SEWERAGE FACILITIES PLAN

UPDATE

YEAR 2005 AMENDMENT

(An amendment and supplement to the Sewerage Facilities Plan prepared in 1997 by McDonald-Stevens Engineers, Inc.)

Prepared by:

VICTOR VALLEY WASTEWATER RECLAMATION AUTHORITY
20111 SHAY ROAD
VICTORVILLE, CA 92394

MEMBER AGENCIES:

TOWN OF APPLE VALLEY
CITY OF HESPERIA
CITY OF VICTORVILLE
SAN BERNARDINO COUNTY SERVICE AREA 64 (SPRING VALLEY LAKE)
SAN BERNARDINO COUNTY SERVICE AREA 42 (ORO GRANDE)

Adopted by the Board of Commissioners
August 1, 2005

VICTOR VALLEY WASTEWATER RECLAMATION AUTHORITY
SEWERAGE FACILITIES PLAN
YEAR 2005 UPDATE

Table of Contents

Table of Contents (continued)

LIST OF TABLES

LIST OF FIGURES

CHAPTER 1
EXECUTIVE SUMMARY

INTRODUCTION

The Victor Valley Wastewater Reclamation Authority (VVWRA) is a California Joint Powers Authority (JPA) that owns and operates regional wastewater collection and treatment facilities which serve the Victor Valley. The service area includes the Town of Apple Valley, the City of Hesperia, the City of Victorville, the Southern California Logistics Airport, and San Bernardino County Services Areas 42 (Oro Grande) and 64 (Spring Valley Lake).

VVWRA owns and maintains 40.5 miles of interceptor sewer, two pump stations and a Regional Wastewater Reclamation Plant. A portion of the interceptor system is constructed in the stream bed of the Mojave River. The existing Reclamation Plant is rated for 12.5 MGD, which is further defined as 8.3 MGD for discharge to the Mojave River and 4.2 MGD for discharge to percolation ponds. In April 2005 construction began on a project that will expand the capacity of the regional treatment facility to 14.5 MGD. The processes at the regional treatment plant consist of screening, grit removal, primary clarification, biological oxidation of wastes with complete nitrification, secondary clarification, coagulation, flocculation, filtration, and disinfection.

Biosolids, which are generated as a component of the liquid treatment phase, are stabilized by dissolved air flotation thickening and anaerobic digestion. The digested biosolids are further dewatered and dried prior to disposal. California Bio Mass, Inc., leases property owned by VVWRA for a regional compost facility, and as a condition of the lease, the regional compost facility must accept and process all of the biosolids generated by VVWRA.

In early 2005 design work began to expand the regional treatment facility to a capacity of 18 MGD, and construction is expected to begin in early 2006. The regional treatment system is capable of meeting a whole effluent toxicity standard that requires no measurable toxic impact on the receiving stream. The treatment system provides complete nitrification, partial denitrification for nitrogen removal, and dechlorination of the disinfected effluent.

OBJECTIVES

Growth in the population and the resulting flow of wastewater is utilizing the capacity of the existing collection and treatment facilities. In addition, the regional aquifer system is in a condition of severe overdraft, which could be reduced through the implementation of recycled water projects. The purpose of this amendment to the 1997 Sewerage Facilities Plan and the subsequent amendments that were adopted by the Board of Commissioners in 2000 and 2002 is to update and revise population projections contained in the original Plan, and to use the revised populations to adjust the findings and recommendations suggested by the Plan. This 2005 amendment considers

population growth, projected wastewater flows, interceptor capacity, regional wastewater treatment, subregional reclamation facilities, and water recycling for the study period up to and including the year 2025.

POPULATION PROJECTIONS

Population projections developed for this amendment are based on each entity's best estimates for planning. The estimated total resident population within the VVWRA service area is summarized in Table 1-1.

TABLE 1-1
RESIDENT POPULATION PROJECTIONS

MEMBER ENTITY	2005	2010	2015	2020	2025
Victorville inc SCLA	90,652	115,645	134,065	155,418	180,172
CSA 42	774	774	774	774	774
CSA 64	12,193	14,135	16,386	17,058	17,058
Apple Valley	61,330	68,030	75,462	83,707	92,851
Hesperia	73,026	86,730	99,084	115,419	137,082
TOTAL	237,975	285,315	325,771	372,375	427,937

Because the residents and businesses in some portions of the service area still use private septic systems, not all of the resident population is sewered. The City of Victorville is approximately 97% sewered, and 100% of the population growth is expected to be sewered. The Town of Apple Valley is approximately 37% sewered, and the portion of Apple Valley's population growth that will be sewered is expected to increase from 60% in 2005 to 100% in 2020. The City of Hesperia is approximately 24% sewered, and the portion of Hesperia's population growth that will be sewered is expected to increase from 65% in 2005 to 96% in 2024. Both CSA 42 and CSA 64 are entirely sewered, and all of the population growth is expected to be sewered. The estimated total sewered population within the VVWRA service area is summarized in Table 1-2.

TABLE 1-2
SEWERED POPULATION PROJECTIONS

MEMBER ENTITY	2005	2010	2015	2020	2025
Victorville inc SCLA	87,859	112,853	131,272	152,625	177,379
CSA 42	774	774	774	774	774
CSA 64	12,193	14,135	16,386	17,058	17,058
Apple Valley	22,863	27,493	33,521	41,279	50,423
Hesperia	17,382	28,131	39,131	54,312	74,942
TOTAL	141,071	183,385	221,084	266,047	320,576

WASTEWATER FLOWS

Wastewater flow projections were developed based upon the estimated sewered population, as summarized in Table No. 1-2, and a wastewater flow of approximately 80 gallons per person per day. Also, flow contributions from septic abandonment and commercial, industrial, and institutional sources were estimated and included. Where equivalent dwelling unit data is shown, the unit factor for flow is 245 gallons per day per EDU. The wastewater flow projections for each member agency are summarized in Table 1-3.

TABLE 1-3
WASTEWATER FLOW PROJECTIONS

MEMBER AGENCY	2005	2010	2015	2020	2025
Victorville/SCLA	7.99	10.40	12.47	15.04	18.25
CSA 42	0.06	0.06	0.06	0.06	0.06
CSA 64	0.82	1.00	1.22	1.37	1.56
Apple Valley	2.04	2.55	3.20	3.99	4.92
Hesperia	1.65	2.67	3.73	5.14	7.02
TOTAL	12.55	16.68	20.68	25.61	31.81

Note: The flow shown is the average daily flow in million gallons per day (MGD).

INTERCEPTOR IMPROVEMENTS

The VVWRA interceptor system extends south approximately 15 miles north from the regional treatment facility to serve each of the member entities. The pipeline ranges in size from 10-inch diameter to 42-inch diameter. The interceptor system was designed to provide approximately 20 years of capacity for sewage flows. Much of the interceptor system has now been in use for 20 years, and portions are reaching capacity. The 1997 Sewerage Facilities Plan included estimates of the improvements and costs that would be necessary to meet growth, which in most cases would have included new and/or parallel sewers to provide additional capacity. In 2005 VVWRA commissioned an engineering study to hydraulically model the interceptor system and determine what improvements would be necessary to convey up to 18 MGD to the regional treatment plant. The results of this study should be available by the summer of 2005, which will be used to revise projections of interceptor improvements for the Sewerage Facilities Plan via a further addendum.

Table 1-4 shows the interceptor improvements that were anticipated in the 1997 Sewerage Facilities Plan if no subregional reclamation facilities were constructed:

TABLE 1-4
INTERCEPTOR IMPROVEMENTS WITHOUT SUBREGIONAL FACILITIES

DESCRIPTION	YEAR	CONSTRUCTION COST
Hesperia Interceptor	2004	$575,000
Main Interceptor (VSD 5 - VSD 1)	2008	$500,000
Apple Valley Interceptor	2008	$380,000
Lower Narrows Interceptor	2009	$750,000
North Apple Valley Interceptor	2010	$1,400,000
Upper Narrows Interceptor	2012	$950,000

Notes: construction costs shown are in 2000 dollars, as described in the 1997 Sewerage Facilities Plan. This information will be replaced with new information when the 2005 Interceptor Hydraulic Modeling Study is complete.

WASTEWATER TREATMENT IMPROVEMENTS

Treatment Facility improvements must be designed and constructed in time to accommodate the growing of the service population and the resulting flow of sewage. Wastewater flows and loadings are expected to grow from residential as well as commercial, industrial, and institutional sources. The construction of additional capacity should be initiated when the existing facilities reach 80% of the current rated capacity, so that construction can be completed before the facilities reach 90% of

rated capacity. For example, engineering to design the expansion of treatment capacity from 14.5 MGD to 18 MGD should begin when the wastewater flow reaches 80% of 14.5 MGD, or 11.6 MGD. The flow of wastewater actually exceeded 11.6 MGD for the first time in January 2005.

A recent concept suggested by the City of Victorville would capture all of the wastewater produced by Apple Valley and Hesperia using subregionals, which in turn would provide capacity at the regional treatment facility for the County Service Areas and the City of Victorville's growth.

Table 1-5 shows the regional treatment facility improvements that are anticipated if all of the wastewater from Victorville and the County continue to be processed at the regional plant, and if all of Apple Valley's and Hesperia's wastewater flows are captured and recycled using subregional reclamation facilities constructed and operational by no later than 2012:

TABLE 1-5
REGIONAL TREATMENT IMPROVEMENTS WITH SUBREGIONAL FACILITIES

DESCRIPTION	YEAR	CONSTRUCTION COST
14.5 MGD Expansion	2005	$25,000,000
18.0 MGD Expansion	2006	$20,000,000
22.0 MGD Expansion	2020	$20,000,000

Note: The regional treatment facility improvements shown in Table 1-5 assume that all of the wastewater produced by Apple Valley and Hesperia is captured and treated using subregional reclamation facilities, which would be constructed and in operation by no later than 2012. Dates shown are the year that construction of each respective improvement should begin. Construction costs include engineering, legal, environmental review, construction, construction management engineering, and contingencies. All costs are shown are in 2005 dollars.

RECLAMATION AND RECYCLING

The 1997 Sewerage Facilities Plan identified numerous potential customers of recycled water within the service area. Many of the potential users of recycled water include landscape irrigation for golf courses, parks, and cemeteries. The 1997 Sewerage Facilities Plan evaluated reclamation opportunities using water produced at the existing regional treatment facility, as well as reclaimed water produced by the construction of one or more subregional reclamation facilities. A number of potential locations for subregional reclamation facilities were identified, including the Victorville Greentree Golf Course, the area near the Mojave Narrows Regional Park, the City of Hesperia, and the Town of Apple Valley.

The City of Victorville recently prepared a Recycled Water Master Plan that included a more detailed study of potential reclamation within the City limits. VVWRA is currently finalizing a

planning study and programmatic Environmental Impact Report (EIR) for the actual siting, design, and construction of approximately four (4) subregional reclamation facilities.

Siting for subregional reclamation facilities must consider economics, aesthetics, public perception, access for maintenance and chemical deliveries, property values, proximity to interceptors and available sewage flows, proximity to potential reclaimed water customers, receptiveness of the respective water purveyor, and alternative effluent disposal options.

Table 1-6 shows the schedule, capacities, and estimated costs that were considered and adopted by the Board of Commissioners in April 2002, which was used as the basis for the 2002 Amendment to the Sewerage Facilities Plan:

TABLE 1-6
SUBREGIONAL RECLAMATION FACILITIES

	Design	Design	Total	Target Dates					
	Average	Peak	Estimated						
Subregional	Capacity	Capacity	Cost	Feasibility	CEQA	Detailed	Bidding &	Construct	Begin
Facility Name	Mgd	mgd	$	Study	Study	Design	Award		Operation
Green Tree - Victorville	1.5	1.5	$22,500,000	2002	2003	2003	2004	2004	2005
Otoe Road - Apple Valley	1.5	1.5	$22,500,000	2002	2003	2003	2004	2004	2005
Upper Narrows - Victorville	4.0	4.0	$40,000,000	2006	2007	2008	2008	2009	2010
Riverfront - Hesperia	1.5	1.5	$22,500,000	2006	2007	2008	2008	2009	2010
Lewis Center - Apple Valley	1.0	1.0	$22,500,000	TBD	TBD	TBD	TBD	TBD	TBD

Note: Total estimated cost includes planning, engineering, property acquisition, CEQA preparation, infrastructure improvements, permitting, and construction, including consideration for odor control and architectural blending. The estimated costs are preliminary and very conservative, and the actual cost to construct the respective facilities may be less. All of the subregional reclamation facilities except for the Lewis Center are already on, or will soon be on, the SWRCB's SRF loan priority list. The Greentree and Upper Narrows subregional facilities are also on the Proposition 13 grant/loan eligibility list. The Lewis Center subregional is a possible joint venture that is too preliminary at this time to warrant further planning.

CHAPTER 2
STUDY AREA, POPULATION AND FLOW PROJECTIONS

EXISTING WASTEWATER FLOW

The Victor Valley Wastewater Reclamation Authority (VVWRA) is a regional wastewater collection, treatment, and reclamation agency with a service area encompassing approximately 216 square miles within the high desert area of San Bernardino County. VVWRA is a four-member joint powers agency consisting of the Cities of Victorville, Hesperia, the Town of Apple Valley, and San Bernardino County Service Areas 42 (Oro Grande) and 64 (Spring Valley Lake). VVWRA also provides sewerage treatment and disposal services to the former George Air Force Base, which was incorporated into the corporate limits of the City of Victorville and is now identified as the Southern California Logistics Airport (SCLA). The City of Adelanto was a member of VVWRA until 1998, when the City began operating a new wastewater treatment facility and withdrew from membership in VVWRA.

VVWRA began operating the regional treatment facility in 1981 with a rated capacity of 4.8 mgd. In 1989, the capacity of the plant was increased to 9.5 mgd (8.3 mgd for discharge to the Mojave River and 1.2 mgd for discharge to percolation ponds). In 2002 the capacity of the plant was increased to 11.0 MGD (8.3 mgd for discharge to the Mojave River and 2.7 mgd for discharge to percolation ponds). In 2004 VVWRA applied to the Lahontan RWQCB to re-rate the capacity of the existing facility from 11.0 MGD to 12.5 MGD based on the actual measured capacity of the percolation ponds (8.3 mgd for discharge to the Mojave River and 4.2 mgd for discharge to percolation ponds). In 2005 construction began on a project to expand the capacity of the regional treatment plant to 14.5 MGD.

VVWRA currently treats an average flow of about 12 mgd as follows:

TABLE 2-1
EXISTING FLOWS

ENTITY	FLOW (MGD)
Victorville	7.37
Hesperia	1.53
CSA 42	0.05
CSA 64	0.82
Apple Valley	1.90
SCLA	0.37
TOTAL	**12.04**

Prior to 2004 the flow of wastewater to VVWRA was increasing at a rate of about 4%-5% per year. However, beginning in 2004 the rate of growth began increasing dramatically, and the current rate of growth is approximately 25%. This dramatic increase in the growth of the flow is due to greatly escalated construction activity, and increases in the resident population that reflect improvements in the economy of California and relatively affordable housing in the Victor Valley. In addition, a component of the growing wastewater flow reflects septic tank pumping, as well as septic system replacements when existing septic systems fail and are connected to the regional sewer system instead of repairing the old septic system.

POPULATION PROJECTIONS

Population projections developed for this amendment to the Facilities Plan Update are based on each entity's best estimates for planning. The 1997 Sewerage Facilities Plan used available sources of information, which included each community's General Plan, the Sewer Master Plan, Planning Department growth forecasts, SCAG population forecasts, information excerpted from the Victor Valley Socioeconomic Forecast (dated January 24, 1997), and the State Department of Finance. The 2000 Amendment to the Sewerage Facilities Plan modified the flows to reflect each entity's updated population projections and planning estimates. This 2005 Amendment further modifies the flow projections to reflect updated population growth estimates. Population projections for the entire VVWRA service area are shown on Table 2-2. Specific criteria used for each entity's population projections are described in the following sections.

This Sewerage Facilities Plan defines capacity needs by examining future population growth as reported by the respective communities. This approach relies on growth that is expected to occur as a part of building activity and resident population increases. In addition to estimating population growth, estimates of commercial, industrial, and institutional capacity needs have also been projected. Estimates were likewise made to compensate for the use of on-site disposal systems (private septic system) and how they can impact capacity demands. The overall methodology used, therefore, attempts to identify and differentiate the various components that go into forecasting population and commercial growth, and then transposing that information to sewage flow capacity demand.

VVWRA should continue tracking growth and use the information to perform regular updates of the Sewerage Facilities Plan at least once every five years. Through the use of population growth forecasts provided by each entity served by VVWRA, and by using the current population and flow as benchmarks, needed changes in the Sewerage Facilities Plan can be routinely monitored to plan for future growth. Updates can then be used to modify and/or reschedule facility improvements and expansions.

City of Victorville

The population of the City of Victorville in 2005 is approximately 90,652 within a service area of approximately 68 square miles. Under the City's current growth forecast, the City's population projection for the year 2025 is 180,172 residents. In 2005, the percentage of the population served by sewers was approximately 97%, and the City has determined that 100% of all of the future growth will be sewered. On this basis, the sewered population in 2025 will be approximately 177,379, or about 98% of the entire population. Estimates of flow for Victorville's population are based on 80 gallons per person per day.

The City's wastewater flow has been introduced into the regional interceptor sewer system at six separate metering points denoted as VSD 1, VSD 2, VSD 3, VSD 4, VSD 5, and VSD 6.

The number of existing septic tank systems that would be subject to failure and abandonment is considered to be a minor impact on the City of Victorville's sewerage system.

Federal Prison

Phase II of the Federal Prison Complex is complete and is currently being occupied, and should be in full operation by the summer of 2005. Phase I of the Federal Prison Complex includes Federal Correctional Institution I (FCI I) and a Women's Camp and accommodates a total of approximately 1,900 inmates, generating a wastewater flow of approximately 350,000 gallons per day. Phase II of the Federal Prison Complex includes a United States Penitentiary (USP) that will accommodate approximately 1,000-1,500 inmates, and FCI II that will accommodate an additional 1,800 inmates. The USP and FCI II will generate approximately 400,000 gallons per day, and the combined Federal Prison Complex will generate a total wastewater flow of approximately 750,000-800,000 gallons per day. The USP and the Women's Camp are sewered through the Southern California Logistics Airport (SCLA) via the City's Nevada Avenue trunk line sewer, which enters VVWRA's interceptor system via the SCLA 1 Metering Station. The FCI I and FCI II facilities are sewered through a second outfall connected to the City's VSD 4 trunk line sewer, which enters VVWRA's interceptor system via the VSD 4 Metering Station.

Southern California Logistics Airport (SCLA)

Sterling Enterprises, in conjunction with the City of Victorville and the Victor Valley Economic Development Authority, is continuing to develop the former air force base for private, public, and commercial uses. Today SCLA is utilized for air cargo, aircraft maintenance, and aircraft storage. In addition, a wire mill and a number of commercial businesses are located at SCLA. The flow from SCLA is expected to be 0.75 mgd by the year 2005 and 1.10 mgd by the year 2015. SCLA is entirely sewered. SCLA's wastewater flow is introduced into the regional interceptor sewer system at two separate metering points denoted as SCLA 1 and SCLA 2.

TABLE 2 - 2
VVWRA
2005 SEWERAGE FACILITIES PLAN UPDATE
Population Trends and Projections

Year	Victorville including SCLA				County Service Areas 42 & 64 - SVL & Oro Grande					Town of Apple Valley				Hesperia				Totals			
	Population		Sewered		Population			Sewered		Population		Sewered		Population		Sewered		Population		Sewered	
	Total	Increase	Total	Percent	CSA 64	CSA 42	Increase	Total	Percent	Total	Increase	Total	Percent	Total	Increase	Total	Percent	Total	Increase	Total	Percent
2004	84,306		81,514		11,838	774		12,612		57,576		20,610		70,470		15,720		224,964		130,456	58%
2005	90,652	6,346	87,859	97%	12,193	774	355	12,967	100%	61,330	3,754	22,863	37%	73,026	2,556	17,382	24%	237,975	13,011	141,071	59%
2006	96,998	6,346	94,205	97%	12,559	774	366	13,333	100%	62,615	1,285	23,698	38%	75,582	2,556	19,171	25%	248,528	10,553	150,407	61%
2007	102,817	5,819	100,024	97%	12,936	774	377	13,710	100%	63,927	1,312	24,551	38%	78,227	2,645	21,155	27%	258,681	10,153	159,439	62%
2008	107,958	5,141	105,165	97%	13,324	774	388	14,098	100%	65,266	1,339	25,488	39%	80,964	2,737	23,344	29%	268,286	9,606	168,096	63%
2009	112,277	4,319	109,484	98%	13,723	774	400	14,497	100%	66,634	1,368	26,446	40%	83,797	2,833	25,667	31%	277,205	8,919	176,095	64%
2010	115,645	3,368	112,853	98%	14,135	774	412	14,909	100%	68,030	1,396	27,493	40%	86,730	2,933	28,131	32%	285,315	8,109	183,385	64%
2011	119,115	3,469	116,322	98%	14,559	774	424	15,333	100%	69,456	1,425	28,562	41%	89,766	3,036	30,742	34%	293,669	8,355	190,959	65%
2012	122,688	3,573	119,895	98%	14,996	774	437	15,770	100%	70,911	1,455	29,726	42%	92,010	2,244	32,717	36%	301,379	7,710	198,108	66%
2013	126,369	3,681	123,576	98%	15,446	774	450	16,220	100%	72,397	1,486	30,915	43%	94,310	2,300	34,787	37%	309,295	7,916	205,497	66%
2014	130,160	3,791	127,367	98%	15,909	774	463	16,683	100%	73,914	1,517	32,204	44%	96,668	2,358	36,933	38%	317,425	8,129	213,187	67%
2015	134,065	3,905	131,272	98%	16,386	774	477	17,160	100%	75,462	1,549	33,521	44%	99,084	2,416	39,131	39%	325,771	8,347	221,084	68%
2016	138,087	4,022	135,294	98%	16,878	774	492	17,652	100%	77,044	1,581	34,944	45%	101,562	2,478	41,411	41%	334,344	8,573	229,300	69%
2017	142,229	4,143	139,436	98%	17,058	774	180	17,832	100%	78,658	1,614	36,396	46%	104,101	2,539	43,747	42%	342,820	8,476	237,412	69%
2018	146,496	4,267	143,703	98%	17,058	774	0	17,832	100%	80,306	1,648	37,962	47%	107,744	3,643	47,135	44%	352,378	9,558	246,632	70%
2019	150,891	4,395	148,098	98%	17,058	774	0	17,832	100%	81,989	1,683	39,561	48%	111,516	3,772	50,643	45%	362,227	9,850	256,134	71%
2020	155,418	4,527	152,625	98%	17,058	774	0	17,832	100%	83,707	1,718	41,279	49%	115,419	3,903	54,312	47%	372,375	10,148	266,047	71%
2021	160,080	4,663	157,287	98%	17,058	774	0	17,832	100%	85,460	1,754	43,033	50%	119,459	4,040	58,109	49%	382,832	10,456	276,261	72%
2022	164,883	4,802	162,090	98%	17,058	774	0	17,832	100%	87,251	1,791	44,823	51%	123,640	4,181	62,081	50%	393,606	10,774	286,826	73%
2023	169,829	4,946	167,036	98%	17,058	774	0	17,832	100%	89,079	1,828	46,651	52%	127,968	4,328	66,193	52%	404,708	11,103	297,712	74%
2024	174,924	5,095	172,131	98%	17,058	774	0	17,832	100%	90,946	1,866	48,518	53%	132,447	4,479	70,493	53%	416,149	11,440	308,973	74%
2025	180,172	5,248	177,379	98%	17,058	774	0	17,832	100%	92,851	1,906	50,423	54%	137,082	4,635	74,942	55%	427,937	11,788	320,576	75%

NOTE: Dates shown are as of July 1, the beginning of the annual fiscal year. The percent sewered that is shown is the % of the total population expected to be sewered.

County Service Area 42 (Oro Grande)

County Service Area 42 provides sewerage services to the residential community of Oro Grande. The number of service connections has remained stable over the years, with no measurable increase expected in the future. For planning purposes, the community is considered to be at its build out. Population and sewage flow are not expected to increase beyond 2005 figures. Using 80 gallons per person per day and an average daily flow of 61,920 gallons of wastewater, the current population of CSA 42 is approximately 774 residents. CSA 42 is entirely sewered.

County Service Area 64 (Spring Valley Lake)

The population of Spring Valley Lake in 2005 is approximately 12,193. County Service Area 64 provides sewerage services to the community of Spring Valley Lake and Victor Valley Community College. Future growth is expected to be predominantly associated with the build out of Spring Valley Lake, and growth of facilities and the student population at the Victor Valley Community College. Build out of Spring Valley Lake is expected by the year 2017. CSA 64 is entirely sewered . Estimates of flow for Spring Valley Lake's population are based on 80 gallons per person per day.

Town of Apple Valley

The population of the Town of Apple Valley in 2005 is approximately 61,330 residents. The Town of Apple Valley covers a total land area of 78 square miles, of which about 15 percent is currently developed. Nearly 65 % of the Town's residential development has been constructed with onsite sewerage systems using septic tanks and seepage pits. Residential properties have large lot sizes (18,000 square feet or more), and the failure of onsite systems is often remedied by reconstructing a new onsite system, rather than connecting to the sewer system. It should be noted that sewer systems are not available in all parts of the service area.

The Town of Apple Valley currently estimates that approximately 37% of the homes in the area are sewered, with the remainder using private septic systems. The Town estimates that approximately 60% of the population growth in 2005 will be sewered, which will increase to 100 % of the growth by 2020, so that 54 % of the total population of Apple Valley will be sewered by 2025. Estimates of flow for Apple Valley's sewered population are based on 80 gallons per person per day.

City of Hesperia

The population of the City of Hesperia in 2005 is approximately 73,026 residents. The City's 20-year population forecast (137,082 by 2025) does not include the development of the Rancho Las Flores Project, which is a planned community development of 15,545 residential units that will have its own sewerage system (Rancho Las Flores will not be connected to VVWRA's regional system). Nearly 80% of the City's residential development has been constructed with onsite sewerage systems using septic tanks and seepage pits. The failure of onsite systems is often remedied by

reconstructing a new onsite system, rather than connecting to the sewer system. Again, it should be noted that sewer systems are not available in all parts of the service area.

The City of Hesperia currently estimates that approximately 24 % of the homes in the area are sewered, with the remainder using private septic systems. The City estimates that approximately 65% of the population growth in 2005 will be sewered, which will increase to 96 % of the growth by 2024, so that 55 % of the total population of Hesperia will be sewered by 2025. Estimates of flow for Hesperia's sewered population are based on 80 gallons per person per day.

Summary of Population Projections

Population growth within the VVWRA service area has been analyzed for each VVWRA member entity. The sewered population was estimated using the criteria discussed above. The year 2020 was selected as the planning horizon for this analysis. Population forecasts are summarized in Tables 2-3 and 2-4. The percentage of the population growth for each entity that is expected to be sewered is shown in Table 2-5.

TABLE 2-3
VVWRA - POPULATION PROJECTION SUMMARY

	RESIDENT POPULATION FORECAST				
MEMBER AGENCY	2000	2005	2010	2015	2020
Victorville	63,639	71,372	82,740	95,919	111,196
CSA 42	725	725	725	725	725
CSA 64	7,810	8,770	9838	11,024	11,025
Apple Valley	56,112	62,484	67,781	76,310	85,895
Hesperia	63,589	69,385	75,709	82,610	90,140
TOTALS	191,875	212,736	236,793	266,588	298,981

TABLE 2-4
VVWRA - POPULATION PROJECTION SUMMARY

	SEWERED POPULATION FORECAST				
MEMBER AGENCY	2000	2005	2010	2015	2020
Victorville	57,275	65,009	76,376	89,555	104,832
CSA 42	725	725	725	725	725
CSA 64	7,810	8,769	9,837	11,024	11,024
Apple Valley	16,758	19,944	22,593	26,857	31,650
Hesperia	11,700	15,364	20,176	26,494	34,791
TOTALS	94,268	109,811	129,707	154,655	183,022

TABLE 2 - 5
VVWRA
2005 SEWERAGE FACILITIES PLAN UPDATE
Population Growth to be Sewered

Year	Victorville Including SCLA				County Service Areas 42 & 64 - SVL & Oro Grande					Town of Apple Valley				Hesperia				Totals			
	Population		Sewered		Population			Sewered		Population		Sewered		Population		Sewered		Population		Sewered	
	Total	Increase	Total	Growth	CSA 64	CSA 42	Increase	Total	Growth	Total	Increase	Total	Growth	Total	Increase	Total	Growth	Total	Increase	Total	Growth
2004	84,306		81,514	100%	11,838	774		12,612	100%	57,576		20,610	55%	70,470		15,720		224,964		130,456	
2005	90,652	6,346	87,859	100%	12,193	774	355	12,967	100%	61,330	3,754	22,863	60%	73,026	2,556	17,382	65%	237,975	13,011	141,071	82%
2006	96,998	6,346	94,205	100%	12,559	774	366	13,333	100%	62,615	1,285	23,698	65%	75,582	2,556	19,171	70%	248,528	10,553	150,407	88%
2007	102,817	5,819	100,024	100%	12,936	774	377	13,710	100%	63,927	1,312	24,551	65%	78,227	2,645	21,155	75%	258,681	10,153	159,439	89%
2008	107,958	5,141	105,165	100%	13,324	774	388	14,098	100%	65,266	1,339	25,488	70%	80,964	2,737	23,344	80%	268,286	9,606	168,096	90%
2009	112,277	4,319	109,484	100%	13,723	774	400	14,497	100%	66,634	1,368	26,446	70%	83,797	2,833	25,667	82%	277,205	8,919	176,095	90%
2010	115,645	3,368	112,853	100%	14,135	774	412	14,909	100%	68,030	1,396	27,493	75%	86,730	2,933	28,131	84%	285,315	8,109	183,385	90%
2011	119,115	3,469	116,322	100%	14,559	774	424	15,333	100%	69,456	1,425	28,562	75%	89,766	3,036	30,742	86%	293,669	8,355	190,959	91%
2012	122,688	3,573	119,895	100%	14,996	774	437	15,770	100%	70,911	1,455	29,726	80%	92,010	2,244	32,717	88%	301,379	7,710	198,108	93%
2013	126,369	3,681	123,576	100%	15,446	774	450	16,220	100%	72,397	1,486	30,915	80%	94,310	2,300	34,787	90%	309,295	7,916	205,497	93%
2014	130,160	3,791	127,367	100%	15,909	774	463	16,683	100%	73,914	1,517	32,204	85%	96,668	2,358	36,933	91%	317,425	8,129	213,187	95%
2015	134,065	3,905	131,272	100%	16,386	774	477	17,160	100%	75,462	1,549	33,521	85%	99,084	2,416	39,131	91%	325,771	8,347	221,084	95%
2016	138,087	4,022	135,294	100%	16,878	774	492	17,652	100%	77,044	1,581	34,944	90%	101,562	2,478	41,411	92%	334,344	8,573	229,300	96%
2017	142,229	4,143	139,436	100%	17,058	774	180	17,832	100%	78,658	1,614	36,396	90%	104,101	2,539	43,747	92%	342,820	8,476	237,412	96%
2018	146,496	4,267	143,703	100%	17,058	774	0	17,832	100%	80,306	1,648	37,962	95%	107,744	3,643	47,135	93%	352,378	9,558	246,632	96%
2019	150,891	4,395	148,098	100%	17,058	774	0	17,832	100%	81,989	1,683	39,561	95%	111,516	3,772	50,643	93%	362,227	9,850	256,134	96%
2020	155,418	4,527	152,625	100%	17,058	774	0	17,832	100%	83,707	1,718	41,279	100%	115,419	3,903	54,312	94%	372,375	10,148	266,047	98%
2021	160,080	4,663	157,287	100%	17,058	774	0	17,832	100%	85,460	1,754	43,033	100%	119,459	4,040	58,109	94%	382,832	10,456	276,261	98%
2022	164,883	4,802	162,090	100%	17,058	774	0	17,832	100%	87,251	1,791	44,823	100%	123,640	4,181	62,081	95%	393,606	10,774	286,826	98%
2023	169,829	4,946	167,036	100%	17,058	774	0	17,832	100%	89,079	1,828	46,651	100%	127,968	4,328	66,193	95%	404,708	11,103	297,712	98%
2024	174,924	5,095	172,131	100%	17,058	774	0	17,832	100%	90,946	1,866	48,518	100%	132,447	4,479	70,493	96%	416,149	11,440	308,973	98%
2025	180,172	5,248	177,379	100%	17,058	774	0	17,832	100%	92,851	1,906	50,423	100%	137,082	4,635	74,942	96%	427,937	11,788	320,576	98%

NOTE: Dates shown are as of July 1, the beginning of the annual fiscal year. The percent growth shown is the % of population growth that is expected to be sewered.

PROJECTED WASTEWATER FLOWS

The per capita wastewater flow that was used for planning purposes was 80 gallons per person per day. The amount is generally considered to be reasonable and conservative for the Victor Valley area and reflects modern plumbing fixtures and a degree of water conservation. Wastewater flow projections for the resident population were calculated by applying the sewered population forecasts previously discussed to a per capita flow of 80 gallons per day.

One Equivalent Dwelling Unit (EDU) generates a wastewater flow of approximately 245 gallons per day, which is generally the wastewater expected from one single family dwelling. Where equivalent dwelling unit data is presented, the unit factor for flow is 245 gallons per day per EDU. EDU's indicate the number of sewer connections that in turn generate connection fees for Capital Improvements. The projected service population, wastewater flows, and the corresponding EDU's through the year 2025 are shown in Table 2-6.

Wastewater flows from the service area reflect more than just the resident sewered population. Commercial businesses, industries, and institutional sources such as schools, hospitals, and prisons also contribute significant flows to the regional collection and treatment system. Table 2-7 shows the estimated sources of wastewater according to the general categories listed as domestic (resident populations), industrial (commercial business, industries, and institutional sources), and septic conversions. As previously discussed, septic conversions include private septic systems that fail and the owner elects to connect to the regional sewer system in lieu of repairing or replacing the failed septic system.

Peak flows for each metering station have been measured as part of the periodic flow monitoring studies, and the results are presented in the following paragraphs. Peak flows are important for planning and design considerations. Peak flows for each station were taken from the November 2004 metering station flow monitoring study.

City of Victorville

The City of Victorville discharges to the VVWRA interceptor system at six (6) locations denoted as VSD 1, VSD 2, VSD 3, VSD 4, VSD 5, and VSD 6. The VSD 1 metering station is located adjacent to E Street and I-15, immediately south of Southwest Portland Cement. The VSD 2 metering station is located close to the railroad tracks between the Kemper Campbell Ranch and the Mojave Narrows Park. The VSD 3 and VSD 4 metering stations are both located along Turner Road; VSD 3 is located closest to National Trails Highway, and VSD 4 is located adjacent to the City of Adelanto's storage tanks, water treatment system, and pump building. The flow from both of the Federal Correctional Institutions (FCI I & FCI II) at the Federal Prison Complex is included in the flow measured by VSD 4. The VSD 5 metering station (formerly known as VSD 1, or old VSD 1) is located immediately north of Southwest Portland Cement and adjacent to the old Victorville sewage treatment ponds. The VSD 6 station is a relatively new connection located at the foot of Third Street, and does not include a metering or sampling station.

TABLE 2 - 6

VVWRA

2005 SEWERAGE FACILITIES PLAN UPDATE

VVWRA Service Population, Wastewater Flows, and EDU Projections

Year	Victorville Including SCLA				CSA's 42 and 64				Town of Apple Valley				Hesperia				Totals			
	Sewered Population	Flow MGD	EDU's Current	EDU's Increase	Sewered Population	Flow MGD	EDU's Current	EDU's Increase	Sewered Population	Flow MGD	EDU's Current	EDU's Increase	Sewered Population	Flow MGD	EDU's Current	EDU's Increase	Sewered Population	Flow MGD	EDU's Current	EDU's Increase
2004	81,514	7.41	30,249		12,612	0.85	3,450		20,610	1.81	7,383		15,720	1.47	5,990		130,456	11.53	47,073	
2005	87,859	7.99	32,594	2,344	12,967	0.88	3,579	128	22,863	2.04	8,314	931	17,382	1.65	6,739	749	141,071	12.55	51,226	4,153
2006	94,205	8.56	34,959	2,365	13,333	0.91	3,712	134	23,698	2.13	8,703	389	19,171	1.83	7,450	711	150,407	13.43	54,824	3,598
2007	100,024	9.11	37,174	2,215	13,710	0.94	3,851	139	24,551	2.23	9,099	396	21,155	2.02	8,226	777	159,439	14.30	58,351	3,527
2008	105,165	9.60	39,191	2,017	14,098	0.98	3,997	145	25,488	2.33	9,525	426	23,344	2.22	9,073	846	168,096	15.14	61,785	3,434
2009	109,484	10.04	40,965	1,774	14,497	1.02	4,149	152	26,446	2.44	9,959	434	25,667	2.44	9,965	892	176,095	15.93	65,037	3,252
2010	112,853	10.40	42,456	1,491	14,909	1.06	4,308	159	27,493	2.55	10,424	465	28,131	2.67	10,906	941	183,385	16.68	68,093	3,056
2011	116,322	10.78	44,009	1,553	15,333	1.10	4,474	167	28,562	2.67	10,898	474	30,742	2.91	11,897	992	190,959	17.46	71,280	3,186
2012	119,895	11.18	45,628	1,619	15,770	1.14	4,650	175	29,726	2.79	11,406	508	32,717	3.11	12,684	787	198,108	18.22	74,368	3,089
2013	123,576	11.59	47,316	1,688	16,220	1.18	4,834	184	30,915	2.92	11,924	518	34,787	3.31	13,505	821	205,497	19.01	77,579	3,211
2014	127,367	12.02	49,076	1,760	16,683	1.23	5,028	194	32,204	3.06	12,477	553	36,933	3.52	14,354	849	213,187	19.83	80,936	3,357
2015	131,272	12.47	50,913	1,837	17,160	1.28	5,234	205	33,521	3.20	13,042	565	39,131	3.73	15,223	869	221,084	20.68	84,412	3,476
2016	135,294	12.94	52,830	1,917	17,652	1.34	5,451	217	34,944	3.34	13,644	602	41,411	3.95	16,122	899	229,300	21.57	88,048	3,636
2017	139,436	13.43	54,831	2,002	17,832	1.37	5,576	124	36,396	3.49	14,259	615	43,747	4.18	17,044	921	237,412	22.47	91,710	3,662
2018	143,703	13.95	56,922	2,091	17,832	1.38	5,651	75	37,962	3.65	14,913	654	47,135	4.49	18,313	1,269	246,632	23.47	95,799	4,089
2019	148,098	14.48	59,107	2,185	17,832	1.41	5,738	87	39,561	3.82	15,582	668	50,643	4.81	19,624	1,312	256,134	24.51	100,051	4,252
2020	152,625	15.04	61,391	2,284	17,832	1.43	5,837	100	41,279	3.99	16,292	710	54,312	5.14	20,993	1,369	266,047	25.61	104,514	4,463
2021	157,287	15.63	63,780	2,389	17,832	1.46	5,952	115	43,033	4.17	17,018	726	58,109	5.49	22,408	1,415	276,261	26.74	109,158	4,644
2022	162,090	16.24	66,280	2,500	17,832	1.49	6,084	132	44,823	4.35	17,759	741	62,081	5.85	23,885	1,477	286,826	27.93	114,008	4,850
2023	167,036	16.88	68,897	2,617	17,832	1.53	6,235	152	46,651	4.54	18,516	757	66,193	6.23	25,413	1,527	297,712	29.17	119,060	5,053
2024	172,131	17.55	71,637	2,740	17,832	1.57	6,409	174	48,518	4.73	19,290	774	70,493	6.62	27,007	1,594	308,973	30.46	124,343	5,282
2025	177,379	18.25	74,508	2,871	17,832	1.62	6,610	200	50,423	4.92	20,080	791	74,942	7.02	28,655	1,648	320,576	31.81	129,853	5,510

NOTE: Dates shown are as of July 1, the beginning of the annual fiscal year. The EDU's shown are based only on gallons of domestic wastewater and do not reflect the greater number of EDU's typical of high strength commercial and industrial wastewater.

TABLE 2 - 7

VVWRA

2005 SEWERAGE FACILITIES PLAN UPDATE

Estimated Sources of Wastewater Flows

Year	Victorville & SCLA				CSA's 42 and 64				Town of Apple Valley					Hesperia					Totals				
	Detail of the Sources of Flows				Detail of the Sources of Flows				Detail of the Sources of Flows					Detail of the Sources of Flows					Detail of the Sources of Flows				
	Sewered Population	Total MGD	Domestic Flow	Other Flow	Sewered Population	Total MGD	Domestic Flow	Other Flow	Sewered Population	Total MGD	Domestic Flow	Other Flow	Septic Conv.	Sewered Population	Total MGD	Domestic Flow	Other Flow	Septic Conv.	Sewered Population	Total MGD	Domestic Flow	Other Flow	Septic Conv.
2004	81,514	7.41	6.52	0.89	12,612	0.85	0.83	0.02	20,610	1.81	1.65	0.16	0.02	15,720	1.47	1.26	0.21	0.02	130,456	11.53	10.25	1.28	0.04
2005	87,859	7.99	7.03	0.96	12,967	0.88	0.85	0.02	22,863	2.04	1.83	0.17	0.04	17,382	1.65	1.39	0.22	0.04	141,071	12.55	11.10	1.37	0.08
2006	94,205	8.56	7.54	1.03	13,333	0.91	0.88	0.03	23,698	2.13	1.90	0.18	0.06	19,171	1.83	1.53	0.23	0.06	150,407	13.43	11.85	1.46	0.12
2007	100,024	9.11	8.00	1.11	13,710	0.94	0.91	0.03	24,551	2.23	1.96	0.19	0.08	21,155	2.02	1.69	0.24	0.08	159,439	14.30	12.57	1.56	0.16
2008	105,165	9.60	8.41	1.19	14,098	0.98	0.94	0.03	25,488	2.33	2.04	0.19	0.10	23,344	2.22	1.87	0.26	0.10	168,095	15.14	13.26	1.67	0.20
2009	109,484	10.04	8.76	1.28	14,497	1.02	0.98	0.04	26,446	2.44	2.12	0.20	0.12	25,667	2.44	2.05	0.27	0.12	176,095	15.93	13.90	1.79	0.24
2010	112,853	10.40	9.03	1.37	14,909	1.06	1.01	0.05	27,493	2.55	2.20	0.21	0.14	28,131	2.67	2.25	0.28	0.14	183,385	16.68	14.49	1.92	0.28
2011	116,322	10.78	9.31	1.48	15,333	1.10	1.04	0.05	28,562	2.67	2.28	0.23	0.16	30,742	2.91	2.46	0.30	0.16	190,959	17.46	15.09	2.05	0.32
2012	119,895	11.18	9.59	1.59	15,770	1.14	1.08	0.06	29,726	2.79	2.38	0.24	0.18	32,717	3.11	2.62	0.31	0.18	198,108	18.22	15.67	2.20	0.36
2013	123,576	11.59	9.89	1.71	16,220	1.18	1.11	0.07	30,915	2.92	2.47	0.25	0.20	34,787	3.31	2.78	0.33	0.20	205,497	19.01	16.26	2.35	0.40
2014	127,367	12.02	10.19	1.83	16,683	1.23	1.15	0.08	32,204	3.06	2.58	0.26	0.22	36,933	3.52	2.95	0.34	0.22	213,187	19.83	16.87	2.52	0.44
2015	131,272	12.47	10.50	1.97	17,160	1.28	1.19	0.09	33,521	3.20	2.68	0.27	0.24	39,131	3.73	3.13	0.36	0.24	221,084	20.68	17.50	2.70	0.48
2016	135,294	12.94	10.82	2.12	17,652	1.34	1.23	0.11	34,944	3.34	2.80	0.29	0.26	41,411	3.95	3.31	0.38	0.26	229,300	21.57	18.16	2.89	0.52
2017	139,436	13.43	11.15	2.28	17,832	1.37	1.24	0.12	36,396	3.49	2.91	0.30	0.28	43,747	4.18	3.50	0.40	0.28	237,412	22.47	18.81	3.10	0.56
2018	143,703	13.95	11.50	2.45	17,832	1.38	1.24	0.14	37,962	3.65	3.04	0.32	0.30	47,135	4.49	3.77	0.42	0.30	246,632	23.47	19.55	3.32	0.60
2019	148,098	14.48	11.85	2.63	17,832	1.41	1.24	0.16	39,561	3.82	3.16	0.33	0.32	50,643	4.81	4.05	0.44	0.32	256,134	24.51	20.31	3.57	0.64
2020	152,625	15.04	12.21	2.83	17,832	1.43	1.24	0.19	41,279	3.99	3.30	0.35	0.34	54,312	5.14	4.34	0.46	0.34	266,047	25.61	21.10	3.83	0.68
2021	157,287	15.63	12.58	3.04	17,832	1.46	1.24	0.22	43,033	4.17	3.44	0.37	0.36	58,109	5.49	4.65	0.48	0.36	276,261	26.74	21.92	4.11	0.72
2022	162,090	16.24	12.97	3.27	17,832	1.49	1.24	0.25	44,823	4.35	3.59	0.39	0.38	62,081	5.85	4.97	0.51	0.38	286,826	27.93	22.76	4.41	0.76
2023	167,036	16.88	13.36	3.52	17,832	1.53	1.24	0.28	46,651	4.54	3.73	0.40	0.40	66,193	6.23	5.30	0.53	0.40	297,712	29.17	23.63	4.74	0.80
2024	172,131	17.55	13.77	3.78	17,832	1.57	1.24	0.33	48,518	4.73	3.88	0.42	0.42	70,493	6.62	5.64	0.56	0.42	308,973	30.46	24.53	5.09	0.84
2025	177,379	18.25	14.19	4.06	17,832	1.62	1.24	0.38	50,423	4.92	4.03	0.45	0.44	74,942	7.02	6.00	0.59	0.44	320,576	31.81	25.46	5.47	0.88

NOTES: Dates shown are as of July 1, the beginning of the annual fiscal year. "Other Flow" includes wastewater from industrial, commercial, and institutional sources. "Septic Conv" includes wastewater from residential, commercial, and institutional septic tank abandonment.

Average and peak flows from each Victorville station in November 2004 are summarized as follows:

TABLE 2-8
VICTORVILLE - AVERAGE AND PEAK FLOWS

STATION	AVERAGE DAILY FLOW (MGD)	TYPICAL PEAK FLOW (MGD)	PEAKING FACTOR
VSD 1	0.606	1.345	2.22
VSD 2	2.284	4.312	1.89
VSD 3	2.257	3.534	1.56
VSD 4	0.590	1.340	2.27
VSD 5	0.106	0.195	1.84
VSD 6	0.873	1.448	1.66
TOTAL	**6.716**	**12.174**	**1.81**

Southern California Logistics Airport (SCLA)

SCLA discharges to the VVWRA interceptor system at two metering stations denoted as SCLA 1 and SCLA 2. SCLA 1 is located on the former Air Force Base, north of the intersection of Nevada Avenue and Phantom East Road. SCLA 2 is located at the intersection of Shay Road and Phantom East Road. The flow from SCLA 1 includes the US Penitentiary and the Women's Camp at the Federal Prison Complex. SCLA is expected to be fully redeveloped by the year 2015. The average daily flow measured by SCLA 1 in November 2004 was 0.398 MGD, and the typical peak flow was 1.287 MGD. Therefore, the peaking factor is approximately 3.23. The flow from SCLA 2 is currently negligible.

County Service Area 42 (Oro Grande)

CSA 42 is not expected to experience any significant growth, and the daily average wastewater flow is approximately 61,920 gallons. Flow studies performed by CSA personnel in 1995 determined the typical peaking factor to be approximately 3.2.

County Service Area 64 (Spring Valley Lake)

CSA 64 Spring Valley Lake discharges to the VVWRA interceptor system at a metering station located on Ridgecrest Drive, adjacent to the Mojave Narrows Park. The flow from CSA 64 includes the Victor Valley Community College, which tends to be quite seasonable. Spring Valley Lake is expected to grow and should reach build out by the year 2017. The college is expected to continue growing, even after Spring Valley Lake reaches build out. The average daily flow from CSA 64 in

November 2004 was 0.724 MGD, and the typical peak flow was 1.560 MGD. Therefore, the peaking factor is approximately 2.15.

Town of Apple Valley

The Town of Apple Valley discharges to the VVWRA interceptor system at a metering station located adjacent to the Desert Knolls Wash, close to Highway 18 and the Mojave River. The average daily flow from Apple Valley in November 2004 was 1.734 MGD, and the typical peak flow was 3.681 MGD. Therefore, the peaking factor is approximately 2.12. The flow in the new North Apple Valley Interceptor is currently negligible.

City of Hesperia

The City of Hesperia discharges to the VVWRA interceptor system at a metering station located adjacent to the railroad tracks and immediately north of Bear Valley Road. The average daily flow from Hesperia in November 2004 was 1.404 MGD, and the typical peak flow was 3.672 MGD. Therefore, the peaking factor is approximately 2.62.

Peaking Factors Summary

A summary of the average and peak flows from November 2004 and the corresponding peaking factors are as follows:

TABLE 2-9
SUMMARY OF AVERAGE AND PEAK FLOWS

ENTITY	AVERAGE DAILY FLOW (MGD)	TYPICAL PEAK FLOW (MGD)	PEAKING FACTOR
VICTORVILLE	6.716	12.174	1.81
APPLE VALLEY	1.734	3.681	2.12
HESPERIA	1.404	3.672	2.62
CSA 64	0.724	1.560	2.15
CSA 42	0.062	0.198	3.20
SCLA	0.398	1.287	3.23
TOTAL	**11.038**	**22.572**	**2.05**

CHAPTER 3
EXISTING INTERCEPTOR SYSTEM

GENERAL SYSTEM DESCRIPTION

The VVWRA interceptor system extends approximately 15 miles from the regional treatment facility south to each of the member entities. The interceptor system extends as far south as I Avenue and Hercules in Hesperia, as far east as Nanticoke and Tajanta Roads in Apple Valley, and as far west as Highway 395 and Auburn Avenue in Adelanto. The total service population in 2005 is approximately 141,071 residents.

The interceptor system consists of both gravity and force main pipelines, ranging in size from 6-inch to 42-inch diameter. The relatively small pipelines less than 21-inch diameter are constructed of PVC, and the larger pipelines are vitreous clay pipe (VCP). The force mains are typically constructed of PVC or welded steel. A large pumping station operated by VVWRA serves the Town of Apple Valley, and a second smaller pumping station serves County Service Area 42 (Oro Grande). Wastewater collected by each entity is discharged through separate metering stations to the interceptor system operated by VVWRA. The general configuration of the interceptor system is shown on Figure IV-1 (copied from the 1997 Sewerage Facilities Plan).

The main stem of the interceptor has been damaged several times by floodwaters in the Mojave River. In 1983, Reach 7 in the Lower Narrows was damaged by a flood event that destroyed approximately 150 feet of pipe, resulting in a 3-day spill of untreated sewage to the river. A temporary emergency bypass and pumping station was installed in the river channel to allow the replacement of the damaged pipeline. The temporary bypass was in use for nearly 8 months.

In 1993, the most serious damage event occurred again in Reach 7, the Lower Narrows of the Mojave River. At this location, an unknown length of pipe was destroyed by high flows in the river, resulting in a one week spill of untreated sewage to the river. The failure of the Lower Narrows Interceptor necessitated the construction of a semi-permanent emergency bypass pipeline and pump station near Southdown Cement, which was in use for several years. The damage was eventually repaired using 5,000 feet of 33-inch and 36-inch diameter, 3/8-inch thick welded steel pipe supported by piers in the riverbed. The bypass pipeline and pump station were later removed.

Also in 1993, manholes located in Reaches 9 and 10 through the Upper Narrows were damaged by debris carried by floodwaters in the Mojave River. Remedial measures taken by VVWRA involved cutting and sealing of the manholes below the riverbed level. The total length involved was approximately 1,700 feet. Video inspections completed after the repair in 1997 indicated that the pipeline remains essentially intact and undamaged, with the exception of approximately 100 feet of sewer located immediately south of the Highway 18 Bridge. A 100-foot section of the pipeline has clearly settled and is completely full of water, rendering an inspection impossible unless a means can be developed to bypass and drain the submerged section of pipe.

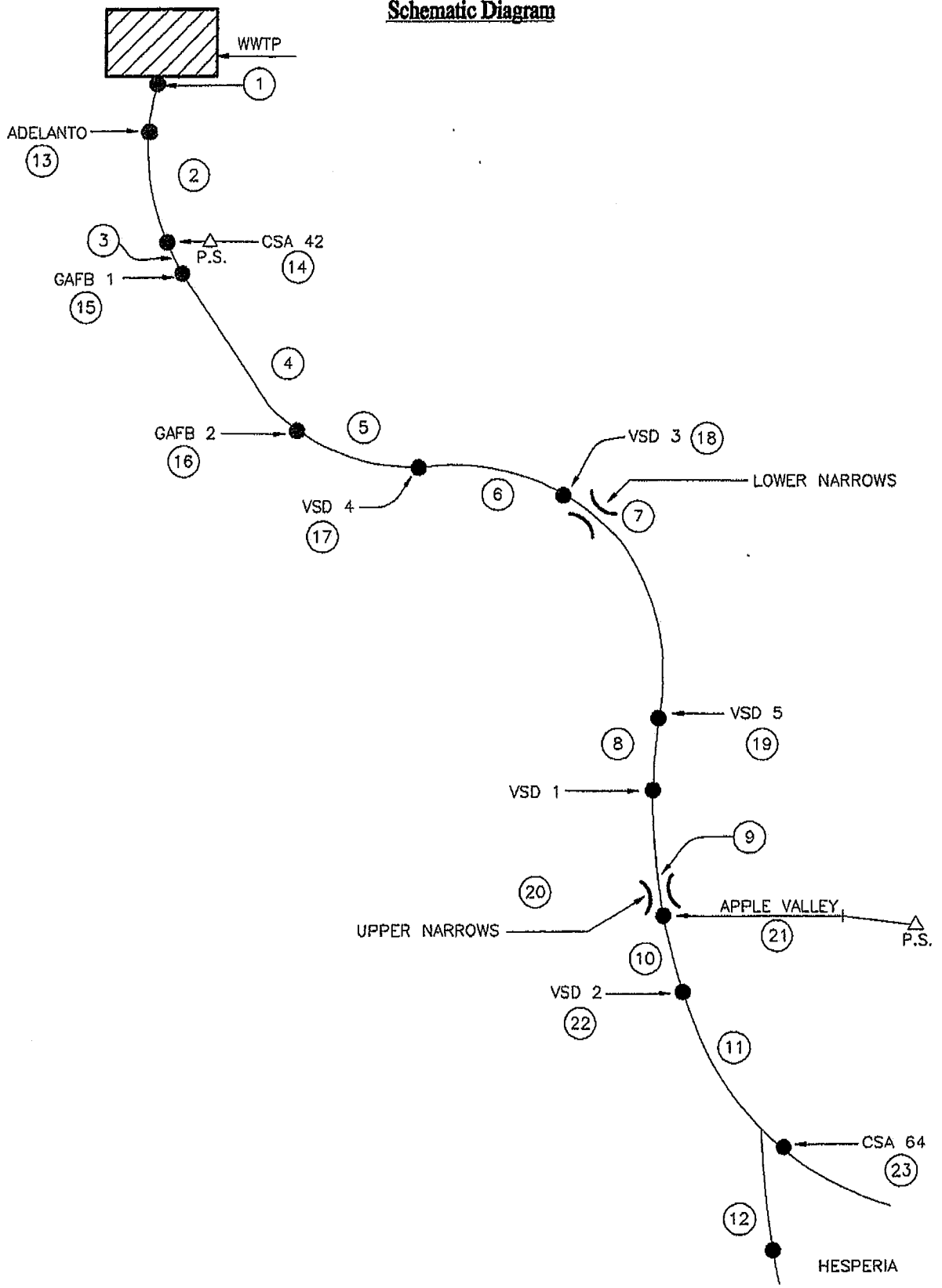
FIGURE NO. IV-1

VVWRA

Sewerage Facilities Plan Update Project

Existing Interceptor System And Reach Destination

Schematic Diagram



MSE

In 1993, a parallel 42-inch diameter relief sewer was completed from the VSD No. 3 metering station on Turner Road to the existing junction structure located immediately upstream of the treatment plant headworks. The total length of the paralleled sewer was approximately 19,600 feet.

In 1999 the VVWRA Board of Commissioners adopted a goal to cease using the Upper Narrows Interceptor within a five year period of time. The Board's decision was based on the potential for damage to the interceptor and the environmental impacts of a sewage spill in the Mojave River as a result of flood events and other natural disasters. To move forward with this goal, in 2000 the Commission approved the preparation o f a conceptual design study to convey sewage around the Upper Narrows of the Mojave River, and to eventually abandon that portion of the gravity sewer. VVWRA recently applied for a FEMA Pre-Disaster Mitigation Grant to help fund the replacement of facilities in the Upper Narrows.

In February 2004 the construction of the 9-mile North Apple Valley Interceptor was completed, serving portions of Victorville, Apple Valley, and unincorporated areas of San Bernardino County. The new interceptor drains into the City of Victorville's Stoddard Wells Pump Station, which in turn pumps across the Mojave River and enters the main interceptor system at VSD 1. VVWRA and the City of Victorville are currently negotiating a lease agreement for VVWRA to assume the operation and maintenance of the pump station.

EXISTING INTERCEPTORS - CAPACITY CONSIDERATIONS

The interceptor system was designed to provide a nominal twenty (20) years of firm capacity for the service area. Most of the interceptor system was constructed prior to the startup of the treatment facility, which occurred in February 1981. The Apple Valley, Adelanto, and Hesperia Interceptors were completed in the early 1980's, after the plant began operation. Most of the interceptor system has now been in service for nearly 20 years.

Interceptor capacity for gravity sewers is considered to be fully utilized when the flow of sewage occupies 75% of the cross-sectional area of the respective pipe. The flow of sewage typically varies significantly during any 24-hour period. Usually the highest flows occur during the morning hours, and the lowest flows occur during the middle of the night. In the Victor Valley, the highest flows typically occur on weekends, which reflects the employment base and the corresponding large number of commuters that travel during the week to jobs outside the area. Interceptors must be capable of conveying sewage during the highest flow periods, in order to prevent surcharging of the sewer. Surcharging can result in overflows at manholes, backups into businesses and residences, odors, plugging, and even structural failures of the pipe.

Engineering calculations can be used to evaluate sewer pipelines for estimated maximum capacity, using pipe size, slope, and pipeline roughness. Engineering calculations of pipeline capacity are limited in their accuracy due to the following factors:

1. The roughness coefficient must be estimated, based on the respective pipe material. For example, PVC sewer pipe is assumed to have a given roughness coefficient. Typically,

engineers are conservative when assigning roughness coefficients for capacity calculations. Actual field conditions often reveal that pipelines are smoother, or capable of passing flow more quickly, than the roughness coefficient would indicate. Sometimes corrosion and/or encrustation of the pipeline can result in conditions where the pipeline resists the smooth flow of liquid and cannot pass as much flow as expected. Grease and grit accumulations also impact the ability of a sewer pipeline to pass flow.

2. The slope of the pipe must be considered, which is usually based on information found in the engineering design drawings and/or record drawings. Over time, settlement and/or ground movement can sometimes change the slope of a sewer pipeline, affecting the pipe's ability to pass sewage. If recent elevation data is not available, engineering calculations based on slope may provide inaccurate information.

3. Sewer pipelines typically have a capacity for storage that is difficult to estimate. For example, peak flows may partially fill tributary (lateral) sewers before the level in the main interceptor rises, reducing the effect of the peak flow on the interceptor. Likewise, large interceptors on relatively flat slopes act as reservoirs and can absorb and store high flows, releasing the sewage to the treatment facility at a slower rate. In this way, large flat pipelines serve to equalize the flow over time.

4. With long interceptor systems such as that found at VVWRA, peak flows do not enter a given length of the main interceptor at the same time. For example, wastewater from a washing machine in Hesperia will arrive at the treatment plant many hours after wastewater discharged in SCLA, even if both activities occur at the same time during the day.

Hydraulic models can be used to estimate flows and capacity in the interceptor system at any given time. Models, however, are subject to the accuracy of the information entered into the computer model, and actual field data is normally used to confirm the model's assumptions. To fully evaluate the capacity of a given interceptor, both average and peak flows must be considered, which typically requires the collection of diurnal flow data. Due to the effects of equalization, it is quite possible that the actual capacity for an interceptor could be some quantity between the average daily flow and the peak hourly flow for a given location. A hydraulic model of the entire interceptor system is currently being prepared, and the results are expected to become available by summer 2005.

EXISTING INTERCEPTOR CAPACITY - MAIN STEM

The existing main interceptor is divided up and shown on Figure IV-1 as Reaches 1 through 11. The 1997 Sewerage Facilities Plan determined that Reaches 7, 8, and 9 would require improvements (paralleling) in the year 1999 due to full utilization of the remaining capacity, with a total estimated cost of $2,058,700 (in 1998 dollars). However, flows projections shown in the 2000 Amendment determined that Reach 8 may not require improvements until 2008, Reach 7 may not require improvements until 2009, Reach 9 may not require improvements until 2012, and Reach 10 may not require improvements until 2019. However, it is possible that portions of Reaches 7, 8, and 9 may

already be experiencing some surcharging based on peak hourly flows. Staff anticipates collecting field data to establish the actual remaining capacity in the main stem interceptor as a component of the current hydraulic modeling study. The results of the 2005 Interceptor Hydraulic Modeling Study will be used to revise projections of interceptor improvements for the Sewerage Facilities Plan via a further addendum.

Table 3-1 shows the estimated improvements necessary to the main stem interceptor system as described in the 2000 Amendment to the Sewerage Facilities Plan:

TABLE 3-1
MAIN STEM INTERCEPTOR IMPROVEMENTS

Reach ID	Reach Description	Year of Improvement (see note 1)	Construction Cost (see note 2)
7	Lower Narrows	2009	$750,000
8	VSD 5 to VSD 1	2008	$500,000
9	Upper Narrows	2012	$950,000

Note 1: construction costs shown are in 2000 dollars. This information will be replaced with new information when the 2005 Interceptor Hydraulic Modeling Study is complete.

EXISTING INTERCEPTOR CAPACITY - MEMBER ENTITIES

The existing Hesperia Interceptor is shown on Figure IV-1 as Reach 12. The 1997 Sewerage Facilities Plan determined that the Hesperia Interceptor would require improvements (paralleling) in the year 2005 due to full utilization of the remaining capacity, with a total estimated cost of $537,120 (in 1998 dollars). Field data collected in January 2004 determined that the Hesperia Interceptor is not yet experiencing any surcharging. Staff anticipates collecting field data to establish the actual remaining capacity in the Hesperia Interceptor as a component of the current hydraulic modeling study.

The existing Adelanto Interceptor is shown on Figure IV-1 as Reach 13. The 1997 Sewerage Facilities Plan determined that a second Adelanto Interceptor would be needed in 2005 to relieve the flow on the existing interceptor, and to better serve the southern portion of the City of Adelanto, at an estimated construction cost of $901,649 (in 1998 dollars). However, the Adelanto Interceptor is currently not in use, because the City of Adelanto separated from VVWRA in 1998 and began operating their own wastewater treatment facility. Therefore, no improvements are currently anticipated at this time for the Adelanto Interceptor.

The existing CSA 42 (Oro Grande) Interceptor and Pump Station is shown on Figure IV-1 as Reach 14. The 1997 Sewerage Facilities Plan determined that the CSA 42 Interceptor and Pumping

Station would not require expansion or improvements during the 20-year planning period. No improvements are currently anticipated at this time for the CSA 42 Interceptor and Pump Station.

The existing SCLA 1 Interceptor is shown on Figure IV-1 as Reach 15. The 1997 Sewerage Facilities Plan determined that the SCLA 1 Interceptor would not require improvements during the 20-year planning period. However, the capacity of the SCLA 1 Interceptor must be monitored closely as the redevelopment of SCLA proceeds. The SCLA 1 Interceptor currently serves a portion of the Federal Prison Complex. The SCLA 1 Interceptor has a rated peak capacity of 1.7 MGD.

The existing SCLA 2 Interceptor is shown on Figure IV-1 as Reach 16. The 1997 Sewerage Facilities Plan determined that the SCLA 1 Interceptor would not require improvements during the 20-year planning period. However, the capacity of the SCLA 2 Interceptor must be monitored closely as the redevelopment of SCLA proceeds. The SCLA 2 Interceptor currently carries very little sewage flow. Like the SCLA 1 Interceptor, the SCLA 2 Interceptor has a rated peak capacity of 1.7 MGD.

The existing Apple Valley Interceptor is shown on Figure IV-1 as Reach 21. The 1997 Sewerage Facilities Plan determined that the Apple Valley Interceptor would require improvements (paralleling) in the year 2002 due to full utilization of the remaining capacity, with a total estimated cost of $357,270 (in 1998 dollars). Field data collected in January 2004 found that although the Apple Valley Interceptor is not yet experiencing surcharging, several stretches of the interceptor were exceeding 80% of the rated capacity at peak flows. Staff anticipates collecting additional field data to determine the actual remaining capacity in the Apple Valley Interceptor as a component of the current hydraulic modeling study.

The 1997 Sewerage Facilities Plan also anticipated the construction of a second Apple Valley Interceptor in the year 2010 to serve the northern portion of the Town, with a total estimated cost of $1,320,240 (in 1998 dollars). As previously mentioned, the North Apple Valley Interceptor was completed in 2004, in order to serve the County's new Juvenile Detention Center on Dale Evans Parkway in Apple Valley.

The existing CSA 64 (Spring Valley Lake) Interceptor is shown on Figure IV-1 as Reach 23. The 1997 Sewerage Facilities Plan determined that the CSA 64 Interceptor would not require improvements (paralleling) during the 20-year planning period. However, the capacity of the CSA 64 Interceptor must be monitored closely as the development of the Victor Valley College and the build out of Spring Valley Lake proceeds. The CSA 64 Interceptor has a current rated capacity of 5.0 MGD.