City of Victorville

Final Water Supply Assessment

for the

SCLA Specific Plan

Prepared for:

Stirling Development

Prepared Under the Responsible Charge of:

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California R.C.E. No. 70746, Expires 6/30/2021

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WSC
WATER SYSTEMS CONSULTING, INC.

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1 INTRODUCTION AND PURPOSE

This Water Supply Assessment (WSA) was prepared on behalf of Stirling Development for the Victorville Water District (VWD), a subsidiary of the City of Victorville (City), by Water Systems Consulting, Inc. (WSC) to satisfy the requirements of California Water Code (CWC) Section 10910 (Senate Bill 610) for the Southern California Logistics Airport (SCLA) Specific Plan (Project). The Project lies within the City limits and the City is the Lead Agency for the Project's Environmental Impact Report (EIR) which is required by the California Environmental Quality Act (CEQA).

As required by Senate Bill 610 (SB 610), VWD is responsible for assessing whether the total projected water supplies available during average, single dry, and multiple dry water years during a 20-year projection will meet the projected water demand for the Project, in addition to the VWD's existing and planned future uses. A water supplier's Urban Water Management Plan (UMWP) serves as a foundational document for a WSA. The water demands for the SCLA area were different than the proposed Project in the VWD's *2015 Urban Water Management* (2015 UWMP) (1), as submitted to the California Department of Water Resources (DWR) in June 2016. Under this WSA, more accurate demands for this Project were developed and are summarized in Section 4. Additional information from other sources is also incorporated into this WSA to document supplies from all sources, including groundwater and purchased water. Documentation includes identifying and quantifying water rights, contracts, and/or entitlements to the supply. VWD must provide the results of the assessment to the City, as the Lead Agency, for inclusion in the CEQA document for the project. This WSA includes the following:

- Description of the Project and proposed water demand (Section 3 & 4)
- Overview of VWD's water system (Section 2)
- Information on VWD's current and projected water demands in the water service area (Section 4.2)
- Information on VWD's current and projected water supplies (Section 6)
- Discussion of VWD's water service area water supply reliability (Section 7)
- Comparison of VWD's water service area water supplies and water demands for average, single dry, and multiple dry years (Section 8)
- Determination of VWD's water service area water supply sufficiency (Section 9)

1.1 LEGISLATION

VWD has determined that the Project is subject to review under CEQA (*Public Resources Code, Section 21000 et seq.*), and the state CEQA Guidelines (*California Code of Regulations, Section 15000 et. seq.*) VWD has determined that the Project is a "project" as defined in CWC 10912 and has determined that an EIR is required for the Project.

SB 610 amended the Public Resources Code, effective January 1, 2002, to incorporate CWC requirements for certain types of development projects to improve the link between information on water supply availability and certain land use decisions made by cities and counties. SB 610 seeks to promote more collaborative planning between local water suppliers, cities and counties by requiring detailed information regarding water availability to be provided to the city and county decision-makers prior to approval of specified large development projects.

Under SB 610, water suppliers must prepare WSAs for projects meeting certain project size criteria and deliver them to local governments for inclusion in any environmental documentation. The Project requires a WSA because it is a mixed use project that proposes construction of land uses that exceed the criteria for building square footage.

1.2 DEFINITIONS

For the purposes of this WSA, the following defined terms are used:

- **Groundwater production:** The amount of water produced from the Mojave River Basin groundwater supply sources and put into VWD's distribution system based on metered flows at each well. VWD provided annual groundwater production data for 2016-2019 in addition to 2015 UWMP data.
- **Purchased Water:** The amount of water purchased from VWD's wholesale supply sources and put into the distribution system based on metered flows at each supply connection.
- **Consumption:** The amount of billed metered water consumed by customers. VWD provided annual consumption data for 2013-2019.
- **Demand:** The amount of water distributed through the entire water system, which is the sum of groundwater production, purchased water, and recycled water. Demand includes non-revenue water, which is equal to the difference between water put into the distribution system and consumption.
- **Non-revenue water**: Unmetered water use and losses from the distribution system due to leaks, unauthorized connections, agency use (e.g., system flushing), or theft.
- **Water demand factor:** The calculated amount of water demand per unit (e.g., acre, sqft, dwelling unit, etc.) of a specific type of use (e.g., land use, development type, business type, etc.).

2 PUBLIC WATER SYSTEM OVERVIEW

VWD is a subsidiary of the City and is located in the southwest region of San Bernardino County, California, and serves the City of Victorville and the surrounding areas that fall within the City's sphere of influence. In July of 2007, VWD acquired both Victor Valley Water District (VVWD) and Baldy Mesa Water District (BMWD) and formed Improvement District 1 (ID1) and Improvement District 2 (ID2), respectively. The SCLA area falls within ID1. In 2019, VWD provided water to approximately 35,966 connections and served a population of approximately 123,758 people. In 2019, this population made up approximately 6% of the San Bernardino County population. Figure 2-1 shows VWD's service area.

The Project is located entirely within the VWD's ID1 boundary, which is shown in Figure 2-1. VWD's water service area encompasses approximately 85 square miles and is located approximately 90 miles northeast of Los Angeles. VWD is bounded by the City of Adelanto to the west and the City of Hesperia to the south. The City of Apple Valley, Spring Valley Lake, and the Mojave Narrows Regional Park lie to the east.

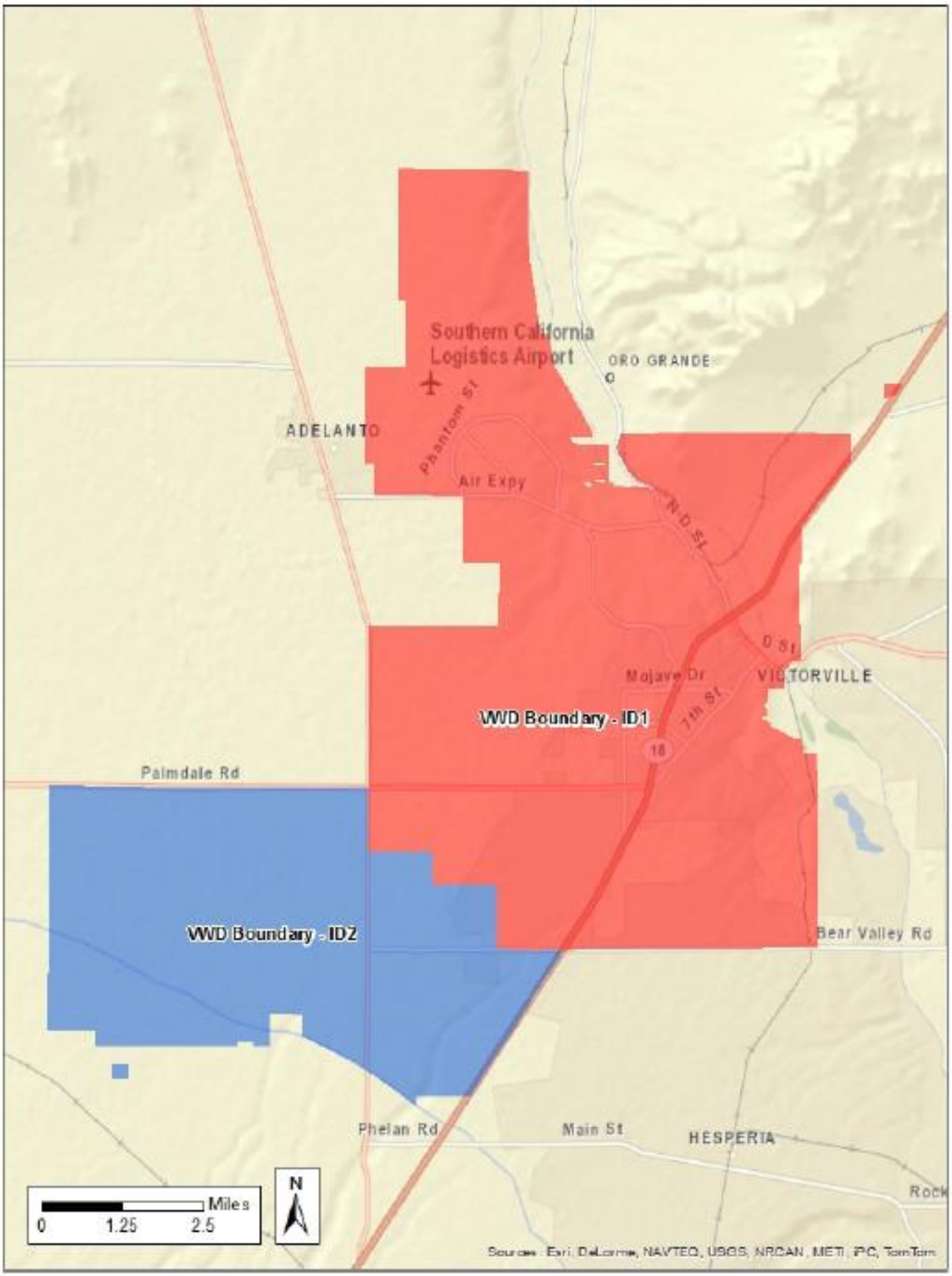

Figure 2-1. VWD Water Service Areas (1)

2.1 CLIMATE

VWD's climate is characterized by warm summers and cool winters. Table 2-1 presents average climate data for the service area, including temperature, rainfall and reference evapotranspiration (ETo). As shown in Table 2-1, the warmest month of the year is July with an average temperature of 80 degrees Fahrenheit (°F), while the coldest months of the year are December and January with an average temperature of 44°F.

The annual average precipitation at VWD is about 6 inches. As shown in Table 2-1, the majority of the rainfall occurs in the months November through March. January and February are the wettest months with an average rainfall of approximately 1 inch.

Table 2-1. Historical Temperature, Rainfall and Reference Evapotranspiration (ETo) Data

	Average Temperature (°F)	Average Precipitation (in.)[1]	Average Standard ETo (in.)[2]
January	44.4	0.95	2.02
February	47.8	1.05	3.51
March	52.0	0.80	5.16
April	58.0	0.36	6.55
May	65.2	0.13	7.65
June	73.2	0.04	8.75
July	80.0	0.14	8.68
August	78.8	0.21	9.27
September	72.9	0.23	6.73
October	62.4	0.32	4.26
November	51.0	0.50	2.90
December	44.4	0.79	2.16

Notes:
[1]NOAA weather station 049325 in Victorville; data from 1917 through 2016;**http://wrcc.dri.edu**;
[2]CIMIS weather station 117 in Victorville; http://wwwcimis.water.ca.gov/

2.2 SERVICE AREA POPULATION

The historical, current, and projected populations for the VWD's water service area are shown in Table 2-2. The population projections were prepared by Beacon Economics under contract with MWA for the 2015 UWMP. Historical data used in the forecast of the incorporated cities were obtained from the California Department of Finance, which makes estimates available from 1970 forward on an annual basis. Based on this data, Beacon Economics created an econometric time series model to capture the historical correlations with countywide population growth. Future population growth was then estimated using these historic correlations and a forecast of countywide population growth.

Table 2-2. Historical, Current and Projected Population (1)

	2000	2005	2010	2015	2020	2025	2030	2035	2040
VWD Water Service Area Population	69,095	91,832	122,051	128,005	139,151	155,657	172,143	188,896	204,986

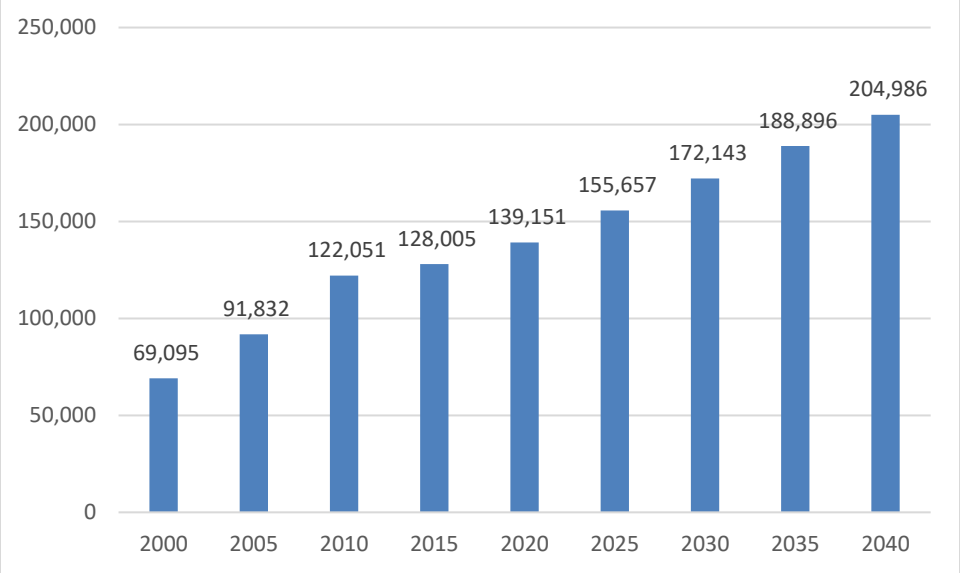

Figure 2-2. Historical, Current and Projected Population Trends (1)

2.2.1 Other Demographic Factors

The SCLA Specific Plan (SP) area is located within the SCLA Planning Area that includes all land within the former George Air Force Base and areas north of Air Expressway to the City's northern and western boundaries and east towards the Mojave River (2), as defined in the City's General Plan 2030, shown in Figure 2-3. Growth within the SCLA SP area is expected to include manufacturing, warehouse, industrial, airport support facilities, fast food without drive thrus, high turnover/sit down restaurants, service stations with convenience markets, shopping centers, and general office spaces.

To make sure the demographic factors impacting the SCLA SP area are accurately captured, the growth rates utilized for projections calculated for this WSA are based on the most current and detailed data available from the 2015 UWMP.

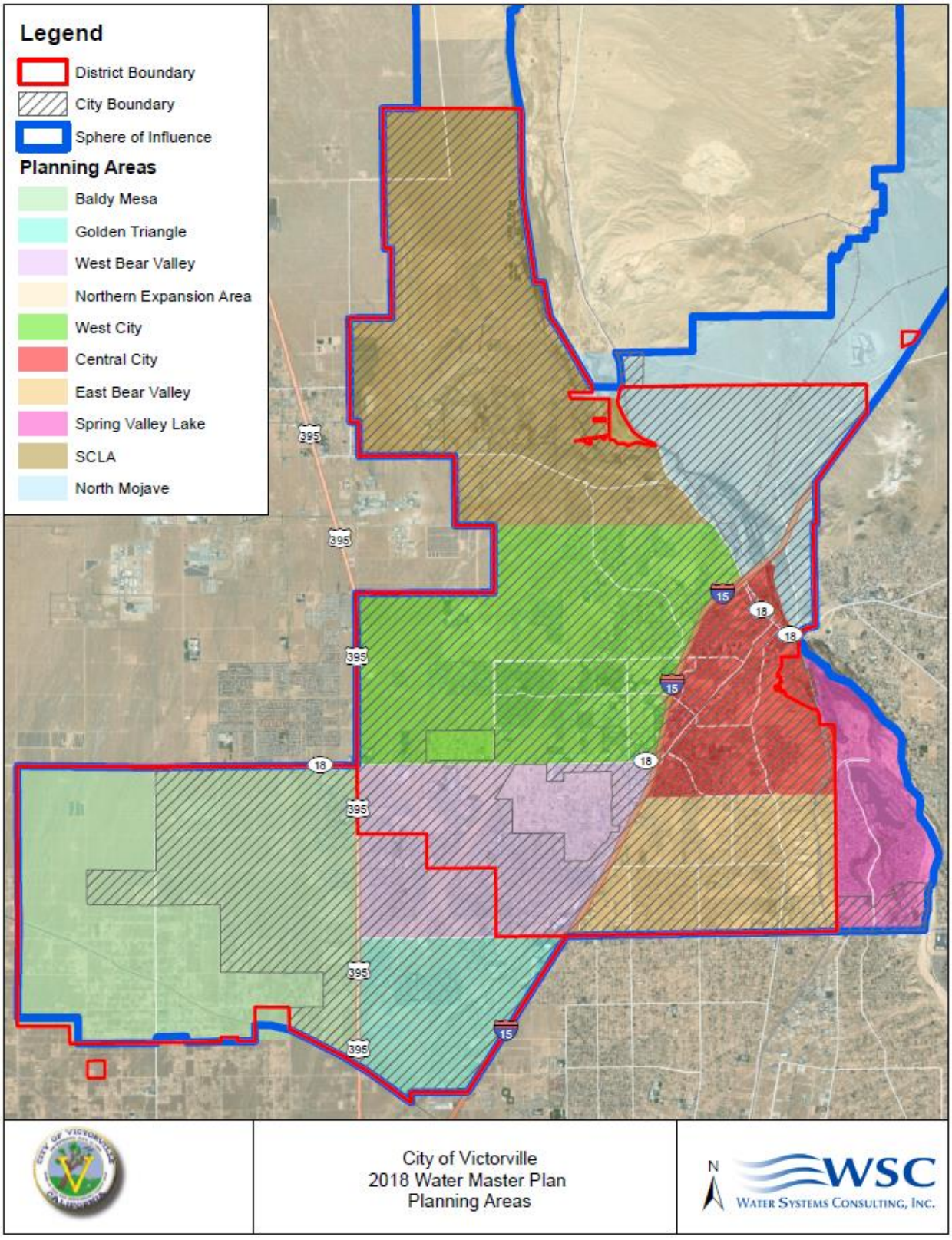

Figure 2-3. Planning Areas identified in the 2019 Water Master Plan

3 PROJECT DESCRIPTION

The Project area consists of 8,611 acres in the northern portion of the City of Victorville in San Bernardino County, California, south of Desert Flower Road, north of Rancho Road and Air Expressway, and west of Adelanto Road. The Project site lies within the VWD's ID1 water service area, a public water system as defined in CWC Section 10912. Figure 3-1 depicts the Project location relative to VWD's service area boundaries.

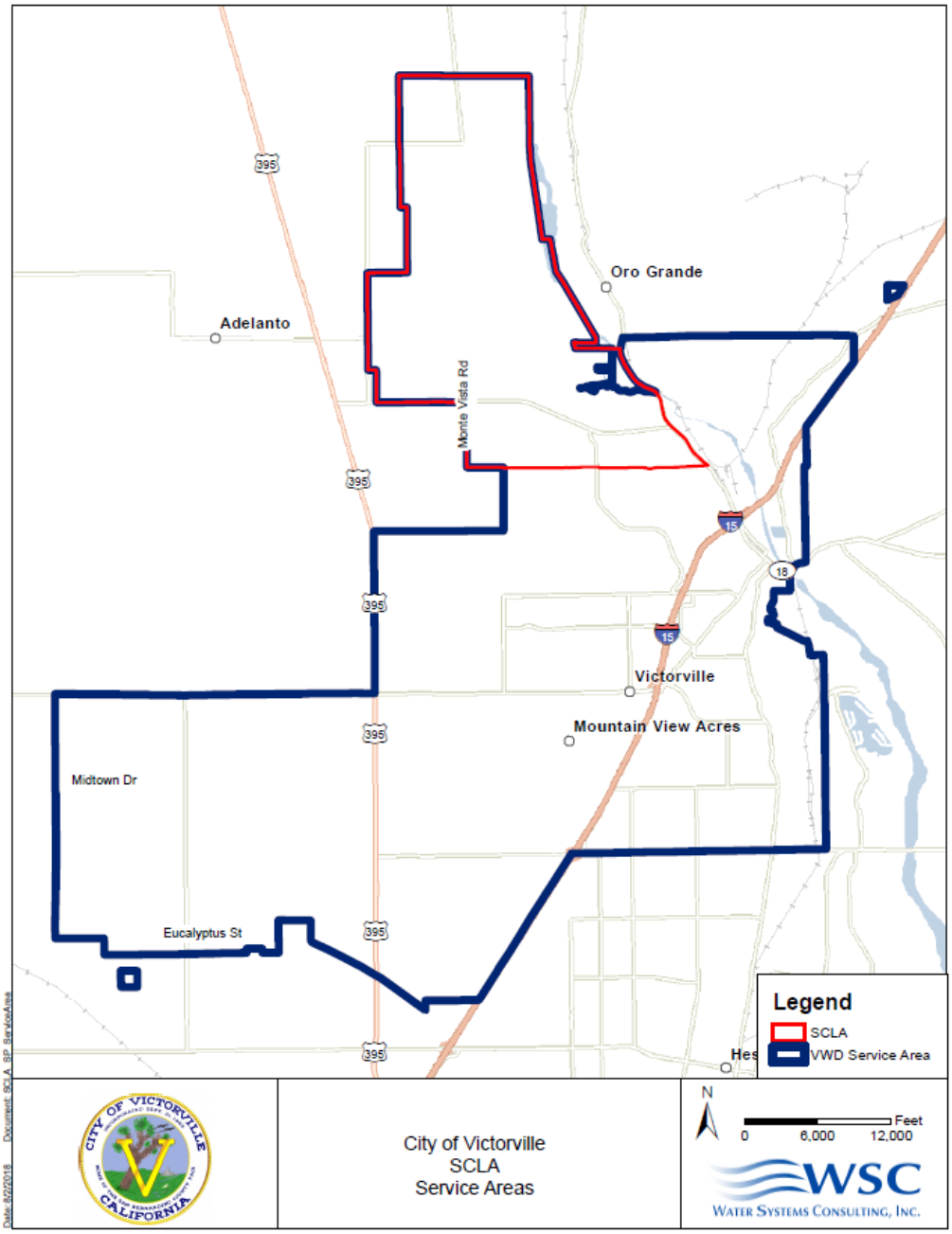

Figure 3-1. Project Vicinity

Existing land uses on the Project site consist of 216 acres of airport support facilities, business park, and industrial land. Majority of the land within the SCLA SP area is vacant, approximately 8,400 acres. At the time this report was prepared, VWD had a conceptual development scenario from Stirling Development. Future land uses are anticipated to include manufacturing, warehouse, industrial, airport support facilities, fast food without drive thrus, high turnover/sit down restaurants, service stations with convenience markets, shopping centers, and general office spaces.

4 PROJECT WATER DEMAND

VWD's 2015 UWMP was based on existing and future water demands that included different assumptions than the Project's proposed demands. Per CWC Section 10910(c)(1), the Project's revised demands need to be accounted for in this WSA. Sections 4 and 5 present the methodology used to reconcile the 2015 UWMP demand projections with the new Project demands.

4.1 PROJECT WATER DEMAND PROJECTIONS

Water demand factors were applied to projected development units (acres and square-feet (sqft)) for each use type to estimate Project demands. Water demand factors were selected from the 2019 Master Plan (3) and determined using historical consumption data for current customers within the SCLA SP area and other existing customers within VWD that have similar land uses. The calculated water demand factors were compared to the 2019 Master Plan, industry research references, planning documents of other water agencies, and other WSAs with comparable land uses. The estimated water demand factors applied to the Project's future land use categories are provided in Table 4-1.

Although there is potential for the Project's land uses to vary according to densities for each respective land use and zoning category, the land use and development units used to estimate Project water demands were based on the development units provided by Stirling Development, as shown in Table 4-2. As summarized in Table 4-2, the total estimated water demand for the Project is 517 AFY. If the actual land uses and development change from these assumptions, the associated water demand may change and would need to be reevaluated.

The Project water demand does not account for existing customers within the SCLA SP area and obsolete SCLA SP demand growth assumptions from the 2015 UWMP. Therefore, Section 4.2 describes the Net Project Demand used for supply and demand projections in this WSA.

Table 4-1. Water Demand Factors for each Land Use Type

Land Use	Water Demand Factor, gpd/ac	Water Demand Factor, gpd/sqft
Manufacturing[1]	1,000	0.023
Light Warehouse[1]	1,000	0.023
Light Industrial[1]	1,000	0.023
Airport Support Facility[1]	1,000	0.023
Fast Food without Drive Thru[2]	3,000	0.069
High Turnover/Sit Down Rest[2]	2,000	0.046
Service Station with Convenience Market[2]	1,000	0.023
Shopping Center[2]	1,000	0.023
General Office[2]	1,000	0.023

[1]Demand Factor based on 2019 **Water Master Plan (3).**
[2]Demand Factor based on Project calculations using existing SCLA SP customers and other VWD customers with similar land uses, industry research references, planning documents of other water agencies, and other WSAs of comparable land uses.

Table 4-2. Estimated Project Water Demands

Phase	Time Frame	Non-Residential Acreage (ac)	Land Use(s)	Non-Residential (sqft)	Demand Factor [1]	Demand Factor Unit	Project Demand (AFY)	Project Demand by Phase (AFY)
Phase 1	0 – 5 Years	125	Manufacturing, Warehouse, Industrial, Airport Support Facility, Serv. Station w/ Conven.Mkt	2,445,600	0.023	gpd/sqft	63	64
			Fast Food w/o Drive Thru	2,700	0.069	gpd/sqft	0.21	
			High Turnover/Sit Down Restaurant	6,000	0.046	gpd/sqft	0.31	
Phase 2	5+ Years	226	Manufacturing, Warehouse, Industrial, Airport Support Facility, Shopping Center	4,286,346	0.023	gpd/sqft	110	111
			Fast Food w/o Drive Thru	3,800	0.069	gpd/sqft	0.29	
			High Turnover/Sit Down Restaurant	12,000	0.046	gpd/sqft	0.62	
Phase 3	10+ Years	252	Manufacturing, Warehouse, Industrial, Airport Support Facility	4,800,000	0.023	gpd/sqft	124	124
Phase 4	15+ Years	235	Manufacturing, Warehouse, Industrial, Airport Support Facility, General Office	4,177,000	0.023	gpd/sqft	108	108
Phase 5	20+ Years	423	Manufacturing, Warehouse, Industrial, Serv.Station w/ Conven.Mkt, Shopping Center, General Office	4,320,000	0.023	gpd/sqft	111	111
Total		***1,261***		***20,053,446***				***517***

[1]Demand Factors sources described **in Table 4-1.**

4.2 NET PROJECT DEMAND

The 2015 UWMP water demand projections were based on the population forecast (1), which was assumed to account for demands within the SCLA area. Therefore, new calculated demands for the Project need to be reconciled with the obsolete SCLA demands that were included in the 2015 UWMP demand projections. For the purposes of supply planning in this WSA, the net change in water demand caused by the Project is referred to as the Net Project Demand. Net Project Demand represents the Project demands that are in excess of the demands included in the 2015 UWMP. Net Project Demand is the Project demand minus the 2015 UWMP SCLA customers demand.

2015 UWMP SCLA customer demands were determined by summing the consumption for customers in 2015 and adding an additional 7.4% to account for non-revenue water. Details about the non-revenue water percentage are discussed in Section 5.2.5 and 5.2.6 of the 2015 UWMP (1). Then, demand growth rates from the 2015 UWMP demand projections from 2015 through 2040 were applied to the 2015 UWMP SCLA customer demands. A comparison of the demands is shown in Table 4-3. The revised demands calculated in this WSA will be included in the 2020 UWMP.

Table 4-3. Net Project Demand, AFY

	2015	2020	2025	2030	2035	2040
2015 UWMP Demand	20,843	24,226	26,769	29,559	32,267	34,929
SCLA Water Demand	*23*	*27*	*29*	*32*	*35*	*37*
2015 UWMP Demand without SCLA	20,820	24,199	26,740	29,527	32,232	34,892
Project Water Demand	23	87	198	322	430	541
Net Water Demand	-	60	169	290	395	504
Non-revenue Water (7.4%)	-	4	12	20	28	35
Total VWD Demand	**20,843**	**24,290**	**26,950**	**29,869**	**32,689**	**35,468**

5 VWD WATER SERVICE AREA WATER DEMAND

Figure 5-1 summarizes baseline, historical and projected demands for VWD, including the Net Project Demand. The Net Project Demand was added to the 2015 UWMP demands to determine the total service area demand, which is used in subsequent sections of this WSA. As described in detail in Appendix D and Appendix E of the 2015 UWMP, demands were calculated based on gallons per capita per day (GPCD) targets per the requirements of Senate Bill x 7-7 (SB7). The GPCD metric provides a way to gauge water use per person historically in order to project expected future demand patterns based on population projections. The Net Project Demand slightly increases the District-wide GPCD by about 2 GPCD. VWD expects to meet or be below its required District-wide SB7 GPCD targets with or without the Net Project Demand.

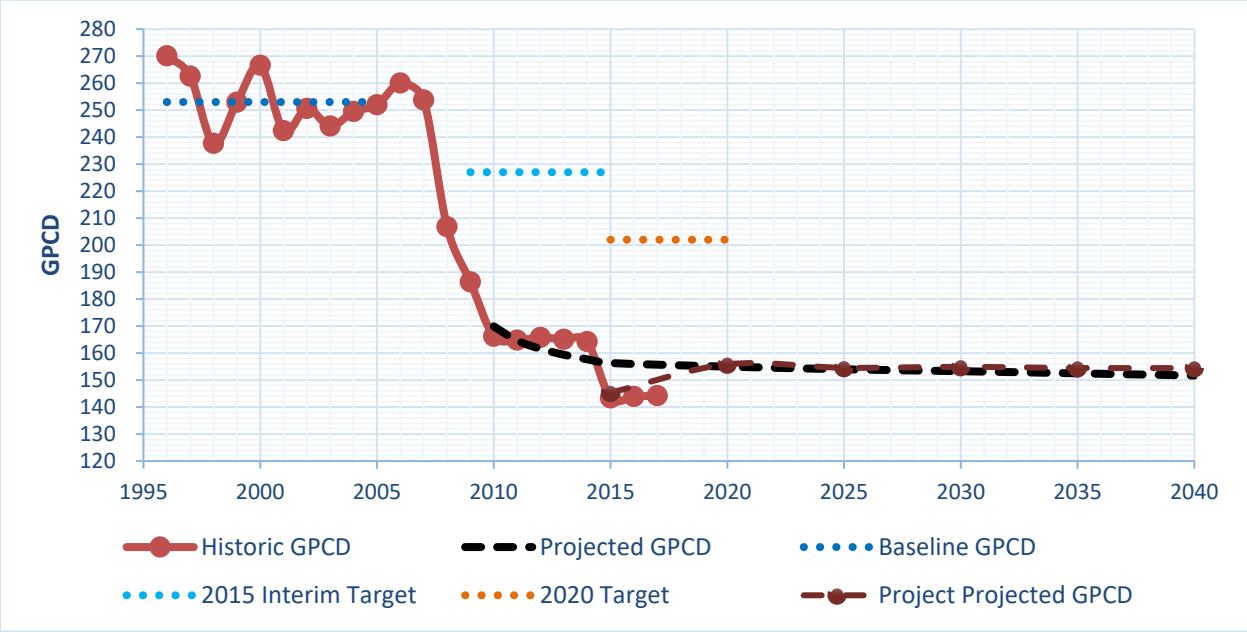

Figure 5-1. Baseline, Historic, and Projected GPCD

6 WATER SUPPLY ANALYSIS

6.1 WATER SOURCES

The current and future water supplies for the VWD consists of groundwater from the Mojave Groundwater Basin and purchases from MWA's Regional Recharge and Recovery Project (R^3), when available. Groundwater is the primary source of supply. The following sections describe each water source in more detail and Table 6-1 summarizes water supply purchases and production from 2016 through 2019.

6.1.1 Purchased or Imported Water

VWD purchases water from the R^3 project when it is available but does not rely on purchased or imported water as a future potable water supply. Through R^3, MWA delivers SWP water to recharge sites located along the Mojave River in Hesperia and southern Apple Valley. MWA recovers the recharged water at wells downstream and delivers through pipelines directly to retail water agencies. This project provides an alternate source of supply that allows agencies to reduce pumping and maintain groundwater levels in the vicinity of their wells. VWD began receiving water from R^3 when Phase 1 of the project was completed in 2013 and has a contract to purchase up to 6,800 AFY, when available.

Water supply from R^3 is interruptible because it depends on the amount of SWP available for storage as well as other operational constraints. VWD intends to continue maximizing purchases of water from R^3 when available; however, since this is an interruptible source of supply, VWD does not rely on this source to meet its demands. For the purposes of this Project, it is assumed that VWD will meet all demands through groundwater sources.

6.1.2 Groundwater

VWD has 36 active groundwater wells within its distribution system that are used to pump groundwater from the Mojave River Groundwater Basin that lies beneath Victor Valley.

6.1.2.1 Mojave River Basin

The Mojave River Groundwater Basin, the largest in the Region, encompasses 1,400 square miles, and has an estimated total water storage capacity of nearly 5 million acre-feet (af). The Mojave River Groundwater Basin Area is essentially a closed basin which means that very little groundwater enters or exits the basin. However, within the basin, groundwater moves between the different subareas; groundwater-surface water and groundwater-atmosphere interchanges also occur. Approximately 80 percent of the basin's natural recharge is through infiltration from the Mojave River. Other sources of recharge include infiltration of storm runoff from the mountains and recharge from human activities such as irrigation return flows, wastewater discharge, and enhanced recharge with imported water. Over 90 percent of the basin groundwater recharge originates in the San Gabriel and San Bernardino Mountains. Groundwater is discharged from the basin primarily by well pumping, evaporation through soil, transpiration by plants, seepage into dry lakes where accumulated water evaporates, and seepage into the Mojave River. The Mojave Basin Area is shown in Figure 6-1.

Recent investigations by MWA, the US Geological Survey (USGS), and others have resulted in an improved understanding of the geology and hydrogeology of the Mojave Basin Area. Specifically, a more refined examination of the hydrostratigraphy has allowed for differentiation between the more permeable Floodplain Aquifer that has a limited extent along the Mojave River and the more extensive but less permeable Regional Aquifer. In the Mojave Basin Area, Alto, Centro, and Baja subareas contain both the Floodplain Aquifer and the Regional Aquifer while Oeste and Este subareas only contain the Regional Aquifer.

The MWA IRWM Plan established the framework for managing future water supplies within MWA's service area which encompasses 4,900 square miles. Water rights within the Mojave River Basin have been the subject of litigation since the early 1990's. Riverside County Superior Court's stipulated Mojave Basin Area Judgment (Judgment) for the adjudication of the Mojave River groundwater basin identified MWA as the Watermaster. The Judgment stipulated that MWA has both the authority and obligation to secure supplemental supplies as part of the solution to overdraft within the Mojave River Basin. While the increased groundwater pumping in excess of natural supplies over the last 50 years has resulted in a decline in groundwater elevations, the groundwater basins remain capable of meeting annual water demands through dry years and consecutive multiple dry years. The Judgment and IRWMP are intended to bring all basins into long term hydrologic balance. Projects and water management actions are needed to continue to recharge the groundwater basins to maintain groundwater levels and protect quality. A copy of the Mojave Basin Area Judgement is included in as Appendix N of the 2015 UWMP (1).

To maintain proper water balance within each subarea, any producer, such as VWD, who produces in any year an amount of water in excess of that producer's share (Free Production Allowance or FPA) for a subarea must buy replacement water (Replacement Water Assessment or RWA). Replacement obligations can be met by buying additional water rights, buying imported water from MWA, or leasing groundwater rights for one year from other water rights holders. The RWA is equal to the number of AF of excess production by the producer multiplied by the RWA rate per AF as adopted annually by the 2015 Mojave Basin Area Watermaster. Based on the 2015 municipal percentage for the VWD Subarea, the FPA for VWD's is 13,812 AFY within ID1 and 1,760 AFY within 1D2. Therefore, VWD's FPA is 15,572 AFY, subject to further ramp down. The 15,572 AFY FPA is used as the available supply for VWD without RWA. Use over this quantity is subject to replacement obligations adopted by the Watermaster and paid to the Watermaster. When available, VWD can also lease water from agencies that pump less than their FPA and this can offset the amount of water in their RWA. In the 2014-2015 water year, VWD leased 1,470 AF of FPA from other parties and will continue to lease groundwater rights from other parties, when available and cost effective. In 2015, VWD pumped approximately 1,800 AFY beyond its FPA.

Producers in the Mojave Basin Area are allowed to produce as much water as they need annually to meet their requirements, according to the Mojave Basin Area Judgment. An underlying assumption of the Judgment is that sufficient water will be made available to meet the needs of the Basin in the future from a combination of natural supply, imported water, water conservation, water reuse and transfers of FPA among parties. MWA is actively operating recharge sites for conjunctive use along the Mojave River Pipeline, Oro Grande Wash Pipeline, Morongo Basin Pipeline, and Silverwood Dam. Recharge sites provide MWA with the ability to recharge SWP water into the Subareas where replacement water is purchased. These sites also provide MWA with the ability to bank excess SWP water when available in wet year for storage to be used in dry years. R^3 facilities allow MWA to manage the groundwater basins surrounding VWD by delivering imported SWP water stored in upper Mojave River recharge areas to purveyors that can reduce pumping rom their wells when taking R^3 water which allows partial recovery of local pumping depressions.

VWD will continue aggressive water conservation efforts and increased use of recycled water to offset potable water demand in an effort to balance supplied and demands into the future. Pumping beyond the FPA is anticipated to continue as needed to meet water demands, and will require VWD to continue to pay replenishment fees to support additional water supply projects being implemented by MWA or purchase of water rights from other agencies in the subbasin.

Table 6-1 Total Water Supply Purchases and Production

Year	Groundwater	R^3	Total
2016	17,901.75	3,003.14	20,904.89
2017	18,705.81	3,662.45	22,368.26
2018	19,979.95	4,402.62	24,382.57
2019	17,362.25	4,392.36	21,754.61

Figure 6-1. Mojave Basin Area within MWA's Service Area (4)

6.1.3 Surface Water

VWD does not utilize surface water supplies.

6.2 TRANSFER OPPORTUNITIES

Regional water transfer and exchange opportunities are described in MWA's 2015 UWMP (4).

VWD frequently executes temporary transfers of FPA or carryover water from other parties in the Alto subarea to offset a portion of excess groundwater production.

6.3 FUTURE WATER PROJECTS

In order to further increase water supply available from the Mojave Groundwater Basin, VWD is also participating in MWA projects to implement groundwater recharge through surface spreading.

VWD currently receives water from phase one of the R^3 project through MWA when it is made available. Quantity and reliability of supply from R^3 is expected to increase upon completion of phase two. VWD does not rely on anticipated supply from the R^3 project to meet future demands because it is not a guaranteed supply. When supply is made available, VWD will use this water to offset groundwater pumping, but plans on meeting all future demands with groundwater.

VWD is also cooperating with MWA on the development of the Oro Grande Wash Recharge Project. The Oro Grande Wash project is a regional supply project that will deliver State Water Project water to recharge basins in the Oro Grande Wash, west of the I-15 and south of Bear Valley Road in Victorville. When complete, the project will recharge up to 8,000 acre-feet per year to support groundwater in the western part of the Alto Subarea of the Mojave Groundwater Basin. Recharge in this portion of the basin benefits the VWD wells the most due to their close proximity to the recharge areas. While the Oro Grande Wash project will enhance the sustainability of the Alto Subarea, it will not be a direct addition to the VWD supply, therefore, it is not identified as a source for future supply for VWD. Table 6-2 shows future water supply projects within the VWD service area and the expected increase in supply to the Mojave Basin area.

Table 6-2. Future Water Supply Projects (1)

Name of Project	Capacity, AFY	Agencies Served	Date Supply Available
Regional Recharge and Recovery Project (R^3)	Phase 1 – 15,000 Phase 2 – 40,000 total	AVRWC, Adelanto, Hesperia Water District, CSA 64, Golden State Water Company, VWD	Phase 1 – Completed Phase 2 - 2019
Oro Grande Wash Recharge	Phase 1 – 4,000 Phase 2 – 8,000 total	VWD	Phase 1 – 2016 Phase 2 - TBD

6.4 RECYCLED WATER

The wastewater that is generated within the service boundary of VWD is collected via a gravity sewer system owned and operated by the City of Victorville. A portion of the collection system conveys wastewater to the Victorville Wastewater Treatment Facility (VWTF) that is owned and operated by VWD. A portion of the collection systems discharges to a regional interceptor, which conveys the wastewater flows to a regional wastewater treatment plant (WWTP) that is owned and operated by the Victor Valley Wastewater Reclamation Authority (VVWRA).

In 2010, VWD began operation of the VWTF, a domestic and industrial wastewater treatment plant at the SCLA with a capacity of 2.5 million gallons per day (MGD). The VWTF is designed to treat wastewater using anaerobic (for high strength industrial wastewater) and aerobic (for sanitary wastewater) treatment processes. The combined flows undergo complete-mix activated-sludge (CMAS) and clarification in a membrane bioreactor (MBR) in the next treatment steps. The final process is ultraviolet (UV) disinfection, resulting in tertiary treated recycled water (RW) that meets Title 22 requirements. Sludge from the facility is discharged to the VVWRA's WWTP for treatment and disposal. The 2015 annual average flow treated at the VWTF was 1.49 MGD, or 1,671 AF; all of this water is available as a RW supply to VWD. Recycled water from the VWTF is currently distributed to the High Desert Power Plant (HDPP) for cooling and applied at the Westwinds Golf Course as irrigation, although this is not required as the golf course is closed. The portion of treated effluent that is not reused at SCLA is conveyed to the VVWRA WWTP site for disposal at Percolation Pond 14, which is owned and operated by VWD.

VVWRA is a Joint Powers Authority consisting of the Town of Apple Valley, City of Hesperia, City of Victorville, City of Adelanto, and County Service Areas of Oro Grande (Number 42) and Spring Valley Lake (Number 64). The regional plant has a current capacity of 14 MGD, and is located approximately 7 miles north of the City of Victorville, between SCLA and the Mojave River. VVWRA's regional WWTP discharges disinfected tertiary effluent to the Mojave River and supplies recycled water to VWD. In 2003, VVWRA executed a Memorandum of Understanding (MOU) with the California Department of Fish and Game (now California Department of Fish and Wildlife or "CDFW") which requires VVWRA to discharge 9,000 AFY of available recycled water to the Mojave River. The MOU includes a provision to allow reduced discharges as long as a minimum flow of 15,000 AFY is measured at the Lower Narrows gage. In 2005, VVWRA and the City of Victorville executed a Second Amended and Restated Agreement for Reclaimed Water Service with a perpetual term that entitles the City to take delivery of all of the treated effluent from VVWRA's WWTP in excess of the amount required to be discharged under the MOU. Treated effluent which is not discharged to the Mojave River or purchased by the City is disposed of via onsite percolation ponds. In 2015, the average treated flow at the VVWRA WWTP was 10.72 MGD or approximately 12,000 AF, and 6,480 AF was discharged to the Mojave River.

The annual volume of recycled water supply available to VWD from VVWRA is equal to the total treated effluent less the volume required to be discharged to the Mojave River under the MOU with CDFW. VVWRA also operates two sub-regional treatment plants in Hesperia and Apple Valley that have capacities of 1.0 MGD each. The sub-regionals are scalping plants and reduce the flows received at the Shay Road WWTP. VWD, VVWRA, HDPP, and CDFW are in ongoing discussions regarding changes in available recycled water supply from the Shay Road WWTP and increased recycled water use by HDPP. Future projections of the available recycled water supply from the Shay Road WWTP are not currently available. For the purposes of the 2015 UWMP, it was assumed that VWD's recycled water demands will be met by recycled water supplies from the VWTF and the Shay Road WWTP. HDPP will retain their own imported water supply and storage account in the groundwater basin as supplemental cooling water supplies.

Some areas within VWD's service area are not connected to the sewer system, especially within ID2. The customers in these areas are currently connected to septic tanks for wastewater disposal but are likely to be connected to the collection system in the future as facilities are extended into these areas.

Table 6-3. Wastewater Collected within Service Area in 2015

Name of Wastewater Collection Agency	Wastewater Volume Metered or Estimated	Volume of Wastewater Collected in 2015, AF	Name of Wastewater Treatment Agency Receiving Collected Wastewater	Treatment Plant Name	Is WWTP Located within the UWMP Area?	Is WWTP Operation Contracted to a Third Party?
The City of Victorville	Metered	1,671	Victorville Water District	Victorville Wastewater Treatment Facility	Yes	Yes
The City of Victorville	Metered	7,328	Victor Valley Wastewater Reclamation Authority	Victor Valley Wastewater Reclamation Authority WWTP	No	No
	Total Wastewater Collected from Service Area in 2015	8,999				

6.5 WATER SUPPLY SUMMARY

VWD's historical current, and projected water supplies are summarized in Table 6-4. These quantities are based on projected demands established in the 2015 UWMP.

Table 6-4. Water Supplies - Historical, Current, and Projected, AFY

Water Supply	Additional Detail on Water Supply	2010	2015	2020	2025	2030	2035	2040
Groundwater	Mojave Basin	22,729	17,340	24,226	26,769	29,559	32,267	34,929
Imported Water	R^3 Project	0	3,503	0	0	0	0	0
Recycled Water		0	611	2,930	2,930	2,930	2,930	2,930
Total		**22,729**	**21,454**	**27,156**	**29,699**	**32,489**	**35,197**	**37,859**

Based on review of the 2015 UWMP, it was determined that a slight revision to the 2015 UWMP supply projection methodology is appropriate and will be applied for the purposes of this WSA. Recycled water projection estimates were reduced from 2,930 AFY to 687 AFY, based on the 2019 Recycled Water Master Plan (5). However, it is assumed that SCLA SP area demands will be met by through groundwater supply. Total historic and updated projected water supplies are shown in Table 6-5.

Table 6-5. Updated Water Supplies - Historical, Current, and Projected, AFY

Water Supply	Additional Detail on Water Supply	2010	2015	2020	2025	2030	2035	2040
Groundwater	Mojave Basin	22,729	17,340	24,290	26,950	29,869	32,689	35,468
Imported Water	R^3 Project	0	3,503	0	0	0	0	0
Recycled Water[1]		0	611	687	687	687	687	687
Total		**22,729**	**21,454**	**24,977**	**27,637**	**30,556**	**33,376**	**36,155**

[1]Recycled Water Projections for 2020 through 2040 reflect projections established in the 2019 Recycled Water Master Plan **(5)**.

7 WATER SUPPLY RELIABILITY

7.1 WATER SUPPLY RELIABILITY

Per the Mojave Basin Area Judgment, producers in the Mojave Basin Area are allowed to produce as much water as they need annually to meet their requirements. An underlying assumption of the Judgment is that sufficient water will be made available to meet the needs of the Basin in the future from a combination of natural supply, imported water, water conservation, water reuse and transfers of FPA among parties.

8 WATER SUPPLY AND DEMAND ANALYSIS

In general, groundwater and recycled water supplies are less vulnerable to seasonal and climatic changes than surface water (i.e. local and imported supplies). Natural groundwater supply estimates are based on long-term averages, which account for inconsistency in natural supplies (i.e. historic periods of drought are included in the long-term average). Therefore, VWD does not have any inconsistent water sources that result in reduced supplies in dry or multiple dry years. MWA is actively operating recharge sites for conjunctive use along the Mojave River Pipeline, Oro Grande Wash Pipeline, Morongo Basin Pipeline, and Silverwood Dam. Recharge sites provide MWA with the ability to recharge SWP water into the Subareas where replacement water is purchased. These sites also provide MWA with the ability to bank excess SWP water when available in wet year for storage to be used in dry years. R^3 facilities allow MWA to manage the groundwater basins surrounding VWD by delivering imported SWP water stored in upper Mojave River recharge areas to purveyors that can reduce pumping from their wells when taking R^3 water which allows partial recovery of local pumping depressions. For these reasons, supplies are considered to be unchanged in normal, dry, and multiple dry years.

The basis for the "year type" is determined from the single-driest and multiple-driest years using precipitation data (1940-2016) from National Oceanic and Atmospheric Administration (NOAA) Station 049325 in Victorville. However, even though precipitation is variable, groundwater supply estimates are based on the long-term averages, which account for these variabilities so groundwater is assumed to be 100% available in single-dry and multiple-dry year conditions. Table 8-1 summarizes the historical base years and the percentage of average groundwater supplied during those years.

Table 8-1. Basis of Water Year Data

Year Type	Base Year[1]	% of Average Supply
Average Year	1970	100
Single-Dry Year	1953	100
Multiple-Dry Years 1st Year	2007	100
Multiple-Dry Years 2nd Year	2008	100
Multiple-Dry Years 3rd Year	2009	100

[1]Based on 1940 – 2016 precipitation data from NOAA Station 049325; http://www.wrcc.dri.edu/cgi-bin/cliMAIN.pl?ca9325

Table 8-2. presents a comparison of supply and demand projections in an Average Year.

Table 8-2. Normal Year Supply and Demand Comparison, AFY

Totals	2020	2025	2030	2035	2040
Supply Totals	24,977	27,637	30,556	33,376	36,155
Demand Totals	24,977	27,637	30,556	33,376	36,155
Difference	0	0	0	0	0

Demand during dry years was assumed to remain constant due to ongoing state and local conservation programs. Groundwater supply is assumed to remain 100 percent available because the long-term average of the groundwater basin includes dry periods, and any single or multiple-year dry cycle does not impact the long-term yield of the basin. Supplies are sufficient to meet dry year demands through 2040 as shown in Table 8-3.

Table 8-3. Single Dry Year Supply and Demand Comparison, AFY

Totals	2020	2025	2030	2035	2040
Supply Totals	24,977	27,637	30,556	33,376	36,155
Demand Totals	24,977	27,637	30,556	33,376	36,155
Difference	0	0	0	0	0

Multiple dry year supply is addressed in the same way as a single dry year, described above. Therefore, supplies are sufficient to meet multiple dry year demands through 2040 as shown in Table 8-4.

Table 8-4. Multiple Dry Year Supply and Demand Comparison, AFY

Year	Totals	2020	2025	2030	2035	2040
First Year	Supply Totals	24,977	27,637	30,556	33,376	36,155
	Demand Totals	24,977	27,637	30,556	33,376	36,155
	Difference	0	0	0	0	0
Second Year	Supply Totals	24,977	27,637	30,556	33,376	36,155
	Demand Totals	24,977	27,637	30,556	33,376	36,155
	Difference	0	0	0	0	0
Third Year	Supply Totals	24,977	27,637	30,556	33,376	36,155
	Demand Totals	24,977	27,637	30,556	33,376	36,155
	Difference	0	0	0	0	0

9 DETERMINATION OF WATER SUPPLY SUFFICIENCY

9.1 DETERMINATION OF WATER SUPPLY SUFFICIENCY

According to the MWA 2015 UWMP, MWA has adequate supplies to meet the region's demands and replacement water needs during average, single dry and multiple dry years throughout the 20-year planning period. VWD's demand projections were provided to MWA for inclusion in their analysis for the MWA 2015 UWMP and subsequent changes based on this WSA are assumed to minimally increase previous estimates. Therefore, it is concluded that VWD has adequate supplies to meet demands during average, single dry and multiple dry years throughout the 20-year planning period.

VWD will continue aggressive water conservation efforts, increased use of recycled water to offset potable water demand, and participation in new water supply projects with MWA to ensure they have enough supply to continue to meet their demands.

10 REFERENCES

1. **Water Systems Consulting, Inc.** *2015 Urban Water Management Plan Prepared for Victorville Water District.* Adopted June 30, 2016.

2. **City of Victorville.** *General Plan 2030.* Victorville : City of Victorville, 2008.

3. **Water Systems Consulting, Inc.** *2019 Water Master Plan Update Prepared for Victorville Water District.* 2020.

4. **Kennedy/Jenks Consultants.** *Final 2015 Urban Water Management Plan for Mojave Water Agency.* June 2016.

5. —. *2015 Urban Water Management Plan for Mojave Water Agency.* 2016.

6. **Water Systems Consulting, Inc.** *Draft 2019 Recycled Water Master Plan Prepared for Victorville Water District.* 2020.

7. **City of Victorville Development Department, Michael Baker International, and Stirling Development.** *Southern California Logistics Airport Specific Plan Review DRAFT.* Victorville : s.n., 2019.

8. **Water Systems Consulting, Inc.** *2018 Water Master Plan Update Prepared for Victorville Water District.* 2018.