOTE: PORTIONS OF TT 17500 ARE ALSO LOCATED SOUTH OF ROCK SPRINGS ROAD.

EXHIBIT 4-G

TT 17615
TRIP DISTRIBUTION

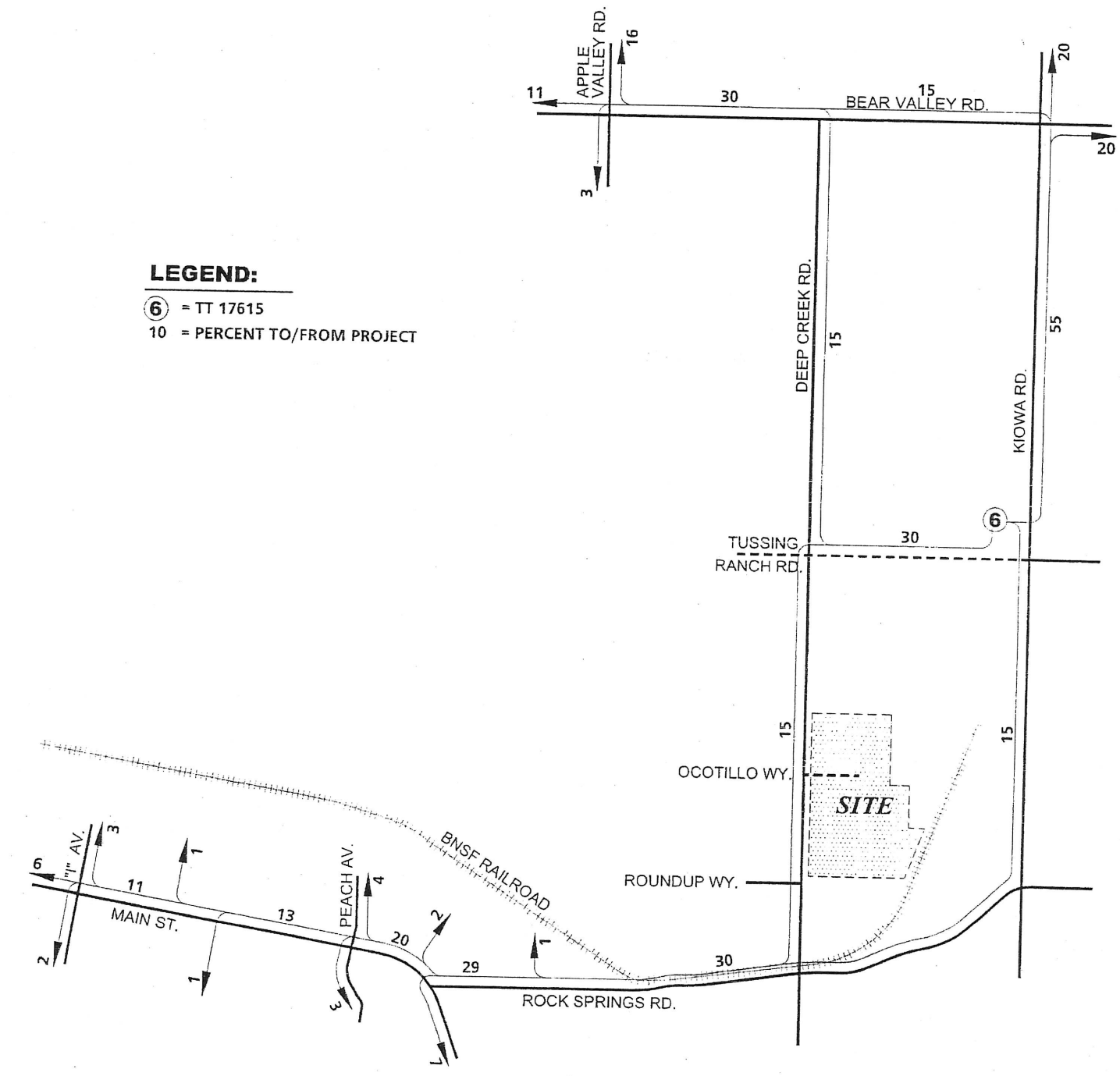


EXHIBIT 4-H

JESS RANCH MARKETPLACE PHASE 3 TRIP DISTRIBUTION

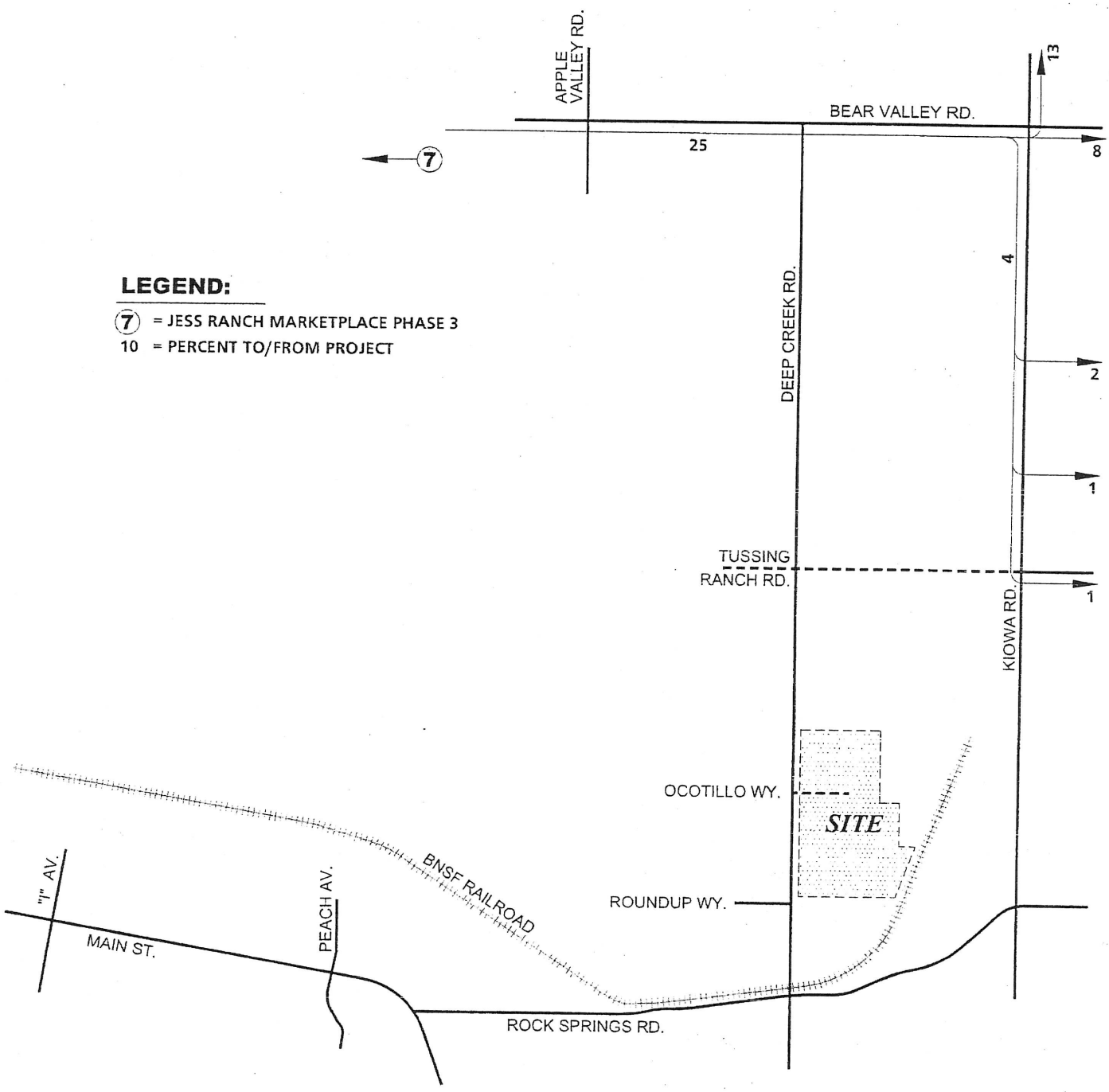
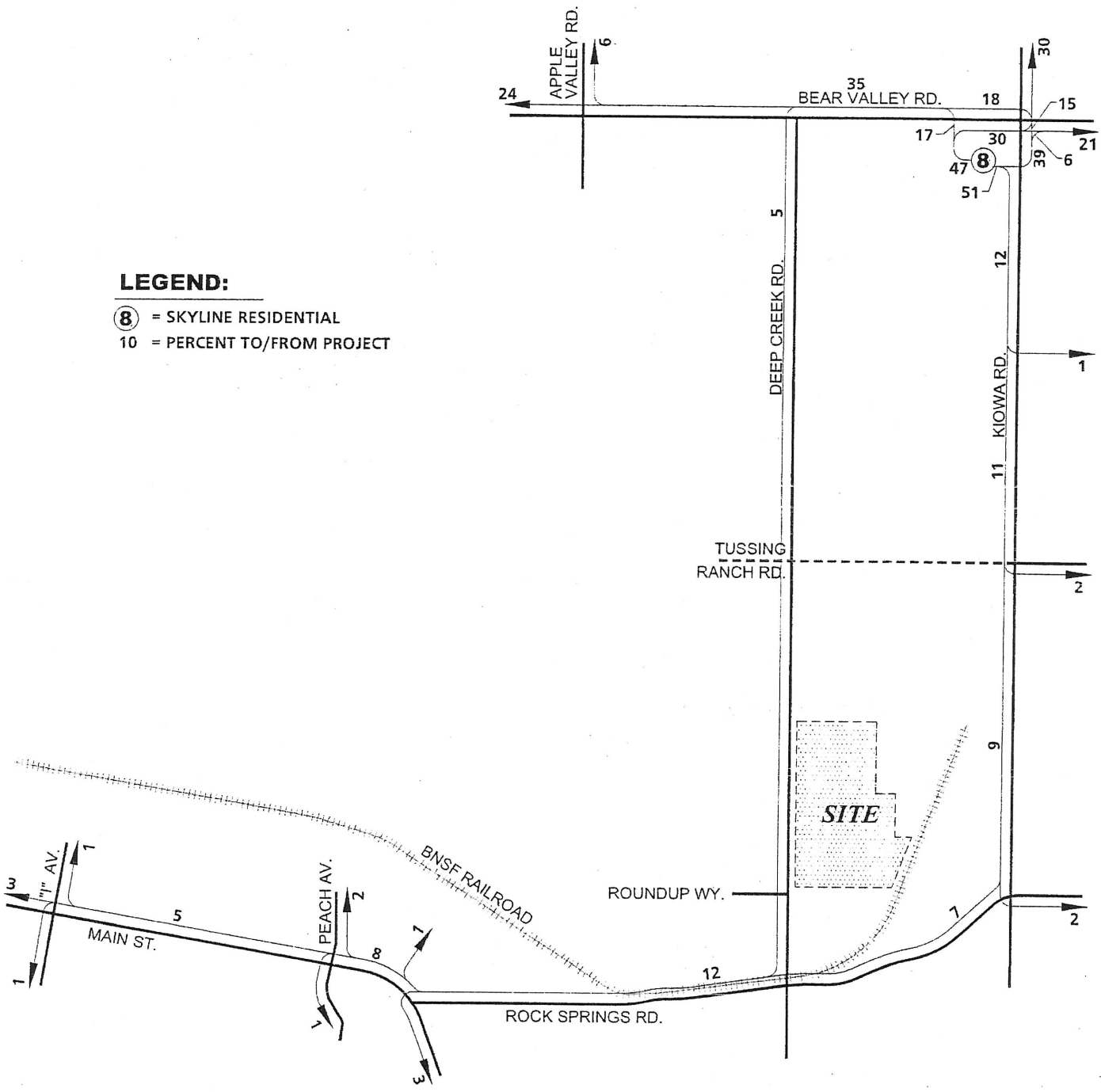


EXHIBIT 4-I

SKYLINE RESIDENTIAL TRIP DISTRIBUTION

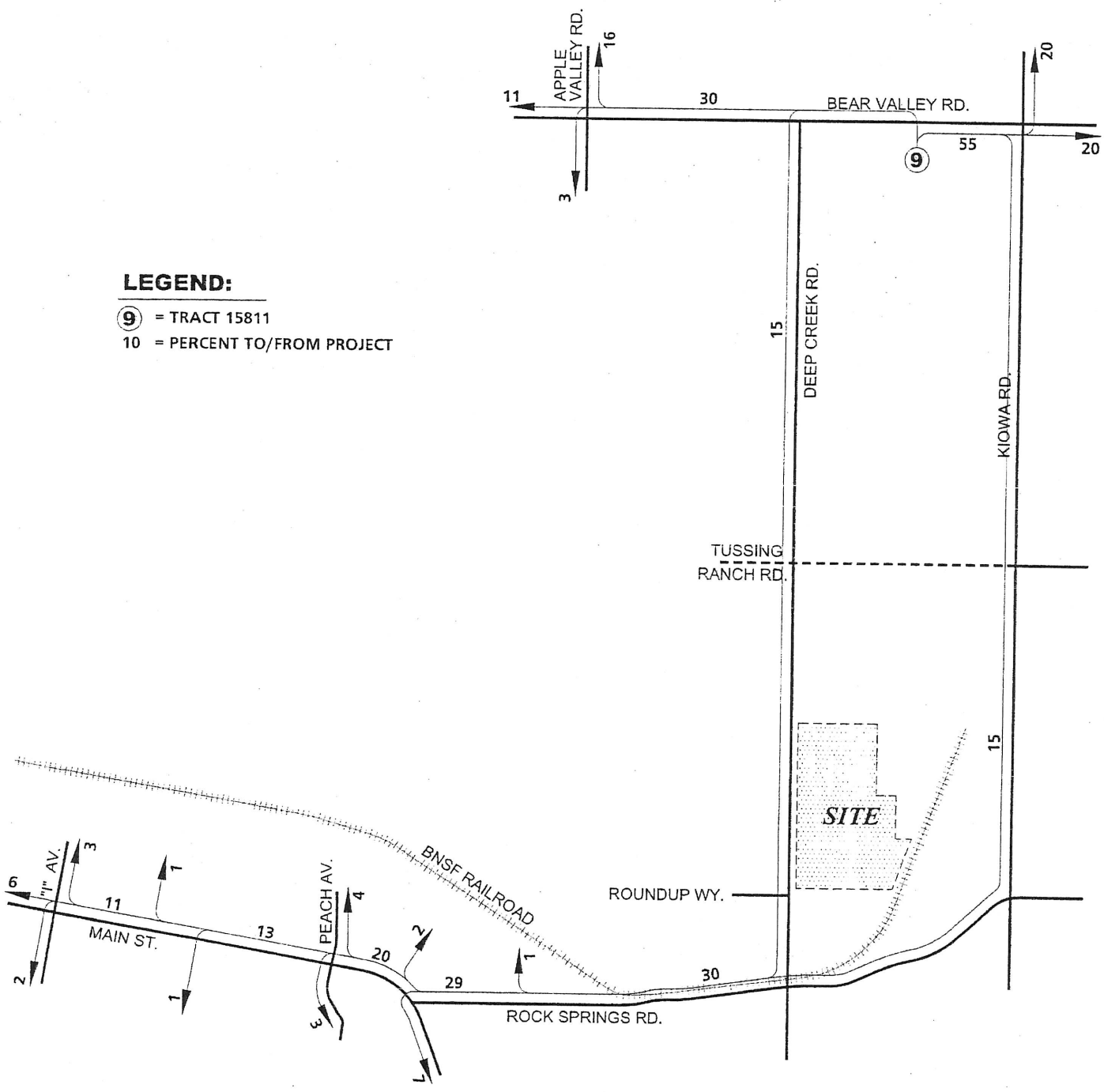


N

NOTE: *2% OF PROJECT TRIPS DISTRIBUTED INTERNALLY PER SKYLINE TRAFFIC IMPACT ANALYSIS (URBAN CROSSROADS, INC. - 8/16/04)*

EXHIBIT 4-J

TRACT 15811
TRIP DISTRIBUTION



volumes are based on interpolating the Interim Year (2009) Without Project daily traffic volumes (presented in the previous traffic study) with the 2030 daily traffic forecasts.

The accumulation of traffic assigned to each roadway link represents the cumulative project traffic volume for that link. The 2015 other development Average Daily Traffic volumes are shown on Exhibit 4-K. The 2015 other development AM and PM peak hour intersection volumes are shown on Exhibits 4-L and 4-M.

4.1.1 2015 Interim Year Without Project Daily Traffic Volumes

ADT volumes for 2015 (Interim Year) conditions have been determined as described above. 2015 ADT volumes without the project traffic are shown on Exhibit 4-N.

For 2015 Without Project traffic conditions, no additional study area intersections are projected to warrant a traffic signal (in addition to those intersections that warrant a traffic signal under existing conditions).

4.1.2 2015 Interim Year With Project Daily Traffic Volumes

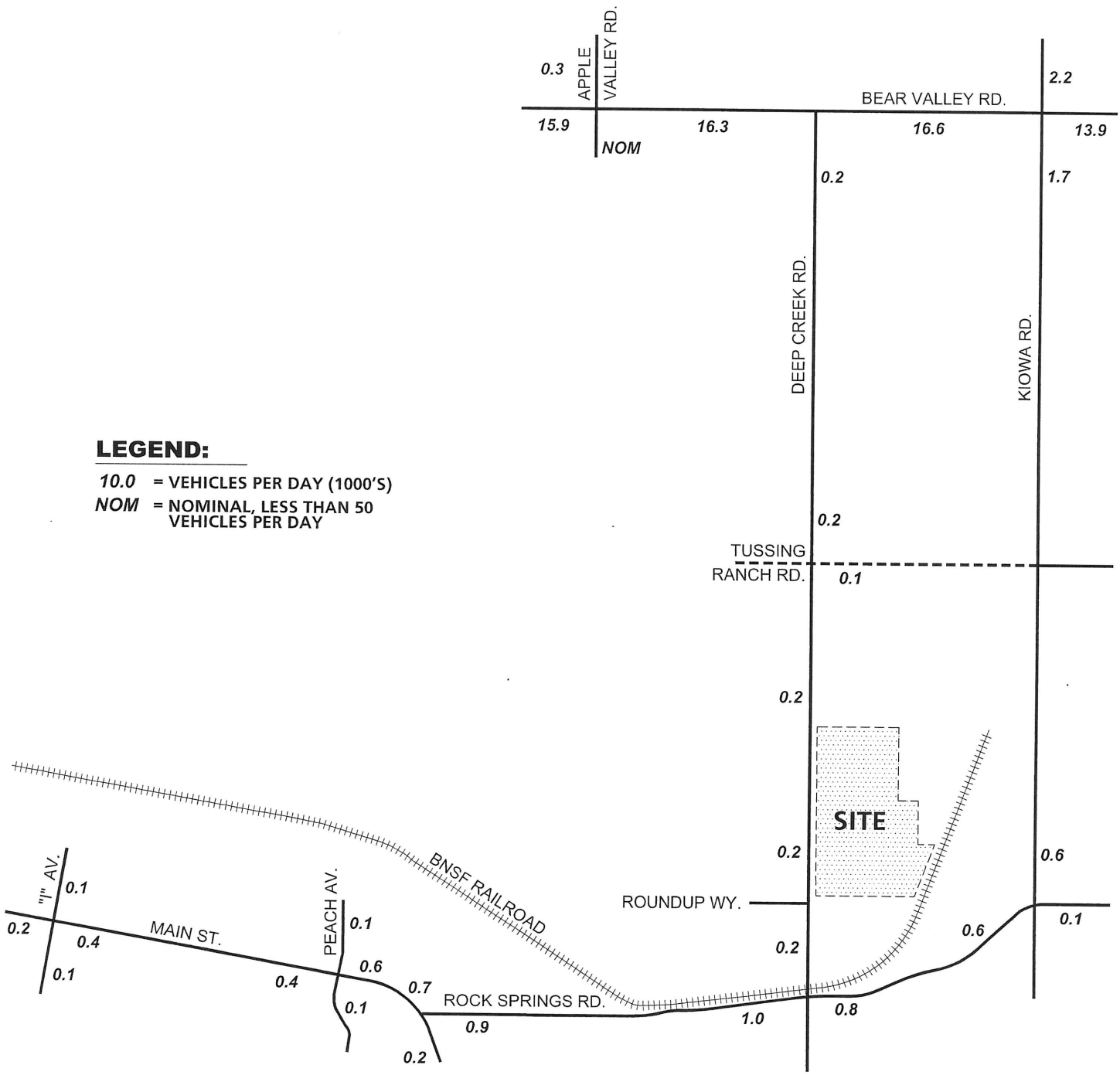
The ADTs for 2015 With Project conditions have been determined by adding the project only traffic volumes to the 2015 Without Project traffic volumes. 2015 Interim Year ADT volumes with the project traffic are shown on Exhibit 4-O. For 2015 With Project traffic conditions, no additional study area intersections are projected to warrant a traffic signal.

4.1.3 2030 Without Project Daily Traffic Volumes

ADT volumes for 2030 have been determined as described previously using the post-processing methodology (see Section 1.3.1). As described within

EXHIBIT 4-K

OTHER DEVELOPMENT AVERAGE DAILY TRAFFIC (ADT)



LEGEND:

10.0 = VEHICLES PER DAY (1000'S)
NOM = NOMINAL, LESS THAN 50 VEHICLES PER DAY

N

EXHIBIT 4-L

OTHER DEVELOPMENT AM PEAK HOUR INTERSECTION VOLUMES

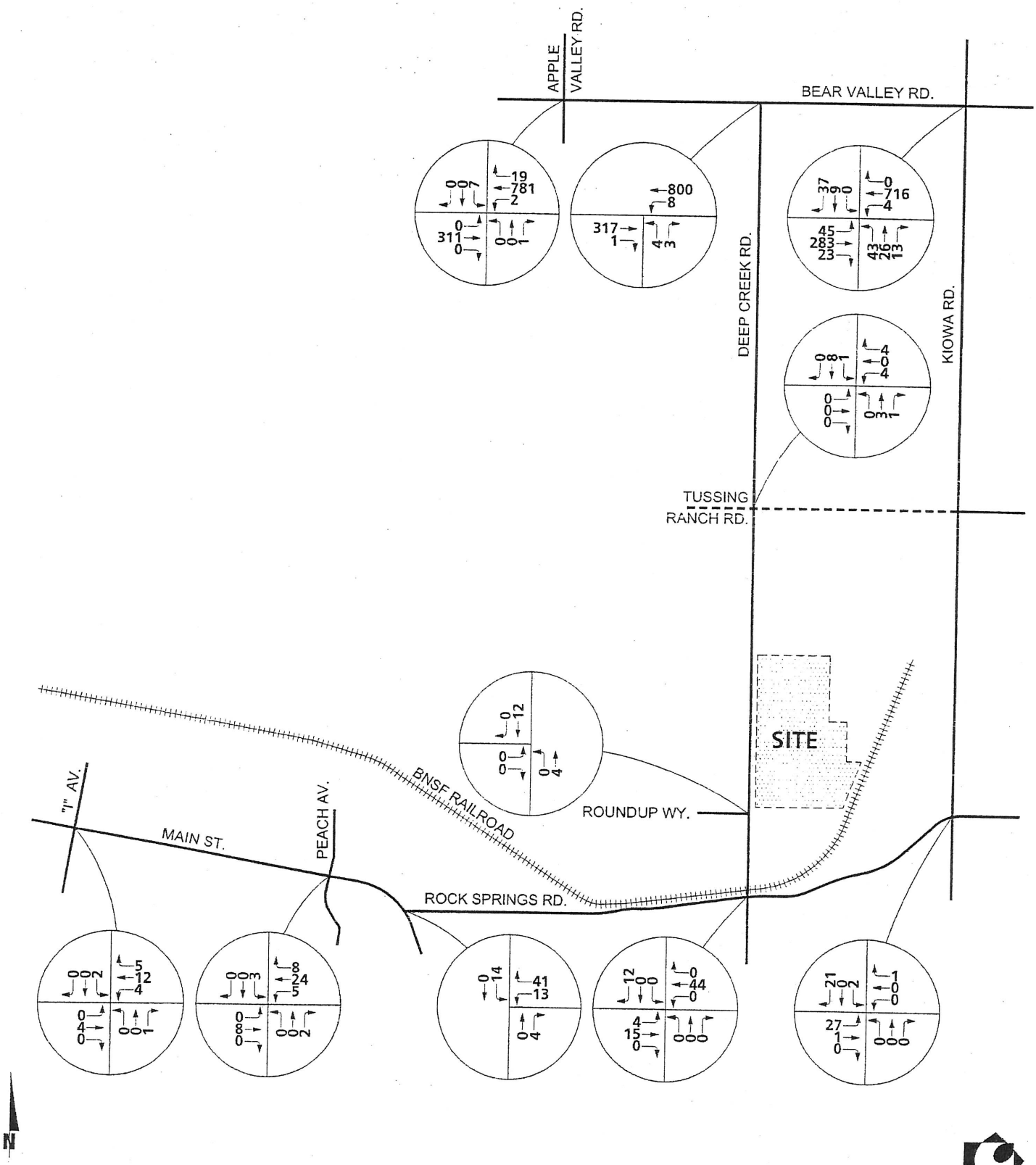


EXHIBIT 4-M

OTHER DEVELOPMENT PM PEAK HOUR INTERSECTION VOLUMES

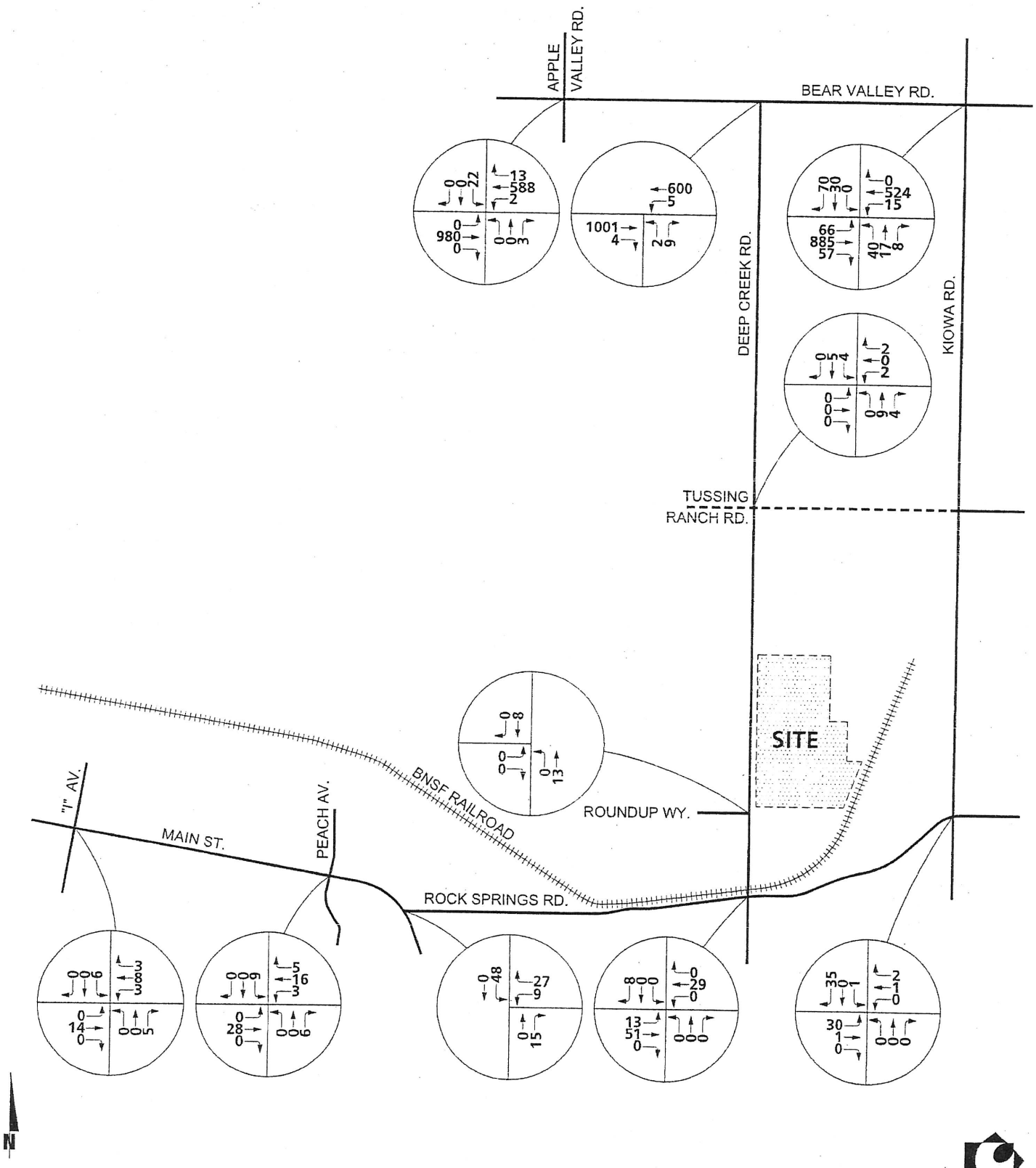
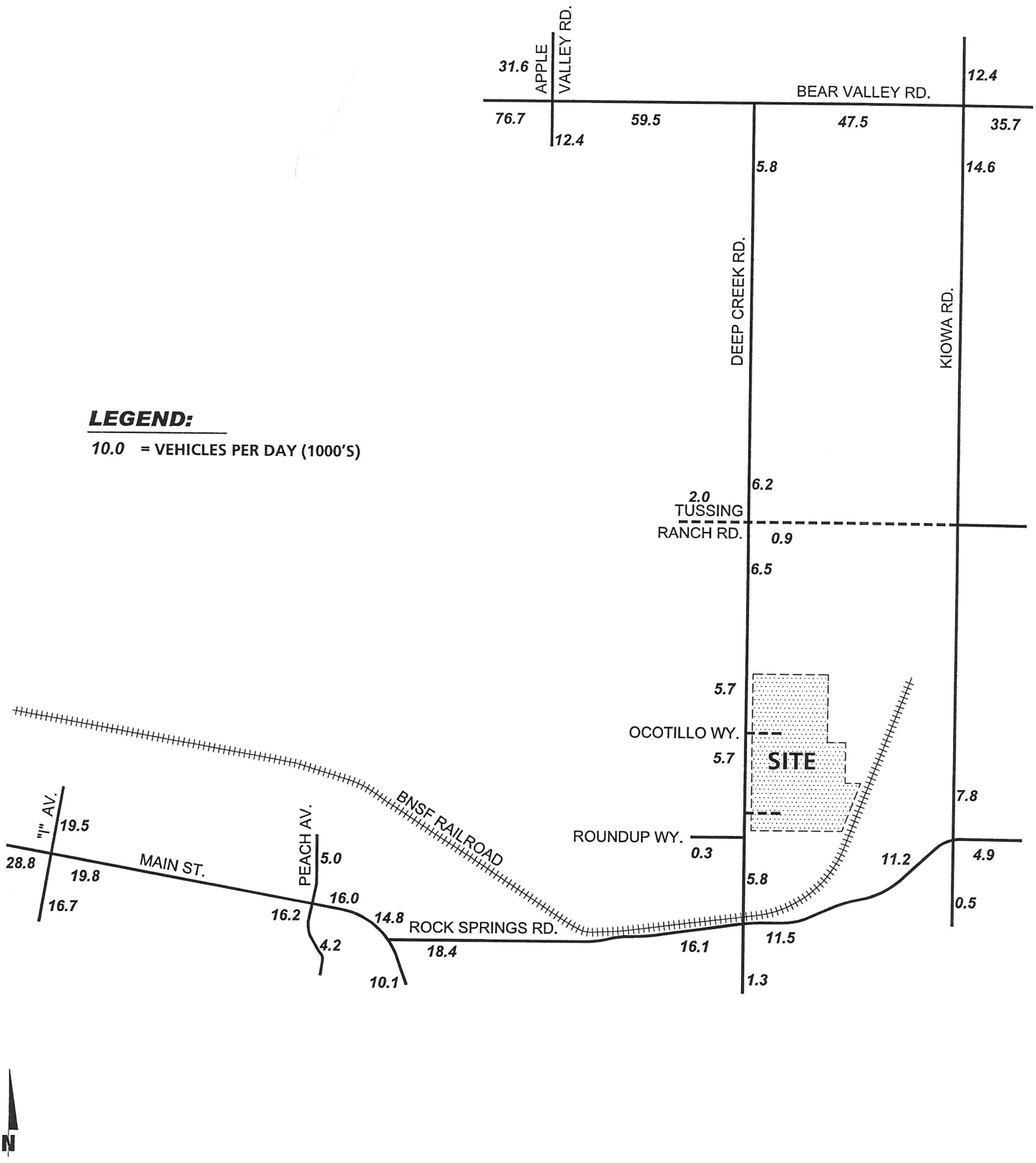


EXHIBIT 4-N

INTERIM YEAR WITHOUT PROJECT AVERAGE DAILY TRAFFIC (ADT)



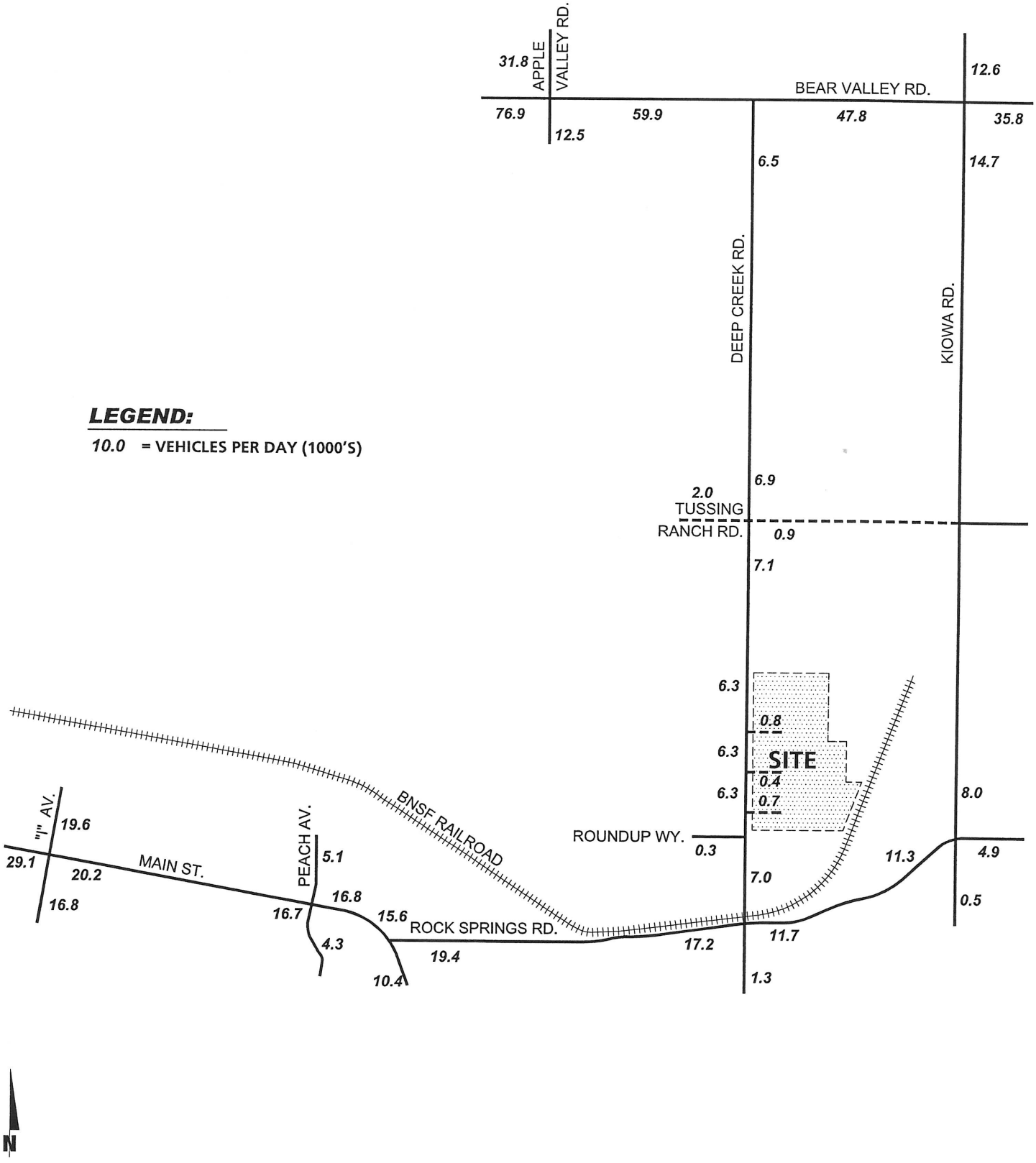
LEGEND:

10.0 = VEHICLES PER DAY (1000'S)

N

EXHIBIT 4-O

INTERIM YEAR WITH PROJECT AVERAGE DAILY TRAFFIC (ADT)



LEGEND:

10.0 = VEHICLES PER DAY (1000'S)

N

Section 1.3.1, the Horizon Year 2030 volume forecasts without project are developed using a growth increment process based on volumes predicted by the CTP traffic model 2000 and 2025 models. The growth increment for CMP Horizon Year 2030 on each roadway segment is the increase in CTP traffic model volume from existing conditions to 2030. The initial refined (2030) roadway segment volumes are determined by adding the 2030 growth increment volume to the existing counted volume. The initial refined (2030) roadway segment volumes are then compared to the final 2015 Without Project roadway segment volumes to ensure that no negative growth had occurred in any of the study area segments. Additionally, per request by County of San Bernardino staff, all the daily traffic from Interim Year 2015 cumulative projects generating less than 250 PM peak hour trips have been added to the adjusted 2030 volumes (all projects generating more than 250 peak hour trips are already included in the traffic model). Appendix "F" includes all the worksheets for peak hour directional growth increment calculation, and future peak hour intersection turning movement calculations.

2030 ADT volumes without the project traffic are shown on Exhibit 4-P. The model data has been reviewed and it has been confirmed that the long range growth exceeds the growth represented by each/all of the cumulative near term projects.

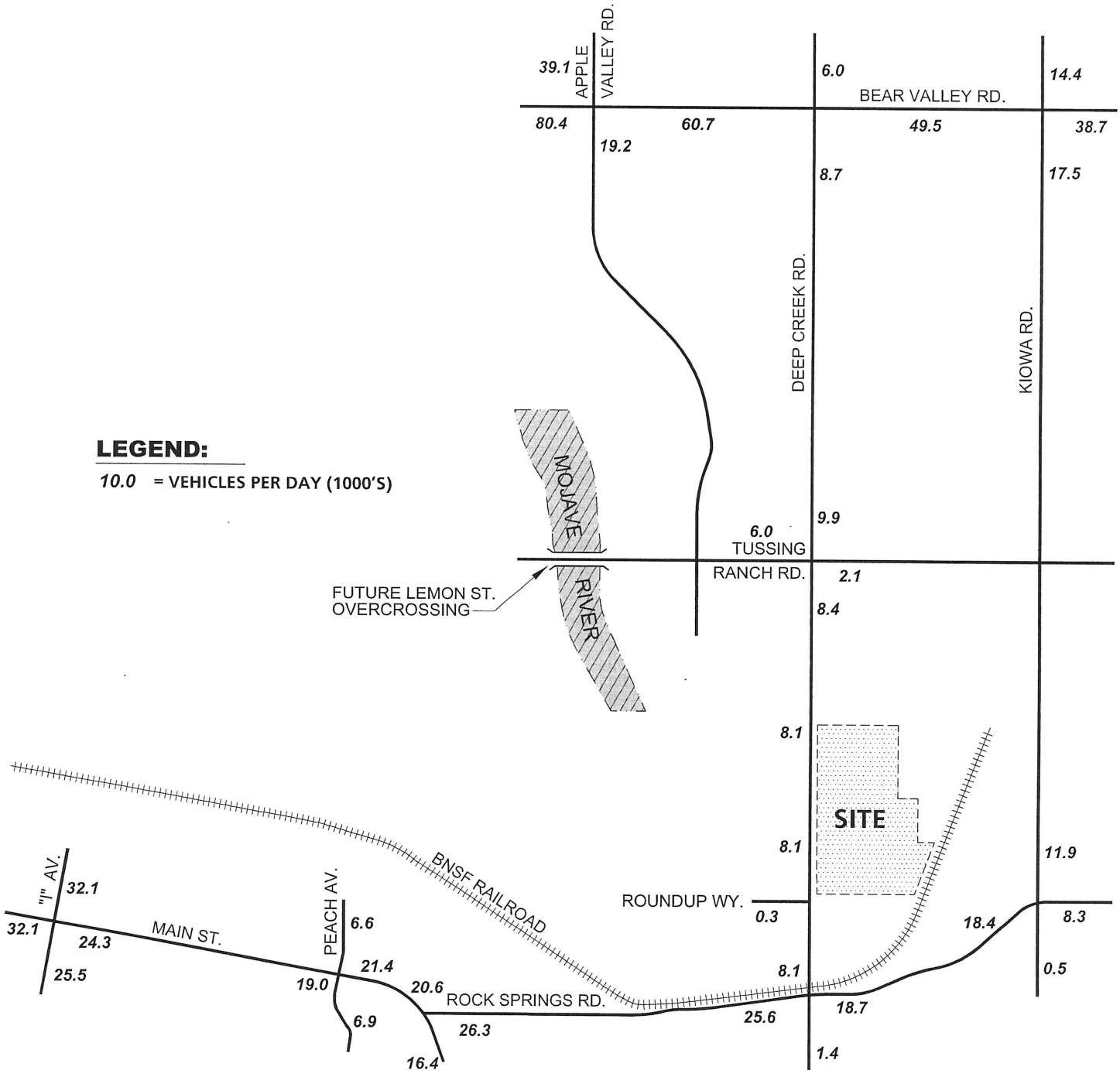
For 2030 Without Project traffic conditions, the following additional study area intersections are projected to warrant a traffic signal (in addition to those intersections that warrant a traffic signal under existing, 2015 Without Project or 2015 With Project conditions. See Appendix "D"):

Deep Creek Road (NS) at:

- Tussing Ranch Road (EW)

EXHIBIT 4-P

2030 WITHOUT PROJECT AVERAGE DAILY TRAFFIC (ADT)



LEGEND:

10.0 = VEHICLES PER DAY (1000'S)

N

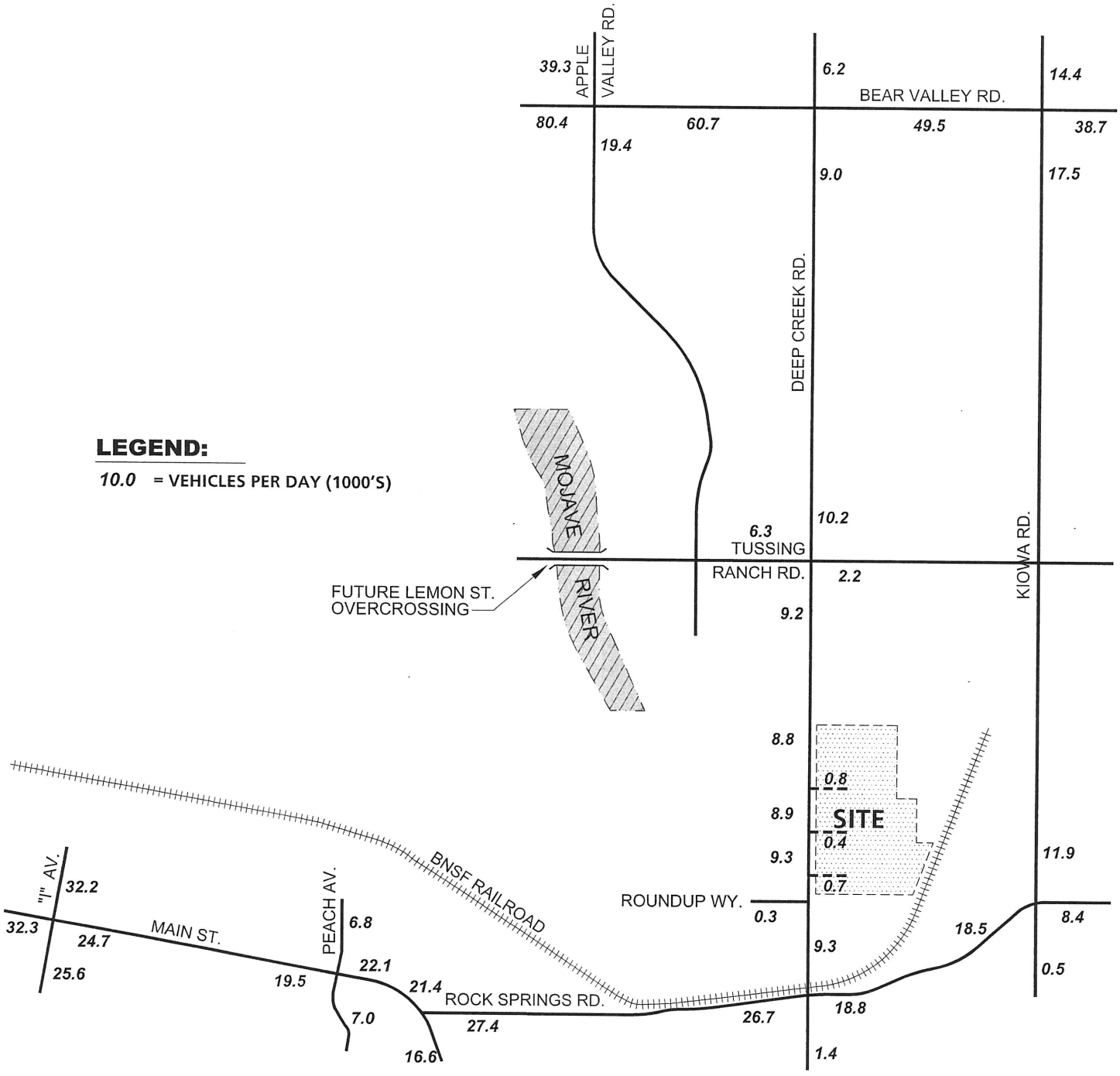
4.1.4 2030 With Project Daily Traffic Volumes

The daily volumes for 2030 with project conditions have been determined by adding the project only traffic volumes to the 2030 Without Project traffic volumes. 2030 ADT volumes with the project traffic are shown on Exhibit 4-Q.

For 2030 With Project traffic conditions, no additional study area intersections are projected to warrant a traffic signal (besides those intersections that warrant a traffic signal under Existing, 2015 Without Project, 2015 With Project and 2030 Without Project conditions).

EXHIBIT 4-Q

2030 WITH PROJECT AVERAGE DAILY TRAFFIC (ADT)



LEGEND:

10.0 = VEHICLES PER DAY (1000'S)

N

5.0 FUTURE TRAFFIC OPERATIONS ANALYSIS

This section of the report presents the operations analysis for the traffic volume forecasts for future traffic conditions without the project and for future traffic conditions with the project. The analysis procedures conform to the requirements of the County of San Bernardino CMP. The operations analysis for each analysis year is presented in a separate subsection.

5.1 Future Interim Year Traffic Operations

5.1.1 2015 (Interim Year) Without Project Conditions

2015 Without Project AM and PM peak hour intersection turning movement volumes are shown on Exhibits 5-A and 5-B, respectively. The intersection operations analysis for 2015 Without Project traffic conditions with existing geometrics are summarized in Table 5-1. The operations analysis worksheets are included in Appendix "H" of this report. As shown in Table 5-1, the following study area intersections are projected to experience unacceptable levels of service operations during the peak hours and are, therefore, deficient per City of Hesperia, Town of Apple Valley, or County of San Bernardino criteria:

Main Street (NS)

- Rock Springs Road (EW)

Apple Valley Road (NS)

- Bear Valley Road (EW)

Deep Creek Road (NS)

- Bear Valley Road (EW)

Kiowa Road (NS)

- Bear Valley Road (EW)

EXHIBIT 5-A

INTERIM YEAR WITHOUT PROJECT AM PEAK HOUR INTERSECTION VOLUMES

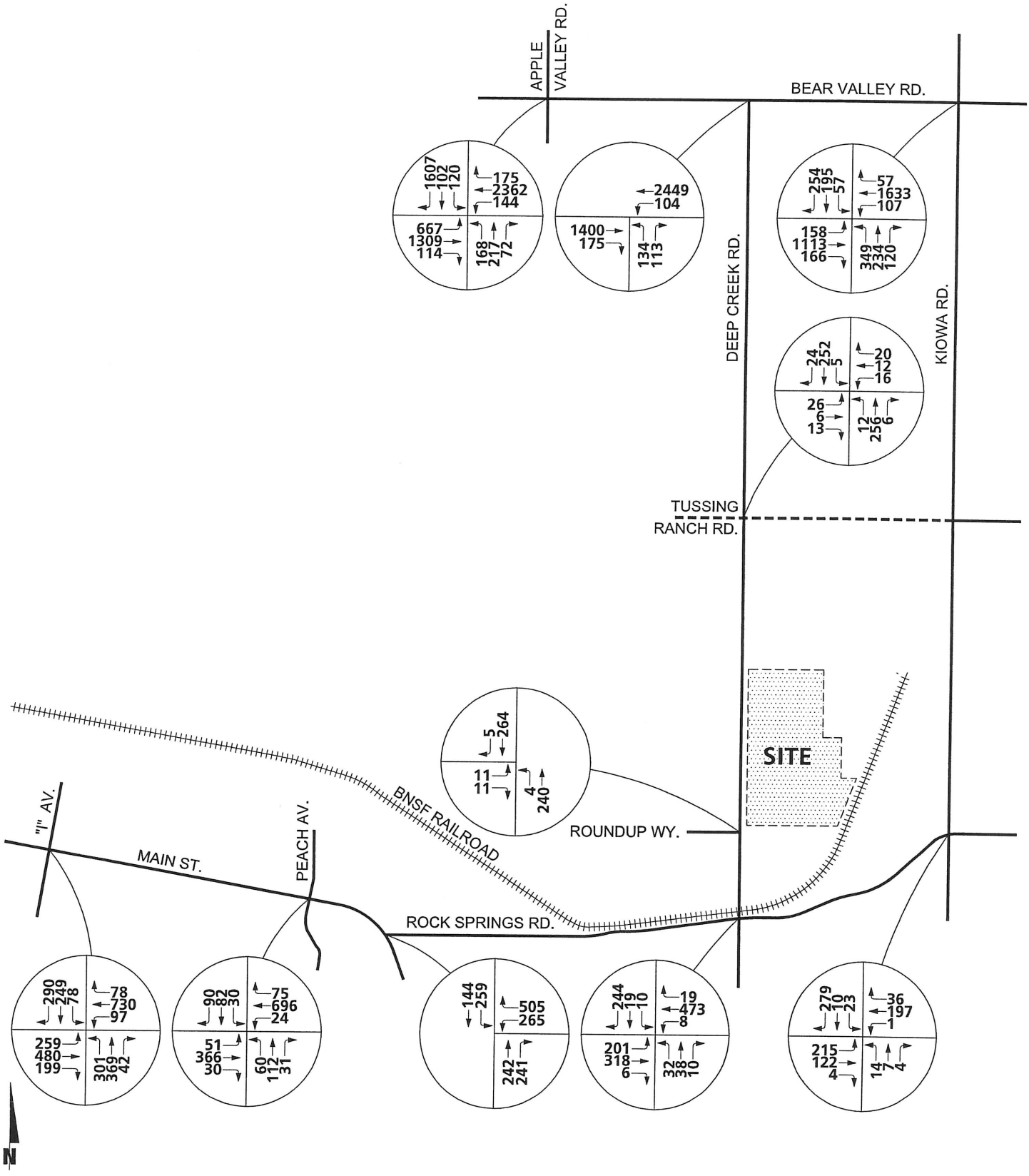


EXHIBIT 5-B

INTERIM YEAR WITHOUT PROJECT PM PEAK HOUR INTERSECTION VOLUMES

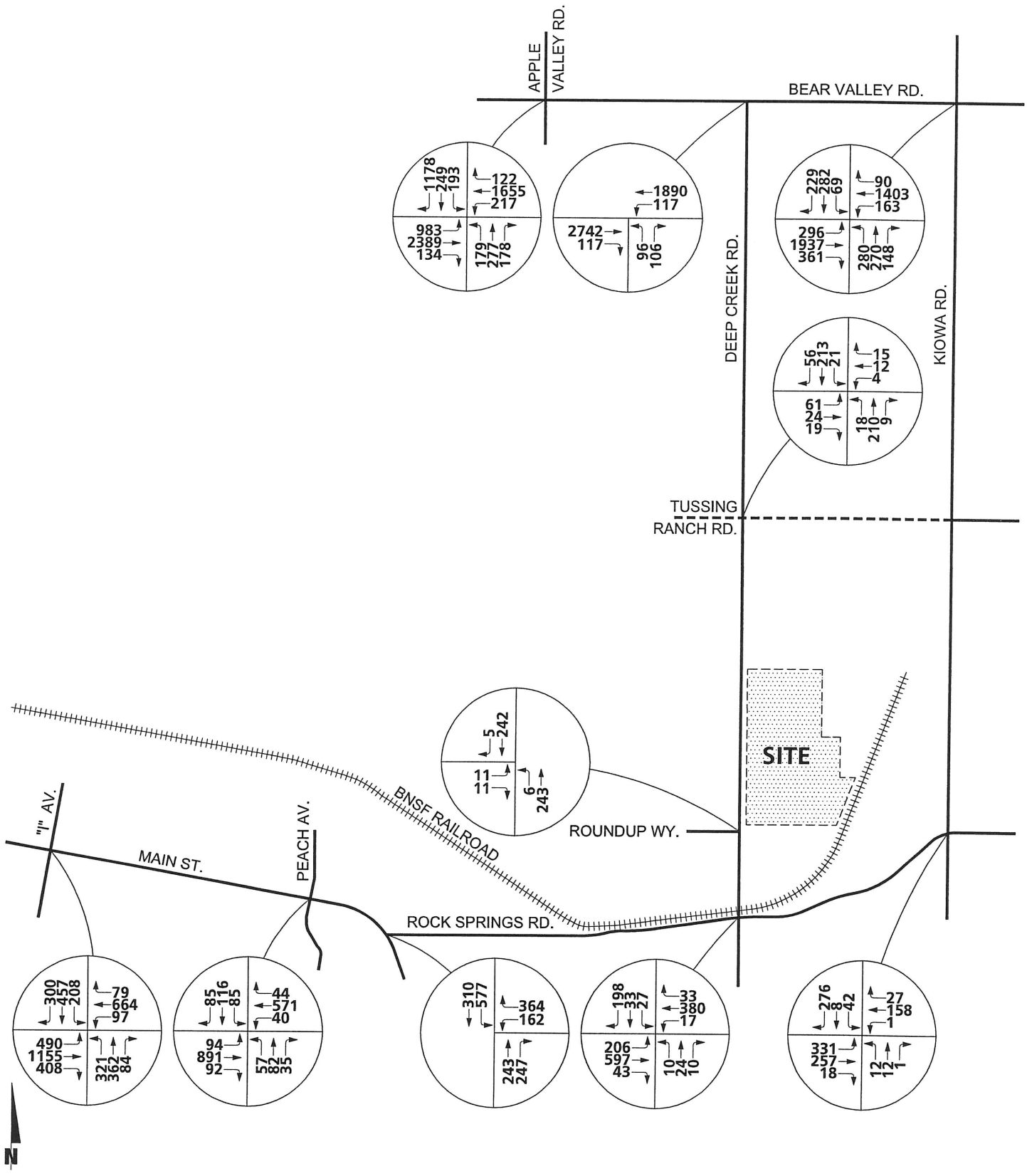


TABLE 5-1

INTERIM YEAR (2015) WITHOUT PROJECT CONDITIONS INTERSECTION ANALYSIS SUMMARY

INTERSECTION	TRAFFIC CONTROL[3]	INTERSECTION APPROACH LANES[1] NORTH-BOUND L	T	R	SOUTH-BOUND L	T	R	EAST-BOUND L	T	R	WEST-BOUND L	T	R	DELAY[2] (SECS.) AM	PM	LEVEL OF SERVICE AM	PM
"I" Avenue (NS) at:																	
• Main Street (EW)	TS	2	2	1	1	2	1>	2	2	1	2	2	0	34.2	42.0	C	D
Peach Avenue (NS) at:																	
• Main Street (EW)	TS	1	1	1	1	1	1	1	2	1	1	2	1	18.4	19.1	B	B
Main Street (NS) at:																	
• Rock Springs Road (EW)	CSS	0	1	1	1	1	0	0	0	0	1	0	1	--[4]	--[4]	F	F
-With Improvements	**TS**	0	1	1	1	1	0	0	0	0	1	0	1	27.9	36.0	C	D
Apple Valley Road (NS) at:																	
• Bear Valley Road (EW)	TS	2	2	1	2	1	2>	2	2	1	1	3	1>	--[4]	--[4]	F	F
-With Improvements[5,6]	TS	2	2	1	2	**2**	**1>>**	2	**4**	0	1	**4**	0	30.4	34.3	C	C
Deep Creek Road (NS) at:																	
• Bear Valley Road (EW)	CSS	0	1	0	0	0	0	0	2	1	1	2	0	--[4]	--[4]	F	F
-With Improvements[6]	**TS**	0	1	0	0	0	0	0	**3**	1	1	**3**	0	18.2	14.2	B	B
• Tussing Ranch Road (EW)	CSS	0	1	0	0	1	0	0	1	0	0	1	0	13.3	14.9	B	B
• Ocotillo Way (EW)	--	DOES NOT EXIST												--	--	--	--
• "H" Street Project Access (EW)	--	DOES NOT EXIST												--	--	--	--
• South Project Access (EW)	--	DOES NOT EXIST												--	--	--	--
• Roundup Way (EW)	CSS	0	1	0	0	1	0	1	0	1	0	0	0	12.8	12.7	B	B
• Rock Springs Road (EW)	TS	0.5	0.5	1	0.5	0.5	1	1	1	0	1	1	0	21.1	19.7	C	B
Kiowa Road (NS) at:																	
• Bear Valley Road (EW)	TS	1	2	1	1	2	1	1	2	1	1	2	1	--[4]	--[4]	F	F
-With Improvements[6]	TS	**2**	2	1	1	2	1	1	**3**	1	1	**3**	0	34.1	29.1	C	C
• Rock Springs Road (EW)	AWS	1	1	1	1	1	1>>	1	1	0	1	1	0	10.6	12.5	B	B
-With Improvements[7]	**TS**	1	1	1	1	1	1>>	1	1	0	1	1	0	24.8	25.1	C	C

[1] When a right turn is designated, the lane can either be striped or unstriped. To function as a right turn lane there must be sufficient width for right turning vehicles to travel outside the through lanes.

L = Left; T = Through; R = Right; > = Right Turn Overlap Phase; >> = Free Right Turn

[2] Delay and level of service calculated using the following analysis software: Traffix, Version 7.8 R5 (2007). Per the 2000 Highway Capacity Manual, overall average intersection delay and level of service are shown for intersections with traffic signal or all way stop control. For intersections with cross street stop control, the delay and level of service for worst individual movement (or movements sharing a single lane) are shown.

[3] CSS = Cross Street Stop
TS = Traffic Signal
AWS = All Way Stop

[4] -- = Delay High, Intersection Unstable, Level of Service "F".

[5] Identified improvements go beyond typical County of San Bernardino roadway cross-sections.

[6] Pedestrians are assumed not to occur on every cycle.

[7] Although no LOS deficiency was identified under this intersection's existing configuration, it was analyzed assuming the provision of a traffic signal because it warranted a traffic signal under Existing (2007) conditions.

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Improvements have been identified that will provide acceptable traffic operations at each of the deficient intersections under 2015 Without Project conditions. The operations analysis worksheets for 2015 Without Project with improvements conditions are also included in Appendix "H". The improvements on Bear Valley Road (at Apple Valley Road) include 4 through lanes in both the eastbound and westbound directions. These through lanes exceed the typical planned cross-section for Bear Valley Road (three through lanes in each direction). The traffic volumes creating the need for these improvements reflect the current lack of parallel capacity crossing the Mojave River. A more appropriate long range solution may be to construct the planned parallel routes that are currently incomplete (Lemon Street south of Bear Valley Road and/or Yucca Loma Road north of Bear Valley Road).

It should be noted that the intersection of Kiowa Road (NS) at Rock Springs Road (EW), with its existing traffic control and lane configuration, is not anticipated to operate at deficient Levels of Service (LOS) under 2015 (Interim Year) Without Project conditions. However, this intersection was analyzed as a signalized intersection, in addition to its existing geometry, since it currently warrants a traffic signal under existing traffic volumes.

5.1.2 2015 (Interim Year) With Project Conditions

2015 With Project AM and PM peak hour intersection turning movement volumes are shown on Exhibits 5-C and 5-D, respectively. The intersection operations analysis for 2015 With Project traffic conditions with existing geometrics are summarized in Table 5-2. The operations analysis worksheets for 2015 With Project conditions are included in Appendix "I". As shown in Table 5-2, the same study area intersections, as 2015 Without Project conditions, are projected to experience unacceptable levels of

EXHIBIT 5-C

INTERIM YEAR WITH PROJECT AM PEAK HOUR INTERSECTION VOLUMES

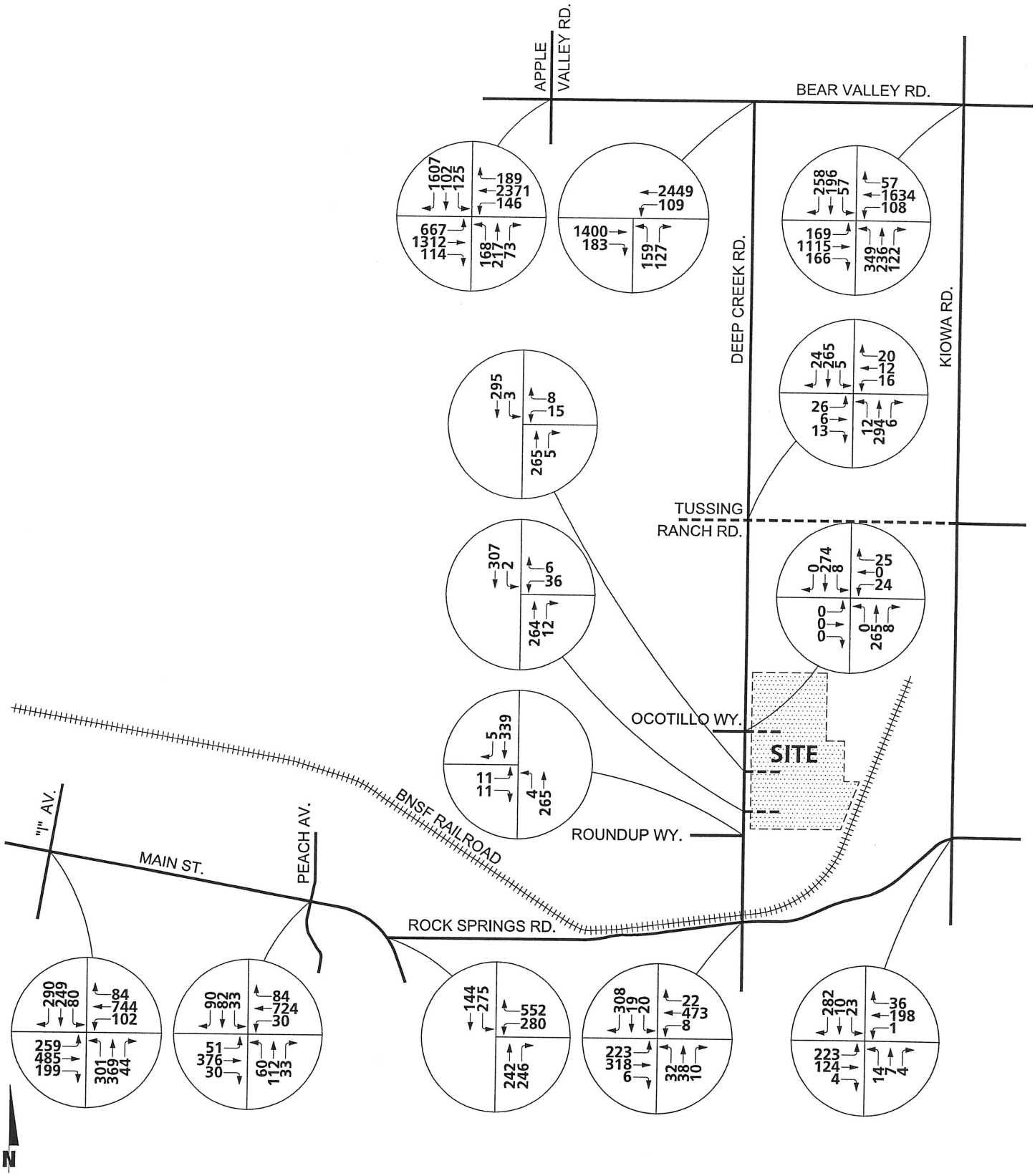

EXHIBIT 5-D

INTERIM YEAR WITH PROJECT PM PEAK HOUR INTERSECTION VOLUMES

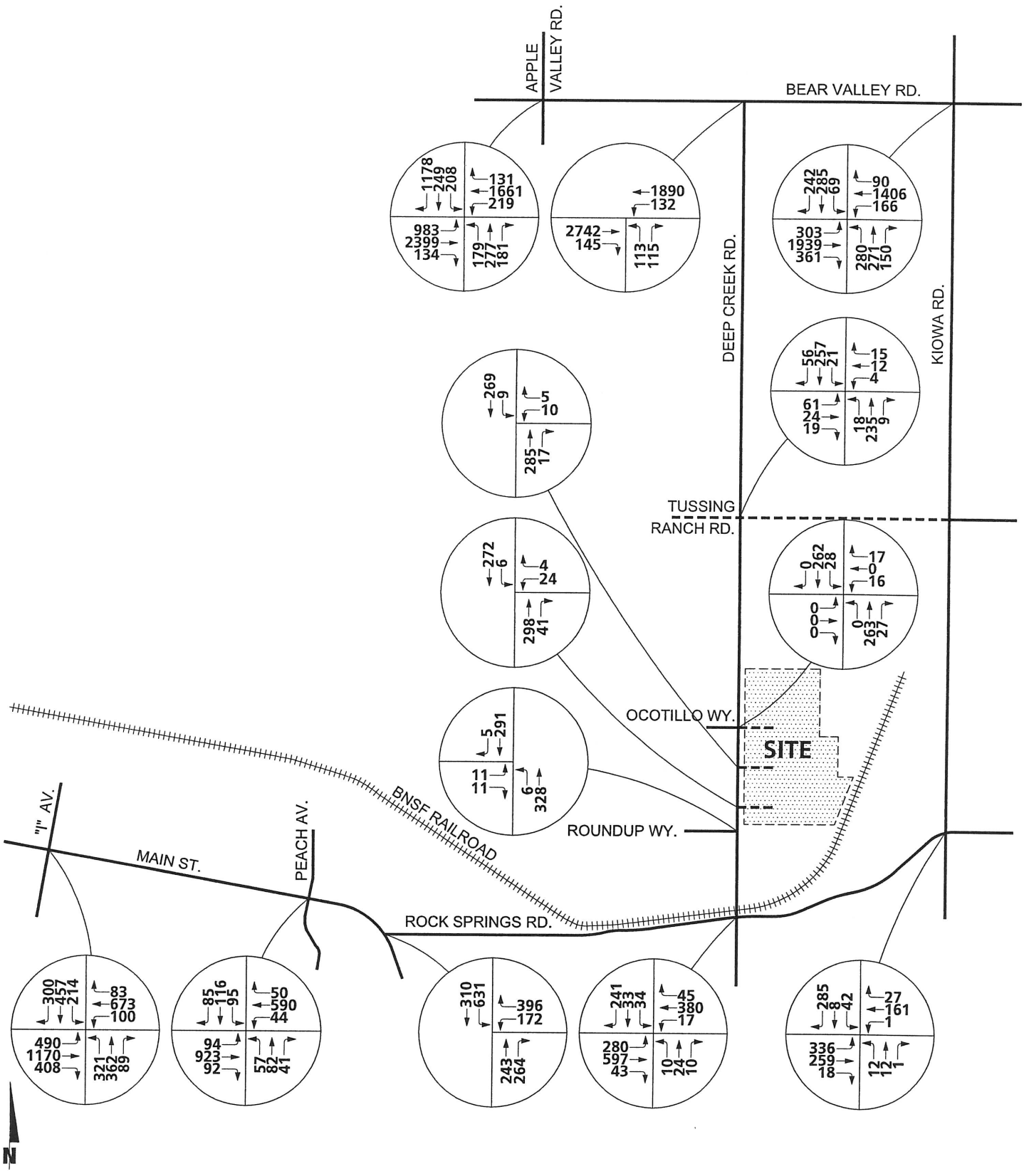

TABLE 5-2

INTERIM YEAR (2015) WITH PROJECT CONDITIONS INTERSECTION ANALYSIS SUMMARY

INTERSECTION	TRAFFIC CONTROL[3]	INTERSECTION APPROACH LANES[1] NORTH-BOUND L	T	R	SOUTH-BOUND L	T	R	EAST-BOUND L	T	R	WEST-BOUND L	T	R	DELAY[2] (SECS.) AM	PM	LEVEL OF SERVICE AM	PM
"I" Avenue (NS) at:																	
• Main Street (EW)	TS	2	2	1	1	2	1>	2	2	1	2	2	0	34.7	41.9	C	D
Peach Avenue (NS) at:																	
• Main Street (EW)	TS	1	1	1	1	1	1	1	2	1	1	2	1	18.1	19.3	B	B
Main Street (NS) at:																	
• Rock Springs Road (EW)	CSS	0	1	1	1	1	0	0	0	0	1	0	1	--[4]	--[4]	F	F
-With Improvements	**TS**	0	1	1	1	1	0	0	0	0	1	0	1	31.3	43.5	C	D
Apple Valley Road (NS) at:																	
• Bear Valley Road (EW)	TS	2	2	1	2	1	2>	2	2	1	1	3	1>	--[4]	--[4]	F	F
-With Improvements[5,6]	TS	2	2	1	2	**2**	**1>>**	2	**4**	0	1	**4**	0	30.7	34.8	C	C
Deep Creek Road (NS) at:																	
• Bear Valley Road (EW)	CSS	0	1	0	0	0	0	0	2	1	1	2	0	--[4]	--[4]	F	F
-With Improvements	**TS**	0	1	0	0	0	0	0	**3**	1	1	**3**	0	22.8	16.4	C	B
• Tussing Ranch Road (EW)	CSS	0	1	0	0	1	0	0	1	0	0	1	0	14.0	16.2	B	C
• Ocotillo Way (EW)	**CSS**	0	1	0	**1**	1	0	0	0	0	0	**1**	0	11.7	11.8	B	B
• "H" Street Project Access (EW)	CSS	0	1	0	**1**	1	0	0	0	0	0	**1**	0	12.0	12.1	B	B
• South Project Access (EW)	**CSS**	0	1	0	**1**	1	0	0	0	0	0	**1**	0	13.1	13.2	B	B
• Roundup Way (EW)	CSS	0	1	0	0	1	0	1	0	1	0	0	0	14.1	14.5	B	B
• Rock Springs Road (EW)	TS	0.5	0.5	1	0.5	0.5	1	1	1	0	1	1	0	23.2	21.8	C	C
Kiowa Road (NS) at:																	
• Bear Valley Road (EW)	TS	1	2	1	1	2	1	1	2	1	1	2	1	--[4]	--[4]	F	F
-With Improvements[6]	TS	**2**	2	1	1	2	**1>**	1	**3**	1	1	**3**	0	26.5	26.2	C	C
• Rock Springs Road (EW)	AWS	1	1	1	1	1	1>>	1	1	0	1	1	0	10.7	12.6	B	B
-With Improvements[7]	**TS**	1	1	1	1	1	1>>	1	1	0	1	1	0	25.0	25.2	C	C

[1] When a right turn is designated, the lane can either be striped or unstriped. To function as a right turn lane there must be sufficient width for right turning vehicles to travel outside the through lanes.

L = Left; T = Through; R = Right; > = Right Turn Overlap Phase; >> = Free Right Turn

[2] Delay and level of service calculated using the following analysis software: Traffix, Version 7.8 R5 (2007). Per the 2000 Highway Capacity Manual, overall average intersection delay and level of service are shown for intersections with traffic signal or all way stop control. For intersections with cross street stop control, the delay and level of service for worst individual movement (or movements sharing a single lane) are shown.

[3] CSS = Cross Street Stop
TS = Traffic Signal
AWS = All Way Stop

[4] -- = Delay High, Intersection Unstable, Level of Service "F".

[5] Identified improvements go beyond typical County of San Bernardino roadway cross-sections.

[6] Pedestrians are assumed not to occur on every cycle.

[7] Although no LOS deficiency was identified under this intersection's existing configuration, it was analyzed assuming the provision of a traffic signal because it warranted a traffic signal under Existing (2007) conditions.

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service operations during the peak hours and are, therefore, deficient per City of Hesperia, Town of Apple Valley, or County of San Bernardino criteria. Improvements have again been identified that will provide acceptable traffic operations at each of the deficient intersections under 2015 With Project conditions. The operations analysis worksheets for 2015 With Project conditions are also included in Appendix "I". The improvements for 2015 With Project with improvements conditions are identical to the improvements required for 2015 Without Project conditions.

As previously noted, the intersection of Kiowa Road (NS) at Rock Springs Road (EW), with its existing traffic control and lane configuration, is not anticipated to operate at deficient Levels of Service (LOS) under 2015 (Interim Year) With Project conditions. However, this intersection was analyzed as a signalized intersection, in addition to its existing geometry, since it currently warrants a traffic signal under existing traffic volumes.

5.2 Future CMP Horizon Year (2030) Traffic Operations

5.2.1 CMP Horizon Year (2030) Without Project Conditions

2030 Without Project AM and PM peak hour intersection turning movement volumes are shown on Exhibits 5-E and 5-F, respectively. The intersection operations analysis for 2030 Without Project traffic conditions with existing geometrics are summarized in Table 5-3. The operations analysis worksheets for 2030 Without Project conditions are included in Appendix "J". As shown in Table 5-3, the following study area intersections are projected to experience unacceptable traffic operations during the peak hours and are, therefore, deficient per City of Hesperia, Town of Apple Valley, or County of San Bernardino criteria:

Main Street (NS)

- Rock Springs Road (EW)

EXHIBIT 5-E

2030 WITHOUT PROJECT AM PEAK HOUR INTERSECTION VOLUMES

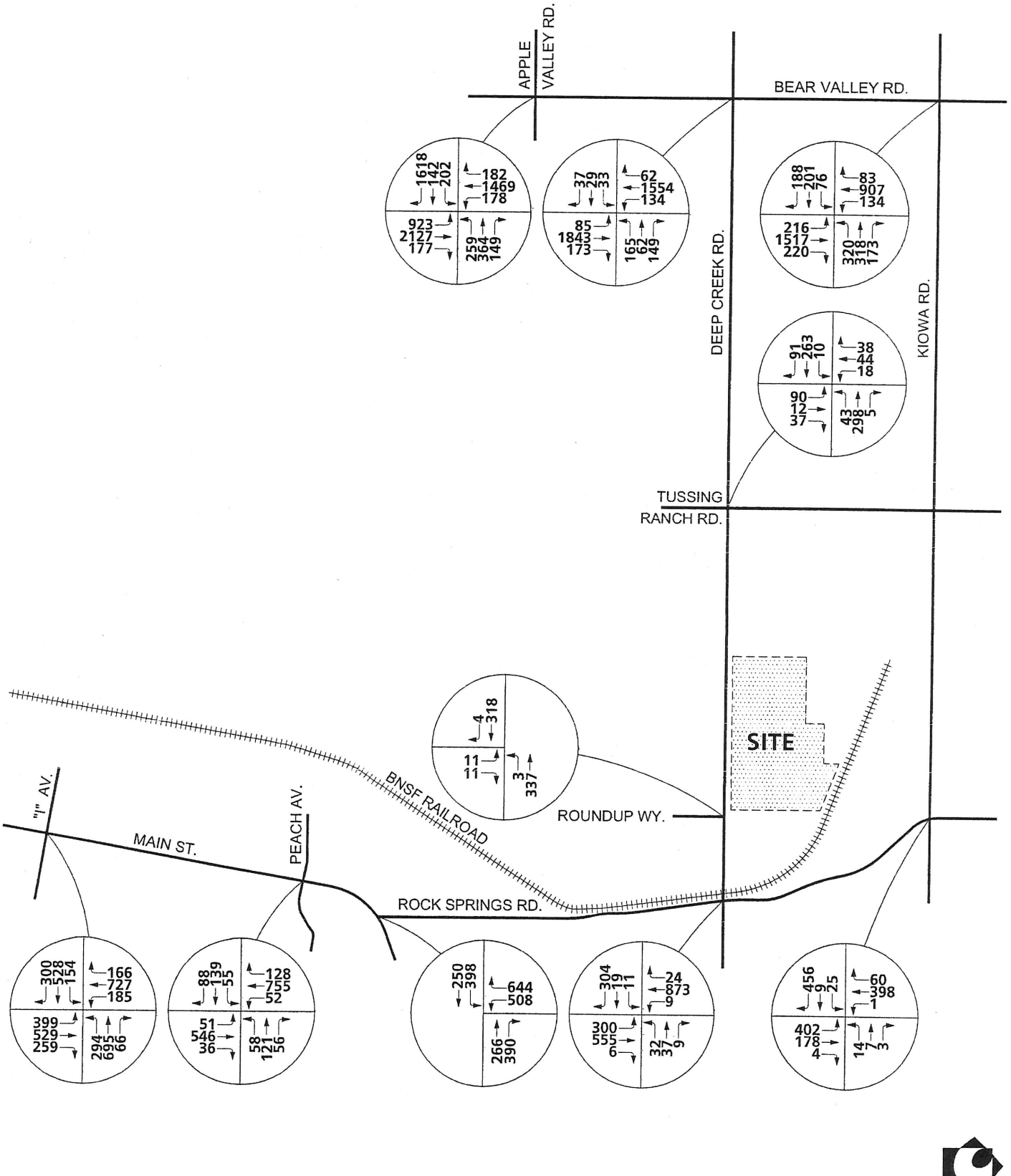

EXHIBIT 5-F

2030 WITHOUT PROJECT
PM PEAK HOUR INTERSECTION VOLUMES

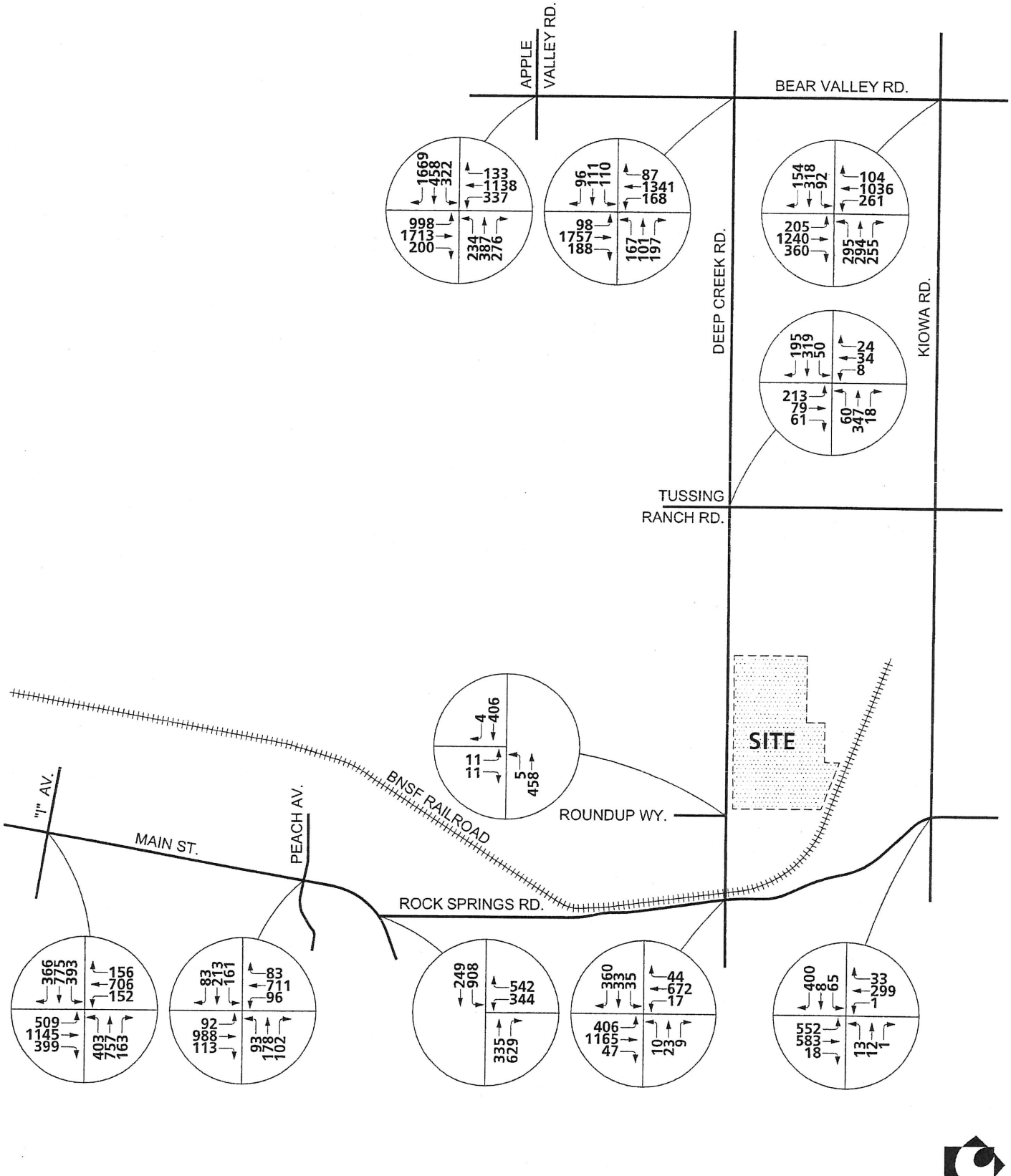

TABLE 5-3

2030 WITHOUT PROJECT CONDITIONS INTERSECTION ANALYSIS SUMMARY

INTERSECTION	TRAFFIC CONTROL[3]	INTERSECTION APPROACH LANES[1]												DELAY[2] (SECS.)		LEVEL OF SERVICE	
		NORTH-BOUND			SOUTH-BOUND			EAST-BOUND			WEST-BOUND						
		L	T	R	L	T	R	L	T	R	L	T	R	AM	PM	AM	PM
"I" Avenue (NS) at:																	
• Main Street (EW)	TS	2	2	1	1	2	1>	2	2	1	2	2	0	34.6	51.3	D	D
Peach Avenue (NS) at:																	
• Main Street (EW)	TS	1	1	1	1	1	1	1	2	1	1	2	1	17.9	18.9	B	B
Main Street (NS) at:																	
• Rock Springs Road (EW)	CSS	0	1	1	1	1	0	0	0	0	1	0	1	--[4]	--[4]	F	F
-With Improvements	**TS**	0	1	**1>**	**2**	1	0	0	0	0	1	0	**1>**	19.8	23.5	B	C
Apple Valley Road (NS) at:																	
• Bear Valley Road (EW)	TS	2	2	1	2	1	2>	2	2	1	1	3	1>	94.6	--[4]	F	F
-With Improvements[5]	TS	2	2	1	2	**2**	**1>>**	2	**3**	1	**2**	3	1>	26.8	30.5	C	C
Deep Creek Road (NS) at:																	
• Bear Valley Road (EW)	CSS	0	1	0	0	1	0	1	2	1	1	2	0	--[4]	--[4]	F	F
-With Improvements[5]	**TS**	**1**	1	**1**	**1**	1	**1**	**1**	2	1	1	2	0	20.6	25.9	C	C
• Tussing Ranch Road (EW)	CSS	0	1	0	0	1	0	0	1	0	0	1	0	26.8	--[4]	D	F
-With Improvements	**TS**	**1**	1	0	**1**	1	0	**1**	1	0	**1**	1	0	21.5	27.4	C	C
• Ocotillo Way (EW)	--	DOES NOT EXIST												--	--	--	--
• "H" Street Project Access (EW)	--	DOES NOT EXIST												--	--	--	--
• South Project Access (EW)	--	DOES NOT EXIST												--	--	--	--
• Roundup Way (EW)	CSS	0	1	0	0	1	0	1	0	1	0	0	0	14.1	17.4	B	C
• Rock Springs Road (EW)	TS	0.5	0.5	1	0.5	0.5	1	1	1	0	1	1	0	35.6	45.0	D	D
-With Improvements	TS	0.5	0.5	1	0.5	0.5	1	1	**2**	0	1	**2**	0	20.5	20.7	C	C
Kiowa Road (NS) at:																	
• Bear Valley Road (EW)	TS	1	2	1	1	2	1	1	2	1	1	2	1	57.9	54.2	E	D
-With Improvements[5]	TS	**2**	2	1	1	2	1	1	2	1	1	**3**	0	25.7	27.3	C	C
• Rock Springs Road (EW)	AWS	1	1	1	1	1	1>>	1	1	0	1	1	0	17.1	37.1	C	E
-With Improvements	**TS**	1	1	1	1	1	1>>	1	1	0	1	1	0	31.7	26.6	C	C

[1] When a right turn is designated, the lane can either be striped or unstriped. To function as a right turn lane there must be sufficient width for right turning vehicles to travel outside the through lanes.

L = Left; T = Through; R = Right; > = Right Turn Overlap Phase; >> = Free Right Turn

[2] Delay and level of service calculated using the following analysis software: Traffix, Version 7.8 R5 (2007). Per the 2000 Highway Capacity Manual, overall average intersection delay and level of service are shown for intersections with traffic signal or all way stop control. For intersections with cross street stop control, the delay and level of service for worst individual movement (or movements sharing a single lane) are shown.

[3] CSS = Cross Street Stop
TS = Traffic Signal
AWS = All Way Stop

[4] -- = Delay High, Intersection Unstable, Level of Service "F".

[5] Pedestrians are assumed not to occur on every cycle.

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Apple Valley Road (NS)

- Bear Valley Road (EW)

Deep Creek Road (NS)

- Bear Valley Road (EW)
- Tussing Ranch Road (EW)
- Rock Springs Road (EW)

Kiowa Road (NS)

- Bear Valley Road (EW)
- Rock Springs Road (EW)

Improvements have been identified that will provide acceptable traffic operations at each of the deficient intersections for 2030 Without Project conditions. The operations analysis worksheets for 2030 Without Project with improvements conditions are also included in Appendix "J".

The improvements required to provide acceptable traffic operations include 3 through lanes on Bear Valley Road at Apple Valley Road in the eastbound direction. This is a reduction compared to Interim Year conditions. The traffic pattern changes creating the need for less intense improvements (compared to Interim Year conditions) reflect the long range solution (consistent with the CTP model network) of constructing planned parallel routes that are currently incomplete (Lemon Street south of Bear Valley Road and/or Yucca Loma Road north of Bear Valley Road).

5.2.2 CMP Horizon Year (2030) With Project Conditions

2030 Without Project AM and PM peak hour intersection turning movement volumes are shown on Exhibits 5-G and 5-H, respectively. The intersection operations analysis for 2030 Without Project traffic conditions with existing geometrics are summarized in Table 5-4. The operations analysis worksheets for 2030 Without Project conditions are included in Appendix

EXHIBIT 5-G

2030 WITH PROJECT AM PEAK HOUR INTERSECTION VOLUMES

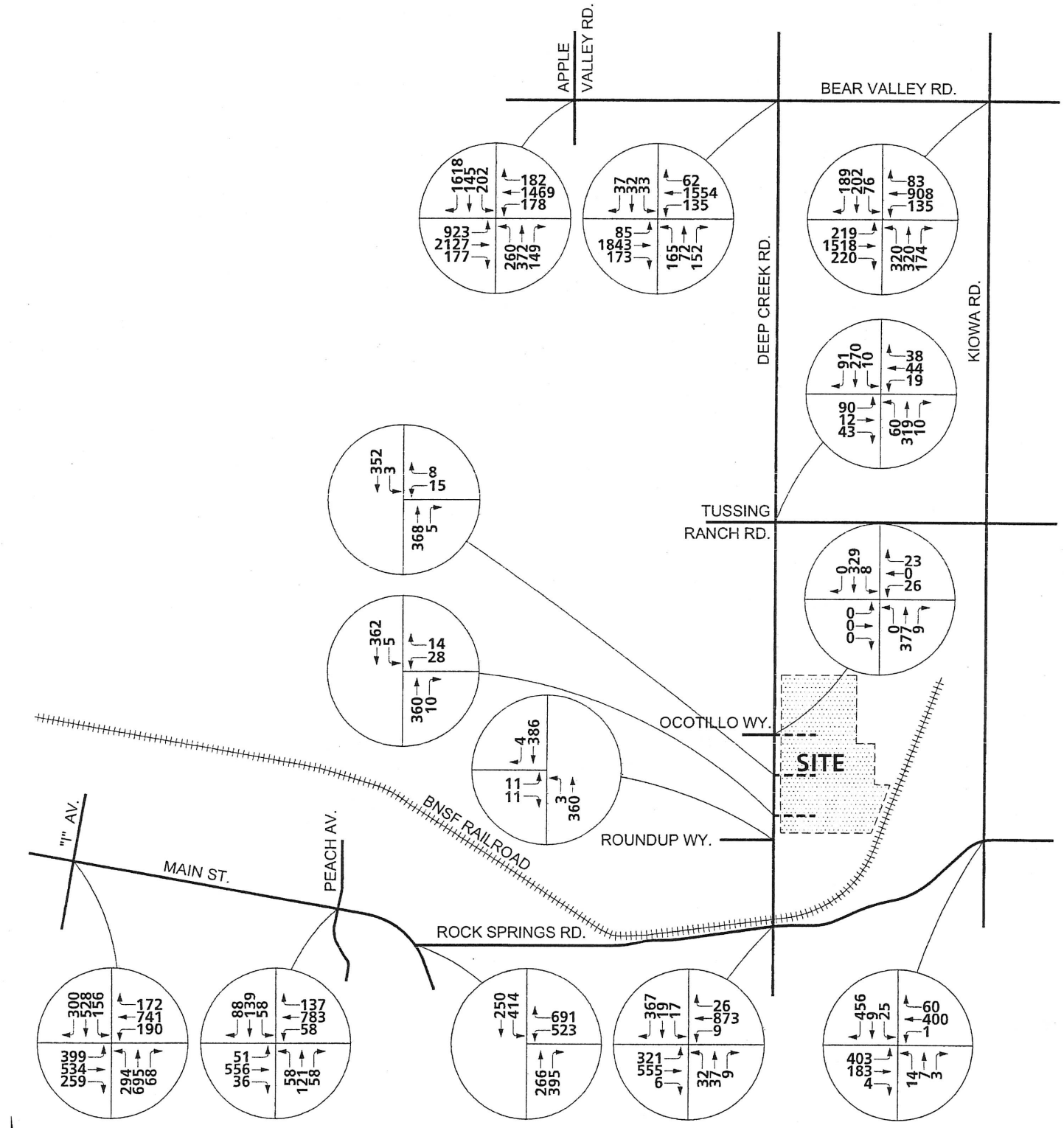

EXHIBIT 5-H

2030 WITH PROJECT PM PEAK HOUR INTERSECTION VOLUMES

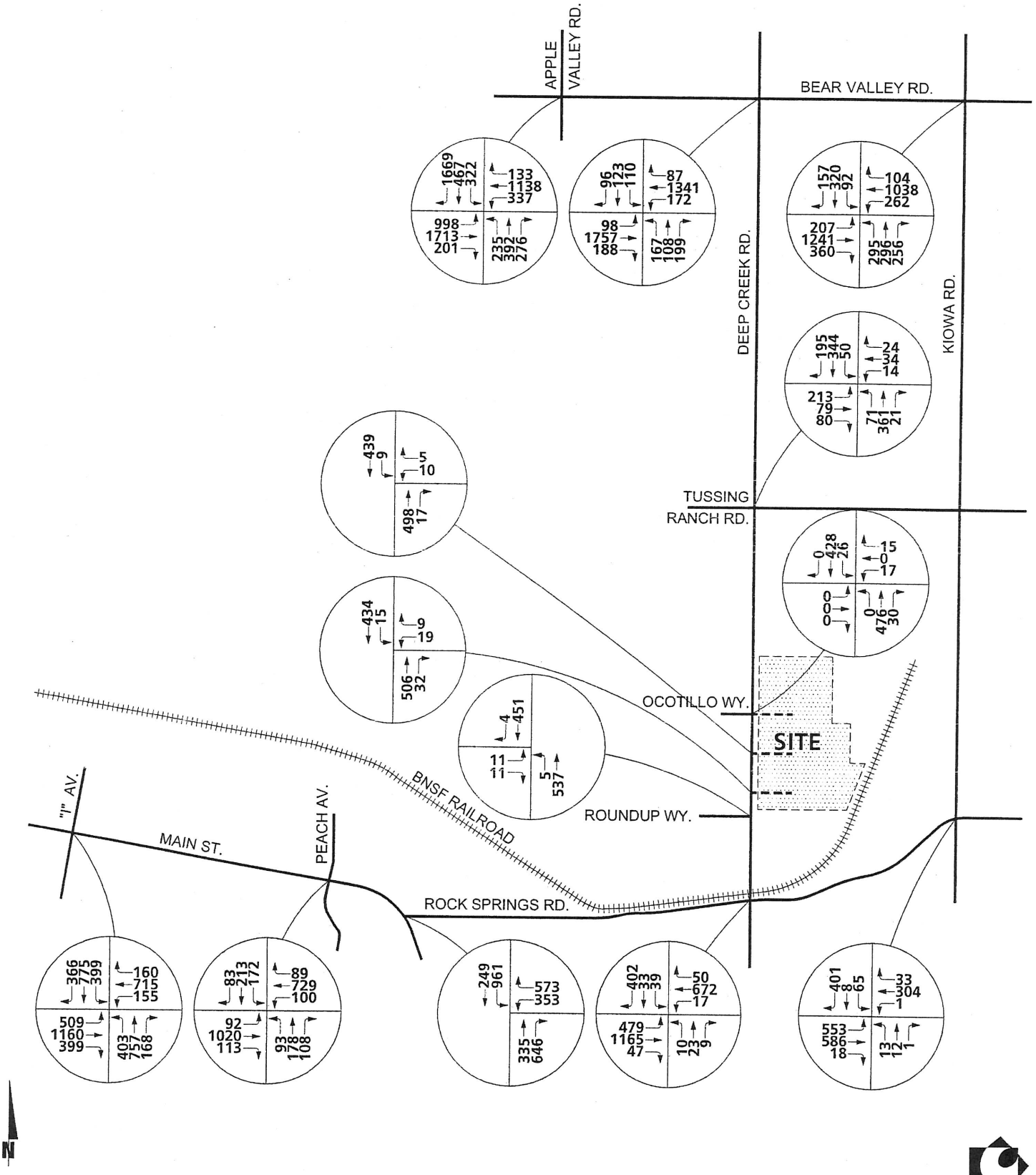

TABLE 5-4

2030 WITH PROJECT CONDITIONS INTERSECTION ANALYSIS SUMMARY

INTERSECTION	TRAFFIC CONTROL[3]	INTERSECTION APPROACH LANES[1] NORTH-BOUND L	NORTH-BOUND T	NORTH-BOUND R	SOUTH-BOUND L	SOUTH-BOUND T	SOUTH-BOUND R	EAST-BOUND L	EAST-BOUND T	EAST-BOUND R	WEST-BOUND L	WEST-BOUND T	WEST-BOUND R	DELAY[2] (SECS.) AM	DELAY[2] (SECS.) PM	LEVEL OF SERVICE AM	LEVEL OF SERVICE PM
"I" Avenue (NS) at:																	
• Main Street (EW)	TS	2	2	1	1	2	1>	2	2	1	2	2	0	34.9	52.4	C	D
Peach Avenue (NS) at:																	
• Main Street (EW)	TS	1	1	1	1	1	1	1	2	1	1	2	1	16.8	19.1	B	B
Main Street (NS) at:																	
• Rock Springs Road (EW)	CSS	0	1	1	1	1	0	0	0	0	1	0	1	--[4]	--[4]	F	F
-With Improvements	**TS**	0	1	**1>**	**2**	1	0	0	0	0	1	0	**1>**	20.3	24.7	C	C
Apple Valley Road (NS) at:																	
• Bear Valley Road (EW)	TS	2	2	1	2	1	2>	2	2	1	1	3	1>	94.6	--[4]	F	F
-With Improvements[5]	TS	2	2	1	2	**2**	**1>>**	2	**3**	1	**2**	3	1>	26.9	31.7	C	C
Deep Creek Road (NS) at:																	
• Bear Valley Road (EW)	CSS	0	1	0	0	**1**	0	1	2	1	1	2	0	--[4]	--[4]	F	F
-With Improvements[5]	**TS**	**1**	1	**1**	**1**	1	**1**	1	2	1	1	2	0	20.9	26.5	C	C
• Tussing Ranch Road (EW)	CSS	0	1	0	0	1	0	0	1	0	0	1	0	32.2	--[4]	D	F
-With Improvements	**TS**	**1**	1	0	**1**	1	0	**1**	1	0	**1**	1	0	22.0	27.8	C	C
• Ocotillo Way (EW)	CSS	0	1	0	**1**	1	0	0	0	0	0	**1**	0	13.7	16.5	B	C
• "H" Street Project Access (EW)	CSS	0	1	0	**1**	1	0	0	0	0	0	**1**	0	13.7	16.8	B	C
• South Project Access (EW)	CSS	0	1	0	**1**	1	0	0	0	0	0	**1**	0	14.3	18.0	B	C
• Roundup Way (EW)	CSS	0	1	0	0	1	0	1	0	1	0	0	0	15.4	20.0	C	C
• Rock Springs Road (EW)	TS	0.5	0.5	1	0.5	0.5	1	1	1	0	1	1	0	40.0	54.8	D	D
-With Improvements	TS	0.5	0.5	1	0.5	0.5	1	1	**2**	0	1	**2**	0	21.8	24.4	C	C
Kiowa Road (NS) at:																	
• Bear Valley Road (EW)	TS	1	2	1	1	2	1	1	2	1	1	2	1	58.1	54.4	E	D
-With Improvements[5]	TS	**2**	2	1	1	2	1	1	2	1	1	**3**	0	25.8	27.5	C	C
• Rock Springs Road (EW)	AWS	1	1	1	1	1	1>>	1	1	0	1	1	0	17.2	37.8	C	E
-With Improvements	**TS**	1	1	1	1	1	1>>	1	1	0	1	1	0	31.7	26.7	C	C

[1] When a right turn is designated, the lane can either be striped or unstriped. To function as a right turn lane there must be sufficient width for right turning vehicles to travel outside the through lanes.

L = Left; T = Through; R = Right; > = Right Turn Overlap Phase; >> = Free Right Turn

[2] Delay and level of service calculated using the following analysis software: Traffix, Version 7.8 R5 (2007). Per the 2000 Highway Capacity Manual, overall average intersection delay and level of service are shown for intersections with traffic signal or all way stop control. For intersections with cross street stop control, the delay and level of service for worst individual movement (or movements sharing a single lane) are shown.

[3] CSS = Cross Street Stop
TS = Traffic Signal
AWS = All Way Stop

[4] -- = Delay High, Intersection Unstable, Level of Service "F".

[5] Pedestrians are assumed not to occur on every cycle.

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"K". As shown in Table 5-4, the same study area intersections as 2030 Without Project conditions are projected to experience unacceptable operations during the peak hours and are, therefore, deficient per City of Hesperia, Town of Apple Valley, or County of San Bernardino criteria.

Improvements have been identified that will provide acceptable traffic operations at each of the deficient intersections for 2030 With Project conditions. The operations analysis worksheets for 2030 Without Project with improvements conditions are also included in Appendix "K". The improvements for 2030 With Project conditions are identical to the improvements required for 2030 Without Project conditions.

5.3 Special Issues

5.3.1 Project Impacts Related to Dirt Road Usage

Existing dirt road traffic volumes are insignificant, however, concerns have been raised related to potential impacts of project traffic increasing the use of dirt roads in the study area. Existing traffic currently uses dirt roads (e.g. Ocotillo Way) within and around the project site. With the construction of the project and paving of Ocotillo Way, dirt road use by existing traffic will be reduced. The project itself is anticipated to contribute a minimal amount of project traffic to dirt roads. Overall, the project will result in reduced dirt road use by others (by paving a portion of Ocotillo Way and physically precluding use of this dirt road as a through route) and will add a negligible amount of project traffic on dirt roads, thus having a less than significant impact (and possibly even a positive effect) on dirt road usage.

5.3.2 Potential Flooding Issues

A concern regarding potential flooding at the Rock Springs Road crossing of the Mojave River has also been raised. Flooding is expected to occur too infrequently to be considered significant to affect the roadway's capacity. Recent improvements have been designed with improved road protection and flow capacity to eliminate the issue of the roadway being "washed out" and therefore impassable for significant periods of time. Appendix "L" includes supporting materials provided by County staff. Roadway design and traffic impact analysis both utilize the concept of a design hour (typically represented by normal weekday conditions) that is expected to occur many times (usually 30-50) per year. Future flooding would be expected far less frequently. Any project impact is therefore less than significant.

6.0 IMPROVEMENT COSTS AND PROJECT CONTRIBUTION

This section of the report summarizes the improvements and associated costs required to meet level of service requirements at each analysis locations. Improvements have been categorized based on whether or not they are included in an adopted fee program.

Improvements which will eliminate all anticipated roadway operational deficiencies throughout the study area have been identified for Interim Year (2015) and Horizon Year (2030) traffic conditions. The improvements were determined through the operations analysis of Section 5.

The approximate costs for 2030 improvements have generally been estimated using cost data provided by the South/East Apple Valley Local Area Transportation Facilities Plan and the 2003 CMP preliminary construction cost estimates for the Congestion Management Plan (see Appendix "M"). These costs have been further modified (increased) per the direction of County staff. The cost of the Lemon Street bridge across the Mojave River has been obtained from the Victor Valley Area Transportation Study, per County staff direction.

6.1 2030 Fee Program and CMP Required Improvements

Table 6-1 indicates all the needed 2030 improvements for the study area intersections. Table 6-1 also indicates whether the needed 2030 improvements are included in the South/East Apple Valley Local Area Transportation Facilities Plan. The project is subject to the South/East Apple Valley Local Area Transportation Facillities Plan fee program, which was established in 1993. The project is not subject to the more recently adopted County of San Bernardino Transportation Mitigation Fee, as the project application was filed prior to February 4th, 2007. As indicated in Table 6-1, all of the required improvements for Deep Creek Road at Bear Valley Road and Deep Creek Road at Rock

TABLE 6-1

2030 OFF-SITE ROADWAY IMPROVEMENT SUMMARY

INTERSECTION	IMPROVEMENT[1]	IN FEE PROGRAM?[2]
Main Street (NS) at: • Rock Springs Road (EW)	Install Traffic Signal Add Northbound Right Turn Overlap Phase Construct 2nd Southbound Exclusive Left Turn Lane Add Westbound Right Turn Overlap Phase	
Apple Valley Road (NS) at: • Bear Valley Road (EW)	Construct 2nd Southbound Through Lane Reconstruct Dual Southbound Right Turn Lanes into Single Free Right Turn Lane Construct 3rd Eastbound Through Lane Construct 2nd Westbound Left Turn Lane	
Deep Creek Road (NS) at: • Bear Valley Road (EW)	Install Traffic Signal Construct 1st Northbound Exclusive Left Turn Lane Construct 1st Northbound Exclusive Right Turn Lane Construct 1st Southbound Exclusive Left Turn Lane Construct 1st Southbound Through Lane Construct 1st Southbound Exclusive Right Turn Lane	
• Tussing Ranch Road (EW)	Install a Traffic Signal Construct 1st Northbound Exclusive Left Turn Lane Construct 1st Southbound Exclusive Left Turn Lane Construct 1st Eastbound Exclusive Left Turn Lane Construct 1st Westbound Exclusive Left Turn Lane	YES - 9A YES - 4 YES - 4 YES - 9A YES - 9A
• Rock Springs Road (EW)	Construct 2nd Eastbound Through Lane Construct 2nd Westbound Through Lane	YES -10 YES -10
Kiowa Road (NS) at: • Bear Valley Road (EW)	Construct 2nd Northbound Exclusive Left Turn Lane Construct 3rd Westbound Through Lane	
• Rock Springs Road (EW)	Install a Traffic Signal	

[1] The construction of turn pockets and intersection endpoints are assumed to be included as widening improvements in the South/East Apple Valley Local Area Transportation Facilities Plan

[2] If an improvement is included in the South/East Apple Valley Local Area Transportation Facilities Plan (i.e. - "Yes, in Fee Program"), the corresponding project reference number as listed in the Fee Schedule (see Appendix "L") is also identified.

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Springs Road are included in the South/East Apple Valley Local Area Transportation Facilities Plan. To avoid double counting, these improvements are not included in the fair share cost calculations in section 6.3.

6.2 Estimated Development Fee Obligation

Table 6-2 indicates the estimated fee obligation based on the South/East Apple Valley Local Area Transportation Facilities Plan. As indicated on Table 6-2, the estimated fee obligation per single family residential unit is $1,785. Based on the project's proposed 202 dwelling units, the estimated development fee is $360,570 (202 DU x $1,785). This fee will be utilized as the project's share for improvements listed in the South/East Apple Valley Local Area Transportation Facilities Plan (which includes those required improvements identified as 'YES, in Fee Program' on Table 6-1).

6.3 2030 Improvement Costs NOT in Fee Program

Table 6-3 indicates the required 2030 intersection improvements NOT included in the South/East Apple Valley Local Area Transportation Facilities Plan. As indicated on Table 6-3, the total construction cost for intersection improvements not included in the South/East Apple Valley Local Area Transportation Facilities Plan is approximately $4,083,880.

6.4 2030 Off-Site Improvements NOT in Fee Program Fair Share Costs

The project fair share contribution towards the required 2030 off-site intersection improvements is presented on Table 6-4. The project fair share contribution towards the required 2030 improvements is based on the project's percentage of new traffic for 2030 With Project conditions. As indicated in Table 6-4, the highest AM or PM local off-site fair share cost is $137,813.

TABLE 6-2

DEEP CREEK TENTATIVE TRACT 16569
ESTIMATED FEE OBLIGATION

FEE REFERENCE	SINGLE FAMILY RESIDENTIAL ($ PER DU)
South/East Apple Valley Local Area Transportation Facilities Plan	**$1,785**

Program	Category	Unit Cost	Units	Total Cost
Development Fee	Single Family Residential	$1,785	202	**$360,570**

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TABLE 6-3

2030 OFF-SITE ROADWAY IMPROVEMENT COSTS NOT IN FEE PROGRAM

INTERSECTION	IMPROVEMENT	NOT IN FEE PROGRAM
Main Street (NS) at:		
• Rock Springs Road (EW)	Install Traffic Signal and Construct roadway modifications[1]	$1,800,000
		$1,800,000
Apple Valley Road (NS) at:		
• Bear Valley Road (EW)	Construct 2nd Southbound Through Lane	$289,720
	Reconstruct Dual Southbound Right Turn Lanes into Single Free Right Turn Lane	$25,000
	Construct 3rd Eastbound Through Lane	$289,720
	Construct 2nd Westbound Left Turn Lane	$50,000
		$654,440
Deep Creek Road (NS) at:		
• Bear Valley Road (EW)	Install Traffic Signal	$400,000
	Construct 1st Northbound Exclusive Left Turn Lane	$50,000
	Construct 1st Northbound Exclusive Right Turn Lane	$50,000
	Construct 1st Southbound Exclusive Left Turn Lane	$50,000
	Construct 1st Southbound Through Lane	$289,720
	Construct 1st Southbound Exclusive Right Turn Lane	$50,000
		$889,720
Kiowa Road (NS) at:		
• Bear Valley Road (EW)		
	Construct 2nd Northbound Exclusive Left Turn Lane	$50,000
	Construct 3rd Westbound Through Lane	$289,720
		$339,720
• Rock Springs Road (EW)		
	Install a Traffic Signal	$400,000
		$400,000
GRAND TOTAL - COST OF CONSTRUCTION		**$4,083,880**

[1] Cost has been provided by the City of Hesperia

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TABLE 6-4

2030 PROJECT FAIR SHARE FOR OFF-SITE LOCAL IMPROVEMENT COSTS (NOT IN FEE PROGRAM)

INTERSECTION	TOTAL COST	PEAK HOUR	EXISTING TRAFFIC	2030 WITH PROJECT TRAFFIC	PROJECT TRAFFIC	TOTAL NEW TRAFFIC	PROJECT % OF NEW TRAFFIC	(A) AM PROJECT COST SHARE	(B) PM PROJECT COST SHARE	HIGHEST AM OR PM LOCAL COST SHARE
Main Street (NS) at:										
• Rock Springs Road (EW)	$1,800,000									
		AM	1238	2539	82	1,301	6.30%	$113,451	$110,448	$113,451
		PM	1308	3117	111	1,809	6.14%			
Apple Valley Road (NS) at:										
• Bear Valley Road (EW)	$654,440									
		AM	4910	7802	12	2,892	0.41%	$2,716	$3,733	$3,733
		PM	5076	7881	16	2,805	0.57%			
Deep Creek Road (NS) at:										
• Bear Valley Road (EW)	$889,720									
		AM	2715	4343	17	1,628	1.04%	$9,291	$14,087	$14,087
		PM	2867	4446	25	1,579	1.58%			
Kiowa Road (NS) at:										
• Bear Valley Road (EW)	$339,720									
		AM	2627	4364	8	1,737	0.46%	$1,565	$3,041	$3,041
		PM	3064	4628	14	1,564	0.90%			
• Rock Springs Road (EW)	$400,000									
		AM	651	1565	8	914	0.88%	$3,501	$3,298	$3,501
		PM	782	1995	10	1,213	0.82%			
OFF-SITE SUBTOTAL - COST SHARE FOR IMPROVEMENTS NOT IN FEE PROGRAM								**$130,524**	**$134,607**	**$137,813**

[1] Cost assigned 100% to project.

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6.5 2030 Project Fair Share For Lemon Street Bridge Across Mojave River

Based on the Victor Valley Area Transportation Study (VVATS) and discussion with County of San Bernardino staff, the estimated construction cost of the planned Lemon Street Mojave River Overcrossing is $40,000,000 for a four lane bridge. The long range traffic volume (Average Daily Traffic of 34,000 vehicles) justifying construction of a four lane bridge has also been obtained from the VVATS report. Table 6-5 includes the project's fair share cost of this improvement based on the project's daily percentage of new traffic at this location. As indicated in Table 6-5, the project's fair share cost for this improvement is approximately $114,118.

6.6 Improvement Costs Summary

Table 6-6 summarizes and calculates the estimated total improvement costs for the proposed project. The values presented on Table 6-6 have been extracted from the estimated fees previously presented in this chapter of the report. As indicated on Table 6-6, the estimated total improvement costs for the proposed project is approximately $612,501.

TABLE 6-5

2030 PROJECT FAIR SHARE FOR LEMON STREET IMPROVEMENT COSTS
(BASED ON AVERAGE DAILY TRAFFIC [ADT])

ALTERNATIVE	TOTAL COST	EXISTING ADT	VVATS ADT	PROJECT ADT	TOTAL NEW ADT	PROJECT % OF NEW ADT	PROJECT COST SHARE
Alternative 10 - Buildout[1]	$40,000,000	0	34,000	97	34,000	0.29%	$114,118

[1] Data has been obtained from Victor Valley Area Transportation Study (VVATS) Alternatives

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TABLE 6-6

IMPROVEMENT COSTS SUMMARY

SOURCE	ESTIMATED FEE
South/East Apple Valley Local Area Transportation Facilities Plan	$360,570
Off-Site Improvements Project Fair Share (Not in Fee Program)	$137,813
Lemon Street Crossing	$114,118
OFF-SITE IMPROVEMENTS TOTAL COSTS	**$612,501**

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7.0 SUMMARY AND RECOMMENDATIONS

This chapter summarizes the findings of this traffic impact analysis, and provides a series of recommendations related to project implementation.

7.1 Summary

The traffic issues related to the proposed land use and development have been evaluated in the context of the California Environmental Quality Act (CEQA). Both an Interim Year analysis and a Horizon Year analysis are included in this report.

A series of scoping discussions were conducted with the County of San Bernardino to define the desired analysis locations. The project contribution test indicates that the project contributes traffic less than the CMP freeway threshold volume of 100 two-way trips, but more than the threshold of 50 trips along roadway segments serving San Bernardino County, the Town of Apple Valley, and the City of Hesperia.

The CMP Horizon Year (2030) traffic volumes without the project have been derived from the subregional travel demand model currently being used for long range planning in San Bernardino County. This model is commonly referred to as the Comprehensive Transportation Plan (CTP) traffic model with County of San Bernardino included. The CTP traffic model is currently the only approved travel demand forecasting tool within the study area, as none of the locally developed travel demand models in the study area have received the necessary "finding of consistency" (with the CTP traffic model) from SANBAG/SCAG.

Project traffic volumes for all future conditions projections were estimated using the manual approach described in the CMP guidelines. The trip generation calculation is based on the most recent Institute of Transportation Engineers Trip Generation Rates, 7th Edition. The project trip distributions for Interim Year conditions are based on a review of existing traffic volumes and the projected 2030 future traffic patterns are predicted by the CTP traffic model.

Project traffic volumes were then added to the refined future year CTP traffic model volumes in order to obtain the 2030 With Project traffic volumes. The result of this traffic forecasting procedure is a series of traffic volumes suitable for traffic operations analysis.

7.1.1 The Project

The approximately 249 acre project site is proposed to include 202 single family dwelling units. Exhibit 1-C illustrates the site plan.

The traffic related to the project has been calculated in accordance with the following accepted procedural steps:

- Trip Generation
- Trip Distribution
- Traffic Assignment

Table 2-2 (previously presented) summarizes the projected trip generation for the proposed development. As indicated in Table 2-2, the proposed Deep Creek (TT 16569) development is projected to generate 1,933 trip-ends per day with 152 vehicles per hour during the AM peak hour and 204 vehicles per hour during the PM peak hour.

7.1.2 Existing Study Area Conditions

All Horizon Year (2030) analysis locations which exist today that are affected by the minimum segment volume requirements (50 two way trips) have been analyzed. Regional access to the site is provided by the Interstate 15 (I-15) Freeway. Local access is provided by various arterial roadways in the vicinity of the site. The east-west roadways which will be most affected by the project include Bear Valley Road, Main Street, and Rock Springs Road. North-south roadways expected to provide local access include Deep Creek Road and Kiowa Road.

7.1.3 Future Conditions

An Interim Year (2015) analysis and CMP Horizon Year (2030) analysis are included in this report. Interim Year (2015) traffic operations analysis has been completed for the AM and PM peak hours and are shown in Tables 5-1 and 5-2 (previously presented). AM peak hour and PM peak hour traffic operations analysis are summarized in Tables 5-3 and 5-4 (previously presented) for 2030 conditions.

7.2 Recommendations

The recommendations in this section address on-site improvements, off-site improvements and the phasing of all necessary study area transportation improvements.

7.2.1 On-Site Improvements

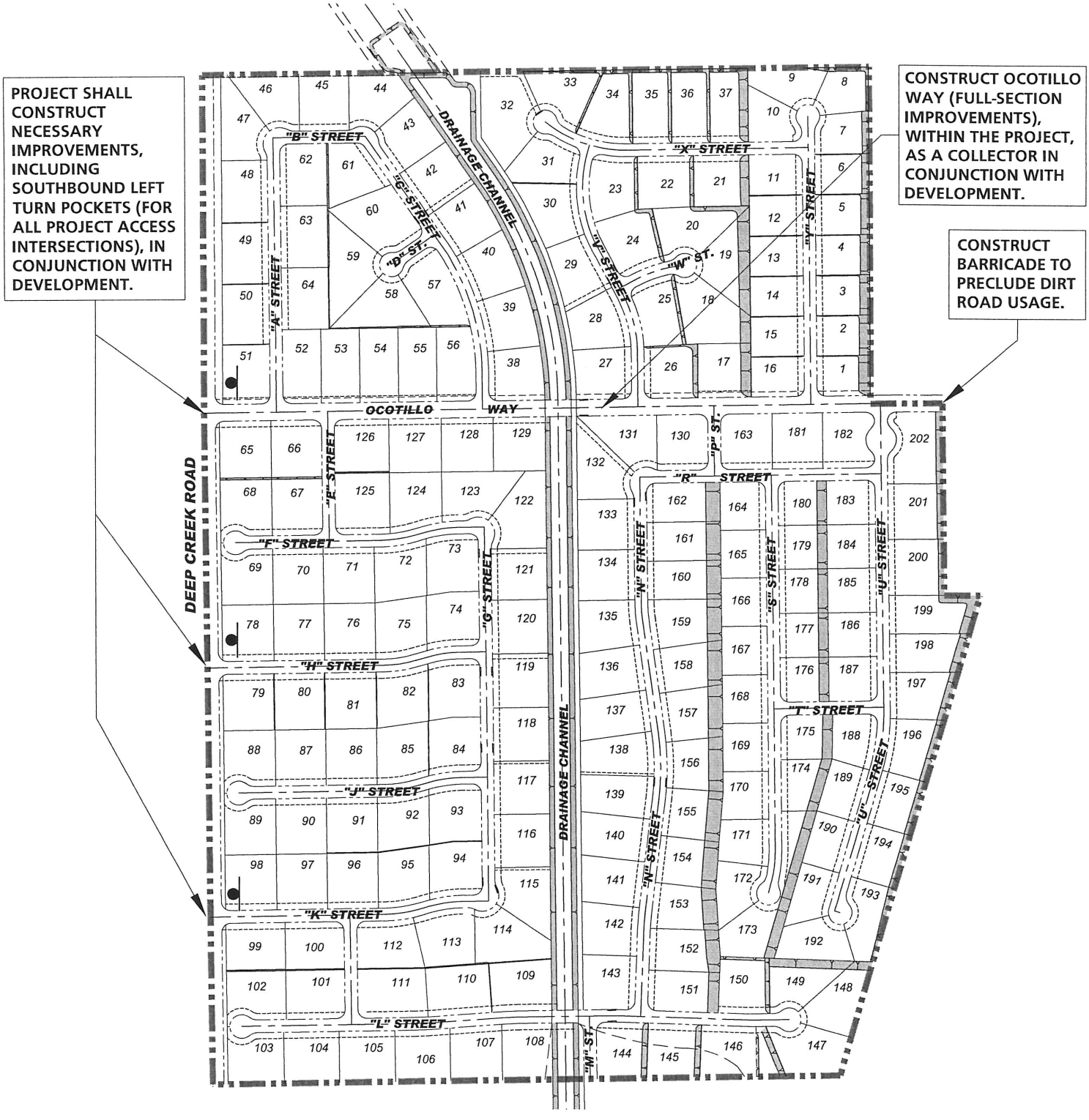
On-site improvements and improvements adjacent to the site will be required in conjunction with the proposed development to ensure adequate circulation within the project itself. Exhibit 7-A illustrates the recommended improvement measures to address on-site circulation requirements of the proposed site, which include the following:

1. Project shall construct necessary improvements, including southbound left turn pockets (for all project access intersections) in conjunction with development.

2. Construct Ocotillo Way (full-section improvements), within the project, as a collector in conjunction with development.

EXHIBIT 7-A

CIRCULATION RECOMMENDATIONS



3. Provide Stop Sign control for all project access roads to Deep Creek Road.

4. Sight distance at the Deep Creek Road access points should be reviewed with respect to County of San Bernardino standards.

5. Construct a barricade at the easterly terminus of (paved) Ocotillo Way to preclude dirt road usage.

7.2.2 Off-Site Improvements

The necessary off-site improvement recommendations were described in previous sections of this report. The project should contribute towards the cost of necessary study area improvements on a fair share or "pro-rata" basis (see Chapter 6) by paying development impact fees and/or additional fair share contributions towards improvements not included in the adopted fee program.

7.2.3 Transportation System Management Actions

a. Off-Site

As development in the area occurs, transit agencies should consider expanding service within the area.

b. On-Site

The on-site design should accommodate private and/or public bus access design and parking.

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