Water Feasibility Study

for

EWTR22-00213 (PLAN21-00019)

Prepared Under the Responsible Charge of:

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1.0 Background and Purpose

The City of Victorville (City) has requested that WSC complete a Water Feasibility Study (WFS) on behalf of the Victorville Water District (District) for EWTR22-00213 (PLAN21-00019) (Project). The Project is a proposed 8.5-acre multi-tenant commercial development, which includes a 112-room hotel, located in the District's Zone 3290. The proposed development is bound by Dos Palmas to the north, Cantina Drive to the east, vacant lot (APN 3096-381-07) to the south, and Highway 395 to the west. Figure 1 shows the location of the proposed Project.

Key objectives for this water feasibility study are to:

- Estimate the water demands associated with the development of the Project, including fire flow demands;
- Assess whether the District's existing water storage is sufficient to serve the Project in addition to existing customers;
- Assess whether the District's existing water supply sources are sufficient to serve the project in addition to existing customers;
- Determine the size and approximate location of pipeline improvements needed to provide adequate service pressure and fire flow to the Project. This includes improvements within the project as well as offsite and may include an evaluation of connecting to an alternative pressure zone if needed;
- Identify coordination needs or opportunities with other improvements planned by the City.

This study incorporates data from the District's 2020 Urban Water Management Plan (2020 UWMP), 2021 Water Master Plan Update (2021 WMP), facility inventory data, and water production data. WSC used the District's hydraulic model to determine the fire flow availability, pipeline velocities, and pipeline pressures in the Project area.

2.0 Project Requirements

Water demand factors, required fire flow, and storage requirements for the Project were determined using water use by similar customers and evaluation criteria presented in the 2021 WMP. This section summarizes the potable water demands, fire flow requirements, and storage requirements for the Project.

2.1 Water Demand

The Project's estimated water demand was calculated using a commercial water demand factor and a hotel water demand factor. The commercial water demand was estimated by applying a water demand factor for commercial land uses to the development's acreage (excluding hotel acreage). The commercial water demand factor from the 2021 WMP was used. The hotel water demand was estimated by using past hotel consumption data provided by the City for local hotels. The City previously provided consumption data from 2015-2017 for existing hotels in their service area. Based on the local hotel consumption data, the average day demand (ADD) per room is 109 gallons per day (gpd), which is consistent with projected hotel demand factors reviewed for other California communities. Peaking factors presented in the 2021 WMP for Zone 3290 were used to calculate maximum day demand (MDD) and peak hour demand (PHD). Table 1 shows the ADD, MDD and PHD demand conditions for the Project.

Table 1. Project ADD, MDD and PHD Demand Conditions

Commercial Demands	
Commercial Water Demand Factor (gpd/ac)[1]	1,000
Commercial Acreage (excluding hotel acreage)	6.4
Commercial ADD (gpd) = Acreage x Water Demand Factor	**6,400**
Hotel Demands	
Hotel Water Demand Factors (gpd/room)[2]	109
Hotel Rooms	112
Hotel ADD (gpd) = Rooms x Water Demand Factor	**12,200**
Total Project Demands	
Total Project ADD (gpd) = Commercial ADD + Hotel ADD	**18,600**
ADD (gpm)	12.9
MDD Peaking Factor[3]	1.3
MDD = ADD x MDD Peaking Factor (gpd)	24,000
MDD (gpm)	16.7
PHD Peaking Factor[3]	1.8
PHD = ADD x PHD Peaking Factor (gpm)	23.3

[1]Source: Calculated using data provided in 2020 Victorville Water District Urban Water Management Plan.
[2] Source: 2015-2017 hotel consumption data from existing hotels in Victorville.
[3]Source: 2021 Victorville Water District Water Master Plan Update Table 4-10.

2.2 Fire Flow Requirements

Table 3-3 of the 2021 WMP was used to establish the fire flow requirements for the Project. The land use associated with the project is commercial; therefore, a minimum fire flow requirement of 3,500 gallons per minute (gpm) for a 4-hour duration applies. This fire flow requirement was used in this analysis. The minimum residual pressure in water systems during fire flow conditions is 20 pounds per square inch (psi), in accordance with the California Waterworks Standards. Table 3-6 of the 2021 WMP identifies a maximum desired pipeline velocity of 15 feet per second (fps) during fire flow conditions. Both the 20-psi pressure minimum and the 15-fps velocity limit were used in the hydraulic model to determine the available fire flow for the Project.

2.3 Storage Requirement

The storage criteria established in the 2021 WMP were used to determine whether the District's existing storage facilities are adequate to provide the Project and the existing customers with sufficient water for operational, firefighting, and emergency demands. Table 3-4 of the 2021 WMP specifies the storage criteria used for this analysis. Storage is calculated separately for each pressure zone. Table 2 provides a summary of the storage requirements for the Project. The total required storage volume is comprised of the following three components:

- Operational storage, which relates to the daily variance in demand on the potable water system. Adequate storage is needed to supply water during peak hours when the system demand exceeds production capacity. Once production capacity becomes greater than system demands, the storage facilities are refilled, replenishing operational storage. Operational storage is calculated as 25% of MDD.
- Emergency storage is required to provide water during supply emergencies, unplanned system interruptions and/or planned system interruptions such as maintenance or construction events. Emergency storage is calculated as 50% of MDD.
- Firefighting storage requirements correspond to the volume of water needed to supply fire flow for a specified duration. The single largest fire flow requirement within each pressure zone is used to calculate the firefighting storage volume. For the Project, a demand of 3,500 gpm for 4 hours was used for commercial development.

Table 2. Storage Requirements for Project

Storage	Requirement[1]	Volume, MG
Operational	25% of MDD	0.01
Emergency	50% of MDD	0.01
Firefighting	3,500 gpm x 4 hours	0.84
Total Storage Required for Project		**0.86**

[1] Source: 2021 Victorville Water District Water Master Plan Table 3-4

3.0 Project Water Feasibility Analysis

This section presents the supply, storage and distribution system analysis results of the Project water feasibility study. The water feasibility study analysis was performed using the criteria outlined in Chapter 3 of the 2021 WMP. The City provided WSC with an inventory of storage and supply facilities and system wide production data for calendar year 2020, which was used to determine 2020 ADD. The data used for this analysis is summarized in Appendix A.

3.1 Supply

The District's current water supply consists of 34 active wells, which pump from the Upper Mojave Groundwater Basin, and two turnouts from the Mojave Water Agency's Regional Recharge and Recovery Project (R^3), which produces stored groundwater.

Available supply for the Project was evaluated on the basis of total system firm capacity. The 2021 WMP calculated firm capacity with the two largest wells and the R3 supply being out of service. With these facilities out of service, the firm capacity of the system is 31,903 gpm. The 2021 WMP supply criteria state that firm capacity should be greater than MDD. The current system MDD as of 2020 is 25,605 gpm; this includes estimated demands for proposed projects which have been previously evaluated based on the City of Victorville 2010 Water Master Plan (2010 WMP) and the 2021 WMP and approved, but not yet constructed. Note that projects evaluated prior to the adoption of the 2010 WMP are not included in this total. Therefore, there is a current system wide firm capacity surplus of 6,298 gpm. The addition of the Project would decrease this surplus to 6,281 gpm. The firm capacity analysis shows that the system currently has sufficient firm capacity to meet the MDD. Table 3 outlines the supply analysis for serving the Project.

Table 3. Project Supply Analysis Summary

Proposed Project MDD, gpm	17
Firm Capacity[1], gpm	31,903
Current MDD[2], gpm	25,605
MDD Supply Required for Approved Projects[3], gpm	3,972
Current Surplus/(Deficit), gpm	6,298
Proposed System Surplus/(Deficit) + Project MDD, gpm	6,281
Is Available System Wide Supply Sufficient?	YES

[1] See Appendix A for firm capacity calculations
[2] Based on 2020 MDD, includes MDD for previously approved projects
[3] See Appendix B for Approved Projects since the 2010 WMP

3.2 Storage

An inventory of the City's water storage facilities is included in Appendix A. Based on this inventory, Zone 3290 currently has a total storage capacity of 15 million gallons (MG). As discussed previously, the fire flow storage requirement for each zone is based on the single largest fire flow requirement in the zone. The 2021 WMP based fire flow storage for Zone 3290 on a fire flow requirement of 4,000 gpm for 4 hours. This equates to a fire storage need of 0.96 MG, leaving 14.04 MG of existing storage capacity in this zone to meet the operational and emergency (O & E) storage needs for the zone.

A summary of the estimated water demands in each pressure zone is included in Appendix A. Based on the 2020 demands plus the storage needs for projects that were evaluated based on the 2010 WMP or 2021 WMP and approved but not constructed, the current O & E storage requirements for the zone totals 5.58 MG, which results in a current surplus of 8.46 MG of storage capacity in Zone 3290 for existing and approved projects.

As outlined in Section 2.3, the total storage required to serve the Project is 0.86 MG (0.84 MG for fire flow and 0.02 MG for O & E).

Table 4 provides a summary of the storage analysis performed for the Project. There is currently sufficient available storage in Zone 3290 to serve the Project.

Table 4. Project Storage Analysis Summary

Current Storage Capacity, MG	15.00
Allocated FF Storage Capacity, MG	0.96
Remaining Storage Capacity for O & E, MG	14.04
O & E Storage Required for Existing and Proposed Demands[1], MG	5.58
O & E Storage Available for Future Demands, MG	8.46
Proposed Project FF Storage Requirement, MG	0.84
Proposed Project O & E Storage Requirement, MG	0.02
Is Available FF Storage Sufficient?	YES
Is Available Zone O & E Storage Sufficient?	YES

[1] Includes O & E Storage allocated to previously approved projects in the Project's zone since the 2010 and 2021 WMP.

3.3 Distribution Pipelines

The proposed project was added to the City's existing InfoWater hydraulic model to determine fire flow availability, pipeline velocities, and system pressures in the Project area. The current hydraulic model was updated as a component of the 2021 WMP and has been maintained to reflect the current water system.

A fire flow simulation was performed in the model to predict available fire flow within the Project under MDD conditions. Fire flow analysis was performed with initial tank level settings at 50 percent of maximum levels and all supply sources off. The model predicted that the fire flow requirement of 3,500 gpm could be met with the existing water system. Residual pressures range between 21 to 30 psi, which meets the criteria in the 2021 WMP. Appendix C provides a summary of the available fire flow for the Project. **Note that this analysis was conducted on the proposed pipes along the perimeter of the project. Depending on the configuration of the onsite piping and the hydraulic losses through any meters or fire service devices, the onsite available fire flow could be lower. The Developer shall conduct its own onsite analysis to confirm compliance with fire department requirements. See last paragraph of this section regarding alternative connection points with higher pressure.**

The Project shall make two connections to the existing system: one to the existing 16-inch pipeline in Dos Palmas Road west of the Dos Palmas Road and Mesa Linda Avenue intersection, and one to the existing 8-inch pipeline in Cantina Drive north of the Cantina Drive and Dandelion Way intersection. The Project shall construct 16-inch pipelines in Dos Palmas Road and along Hwy 395 (outside of Caltrans right-of-way inside a 20 ft wide public utility easement), and a 12-inch pipeline in Cantina Drive. The Developer shall coordinate with the City on number and location of meters. Figure 1 depicts the layout of the Project.

Model results indicate that under MDD conditions, velocities within the Project area do not exceed the maximum velocity of 10 feet per second (fps). Similarly, at PHD conditions, system pressures at all junctions within the Project are above 45 psi and pipeline velocities remained below 5 fps. Model results indicate that the system pressures and velocities meet the criteria established in the 2021 WMP.

Static pressure at the Project site ranges between 42 – 47 psi with the recommended pipe improvements in Zone 3290 and fire flow residual pressures range from 21 – 30 psi along the perimeter of the project. If pressures are not adequate for the Project needs, an alternative to connect to a higher pressure zone (Zone 3485) could be developed. This alternative would require different offsite improvements, including a pipeline crossing Highway 395. The Developer shall coordinate with the City if an alternative connection point with higher pressure is desired.

3.4 Coordination with Other Projects

There are several other proposed projects in the same pressure zone as the Project that have approved Water Feasibility Studies but have not yet been developed:

- Tract 20088, located north of Seneca Rd and east of HWY 395
- EWTR18-00270, located north of Bear Valley Rd and west of Cottonwood Ave
- EWTR20-00114, located north of Mojave Dr and east of Mesa Linda Ave (located in Zone 3290 prior to Zone 3170 Conversion)
- EWTR20-00226, located north of Mariposa Rd and west of Locust Ave
- EWTR21-00008, located south of Seneca Rd and west of Borego Rd
- EWTR21-00554, located south of Seneca Rd and east of Hwy 395

The locations of the developments listed above are shown in Figure 2. In the hydraulic model, this Project was analyzed with and without the demands and the pipeline improvements proposed by these approved developments to assess whether this Project is dependent upon the development of these nearby projects. The hydraulic analysis showed that this Project meets all the requirements from the 2021 WMP with and without the demands and pipeline improvements proposed by the approved developments listed above. Therefore, this Project is not dependent upon the pipeline improvements proposed by these developments.

4.0 Conclusions and Recommendations

The hydraulic analysis concluded that adequate storage is available to serve the Project and the water system has sufficient firm capacity to meet the MDD conditions. **The Project shall make two connections to the existing system: one to the existing 16-inch pipeline in Dos Palmas Road west of the Dos Palmas Road and Mesa Linda Avenue intersection, and one to the existing 8-inch pipeline in Cantina Drive north of the Cantina Drive and Dandelion Way intersection, as shown in Figure 1. The Project shall construct approximately 2,540 feet of 16-inch pipeline and 360 feet of 12-inch pipeline. The Developer shall coordinate with the City on number and location of meters.** The hydraulic analysis indicated that, with the installation of the improvements identified in Figure 1, the system pressures, velocities, and fire flow capacities will meet the criteria identified in the 2021 WMP. **The Developer shall coordinate with the City if an alternative connection point with higher pressure is desired.**

The analysis presented in this WFS is based on the configuration of the water system as of the date of this report and the 2021 WMP and the 2020 UWMP, which are the most current water planning documents available. If a newer planning document becomes available prior to the time the Project develops, or if the District determines there have been significant changes in the water system that may impact the recommendations for this Project, the District may require re-evaluation of the Project based upon such new information.

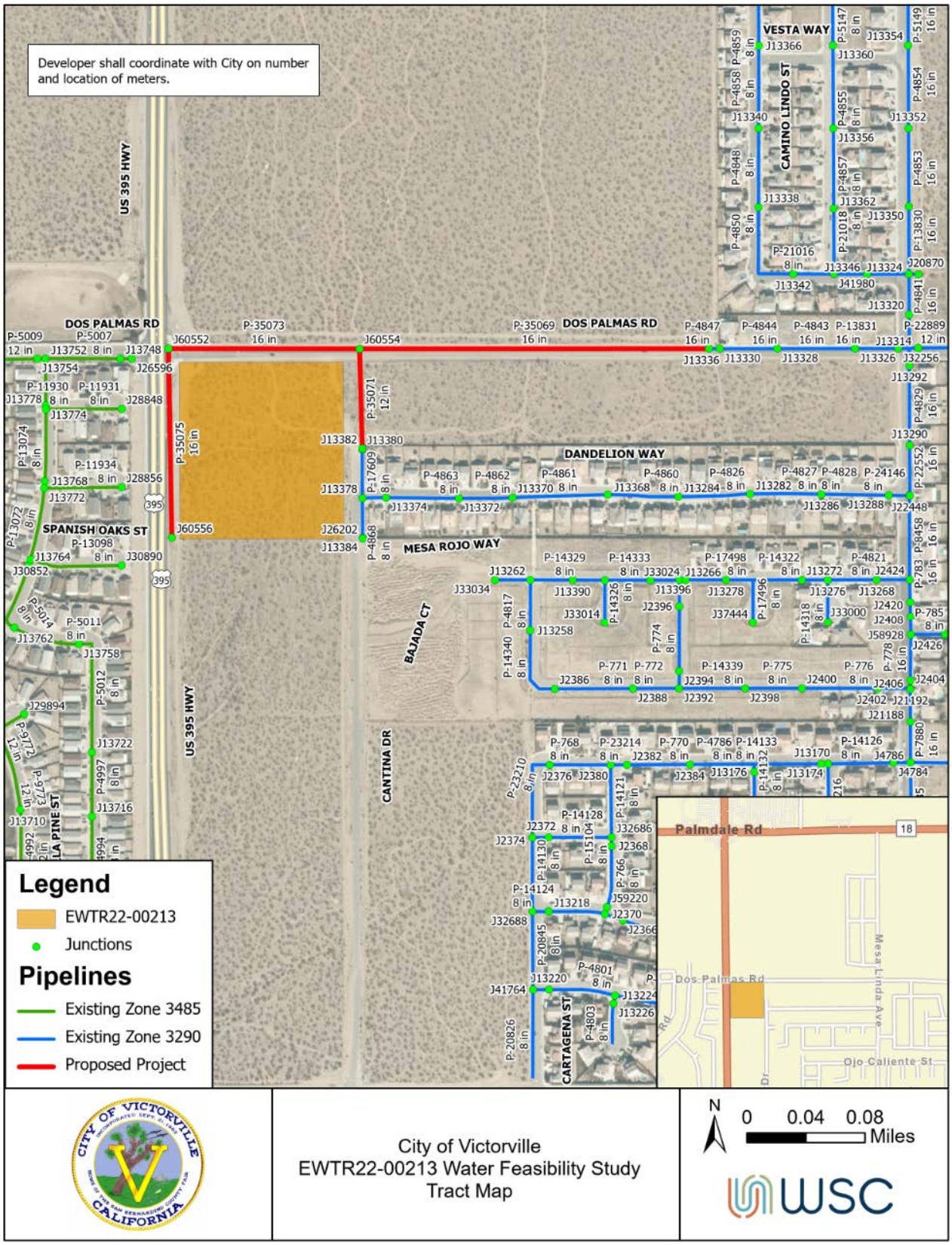

Figure 1. Existing and Proposed Water System

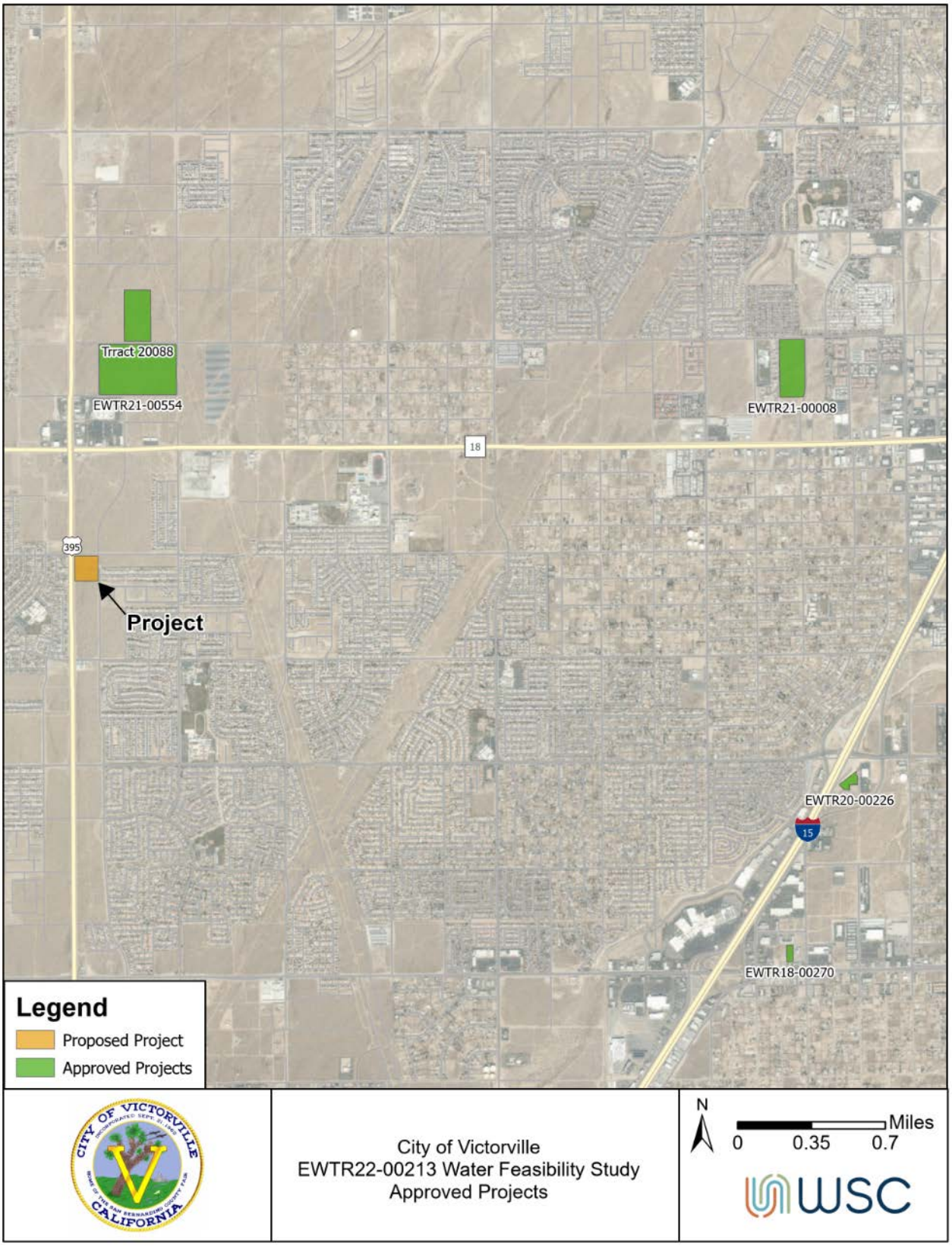

Figure 2. Proposed and Approved Projects

Appendix A System Storage, Supply, and Demand Summaries

Existing Water Supply and Firm Capacity.

Supply Source	Pressure Zone	Status	Well Capacity (gpm)[1]	Total Capacity (MGD)
Well 133	2890	Active	994	1.43
Well 135	2890	Active	660	0.95
Well 102	2890	Inactive	0	0
Well 147	2890	Inactive	0	0
Well 118	2906	Active	737	1.06
Well 119	2906	Active	552	0.79
Well 105	3065	Destroyed	0	0
Well 116	3065	Active	863	1.24
Well 121 (4)	3065	Inactive	0	0
Well 127	3065	Active	915	1.32
Well 130	3065	Active	857	1.23
Well 132	3065	Active	781	1.12
Well 136	3065	Active	381	0.55
Well 139	3065	Active	2,944	4.24
Well 141	3065	Active	1,692	2.44
Well 143	3065	Active	1,149	1.65
Well 146(3)	3065	Inactive	0	0.00
Well 120	3170	Active	1,835	2.64
Well 122	3170	Active	1,789	2.58
Well 140	3170	Active/Largest	3,266	4.70
Well 145(3)	3170	Inactive	0	0
R3 Turnout 3(6)	3170	Active/Not Guaranteed	2,107	3.03
Well 109	3290	Active	838	1.21
Well 123	3290	Active	890	1.28
Well 126	3290	Active	857	1.23
Well 128	3290	Active	609	0.88
Well 131	3290	Active	1,357	1.95
Well 134	3290	Active	709	1.02
Well 137	3290	Active	1075	1.55
Well 138	3290	Active	778	1.12

Supply Source	Pressure Zone	Status	Well Capacity (gpm)[1]	Total Capacity (MGD)
Well 142[(3)]	3290	Inactive	0	0
Well 144[(5)]	3290	Active/Largest	4,600	6.62
Well 129	3485	Active	800	1.15
Well 201	3485	Active	903	1.30
Well 203	3485	Active	864	1.24
Well 204	3485	Active	997	1.44
Well 205	3485	Active	916	1.32
Well 206	3485	Active	876	1.26
Well 207	3485	Active	448	0.65
Well 208	3485	Active	858	1.24
Well 209	3485	Active	616	0.89
Well 212[(5)]	3485	Active	1,363	1.96
R3 Turnout 6[(6)]	3485	Active/Not Guaranteed	2,106	3.03
Total System Supply Capacity			43,982	63.3
Total System Firm Capacity[(2)]			31,903	45.9

[1]Current well capacities were provided to WSC by the City in October 2017.
[2]The firm capacity is the total supply capacity without the largest well in each Improvement District and R^3.
[3]Well is drilled but not equipped.
[4]Taken offline in 2014 due to levels of Chromium-6 approaching the new MCL established in 2014. May be returned to service if Chromium-6 levels decline.
[5]Two largest wells are not included in firm capacity.
[6]The City of Victorville receives a total of 6.06 MGD and can be used at either R^3 turnout. R^3supply is not included in firm capacity due to non-guaranteed supply.

Finished Water Storage Reservoirs. Table was adapted from Table 2-4 in 2021 WMP.

Reservoir Number	Status	Material	Base Elevation (ft-msl)	Diameter (ft)	Depth (ft)	HWL (ft-msl)	Pressure Zone	Capacity (MG)
102	Active	Steel	2874	95	32	2906	2890	1.5
104	Active	Steel	2874	95	32	2906	2890	1.5
105	Active	Steel	3049	104	32	3081	3065	2.0
107	Active	Steel	3269	105	40	3309	3290	2.5
108	Active	Steel	3269	104	40	3309	3290	2.5
109	Active	Steel	2894	60	24	2918	2906	0.5
110	Active	Steel	3150	110	39	3189	3170	2.5
111	Active	Steel	3150	104	39	3189	3170	2.5
112	Active	Steel	3268	150	38	3306	3290	5.0
113	Active	Steel	3050	129	31	3081	3065	3.0
114	Active	Steel	3268	150	38	3306	3290	5.0
115	Active	Steel	3050	165	31	3081	3065	5.0
116	Active	Steel	3150	150	39	3189	3170	5.0
117	Active	Steel	3150	104	39	3189	3170	2.5
118	Active	Steel	3050	129	31	3081	3065	3.0
119	Active	Steel	3050	165	31	3081	3065	5.0
120	Active	Steel	3055	182	27	3081	3065	5.0
121	Active	Steel	2894	60	24	2918	2906	0.5
202	Active	Steel	3469	105	30.8	3500	3485	2.0
205	Active	Steel	3809	60	24	3832	3820	0.5
207	Active	Steel	3469	120	32.4	3501	3485	2.7
208	Active	Steel	3657	120	37.5	3694	3675	3.1
209	Active	Steel	3657	96	37.5	3694	3675	2.0
210	Active	Steel	3809	122	23.8	3832	3820	2.0
211	R[3](2)	Steel	3465	165	32	3497	3485	5.0
					Active Storage Capacity			**66.8**
201	Inactive(1)	Steel	3469	105	30.8	3500	3485	2.0
203	Inactive(1)	Steel	3475	27		3499	3485	0.1
204	Inactive(1)	Steel	3475	38		3499	3485	0.2

[1]Reservoir 201 is currently disconnected from the system and is not included in active storage capacity. May be reconnected in the future. Reservoirs 203 and 204 are disconnected from the system due to lining issues and are not included in active storage capacity.

[2]Reservoir 211 has been incorporated into the R³ Project and is no longer a component of the active storage capacity. However, it is still hydraulically connected to the Zone 3485 distribution system and effectively increases the storage capacity in Zone 3485.

Demand Data. Table was adapted from Table 4-11 of the 2021 WMP.

Pressure Zone	2020 ADD (MGD)[1]	2020 MDD (MGD)[2]	2020 MDD (gpm)[2]
3820	0.20	0.28	198
3675	0.32	0.75	517
3485	3.48	5.57	3,869
3290	5.53	7.18	4,988
3170	5.96	8.34	5,793
3065	4.39	8.33	5,785
2906	0.08	0.22	152
2890	0.32	0.48	331
Total	**20.20**	**30.94**	**21,633**

[1] Based on calendar year 2020 water production data provided by the City. Water served to the City of Adelanto and Phelan Pinon Hills Community Services District through intertie agreements is not included. 2020 pressure zone demands were estimated by multiplying the 2020 total ADD by the zone's proportional amount of demand shown in Table 4-11 of the 2021 WMP.

[2] Pressure zone MDD was calculated by multiplying 2020 ADD by the 2021 WMP ADD to MDD peaking factors shown in Table 4-10.

2020 System Storage. Table was adapted from Table 6-2 of the 2021 WMP. Table includes updated required storage and supply balance figures.

		Required Storage (MG)			Storage Balance (MG)	
Pressure Zone	2020 MDD (MGD)	Operational & Emergency Storage	Fire Flow Storage	Total Storage	Available Storage	Storage Surplus/(Deficit)
2890	0.28	0.36	1.0	1.36	3.0	1.64
2906[1]	0.75	0.16	1.0	1.16	1.0	(0.16)
3065	5.57	6.25	1.0	7.25	23.0	15.75
3170	7.18	6.26	1.4	7.66	12.5	4.84
3290	8.34	5.39	1.0	6.39	15.0	8.61
3485	8.33	4.18	1.0	5.18	4.7	(0.48)
3675	0.22	0.56	1.0	1.56	5.1	3.54
3820	0.48	0.21	1.0	1.21	2.5	1.29
Total	**30.94**	**23.37**	**8.4**	**31.77**	**66.8**	**35.03**

[1]The existing Stoddard Wells Pipeline enables Zone 2906 to utilize excess storage in other zones.

Appendix B Water Feasibility Studies Approved But Not Constructed

This list includes only projects with approved water feasibility studies based on the 2010 WMP and 2021 WMP. Previously approved studies which were based on the prior 1995 Water Master Plan are subject to re-evaluation based on the most current system condition and evaluation criteria in place at the time of development.

Project Name	Additional Project Names		Final Water Feasibility Study Date	Project's Pressure Zone	Project MDD (gpm)	Project O&E Storage Allocation (MG)
Tract 17033[3]	-	-	January 2012	3485	-	-
Tract 17541	-	-	January 2012	3485	110	0.12
Tract 17199	-	-	January 2012	3485	204	0.22
St. Mary's	-	-	March 2012	3675	335	0.36
Tract 18087	-	-	6/3/2014	3485	222	0.24
Tract 16588	WTR14-00074	-	11/17/2014	3170	43	0.05
Tract 17046[1]	WTR14-00081	-	1/14/2015	3485	-	-
Tract 16805[2]	WTR15-00047	-	2/5/2016	3485	-	-
Westcreek	-	-	11/17/2016	3170	431	0.47
Tract 17486[5]	WTR16-00049	-	11/30/2016	3485	-	-
Tract 20064	WTR16-00015	-	1/30/2017	3485	143	0.15
Tract 20037	WTR16-00051	-	3/23/2017	3485	38	0.04
Tract 15297[4]	WTR17-00008	-	4/12/2017	3675	-	0.17
Tract 18487	WTR17-00046	-	8/1/2017	3485	31	0.03
Tract 20131	WTR17-00078	-	11/13/2017	3170	58	0.06
Tract 20088	WTR17-00011	-	12/12/2017	3290	33	0.03

Project Name	Additional Project Names		Final Water Feasibility Study Date	Project's Pressure Zone	Project MDD (gpm)	Project O&E Storage Allocation (MG)
EWTR18-00052	APN 3092-421-08	-	1/22/2018	3170	35	0.04
EWTR18-00270	APN3039-211-01	-	3/28/2019	3290	8	0.01
EWTR18-00307	PSUB18-00057	Desert Grove	6/6/2019	3485	30	0.03
EWTR19-00093	APN 0459-192-50	-	7/15/2019	3170	186	0.21
EWTR19-00086	Tentative Tract 20280	-	9/5/2019	3065	41	0.04
EWTR19-00172	Tract 20274	-	9/17/2019	3485	79	0.08
EWTR19-00181	Tract 20275	-	9/24/2019	3485	64	0.07
EWTR19-00302	PSUB19-00061	-	2/3/2020	3170	35	0.04
EWTR20-00114	PSUB20-00014	-	7/30/2020	3290	8	0.01
EWTR20-00226	PSUB20-00226	Hampton by Hilton	1/5/2021	3290	12	0.01
EWTR21-00070	PSUB20-00130	Tract 16774	2/24/2021	3485	70	0.08
EWTR18-00057	PSUB18-00044	Vista del Valle	3/9/2021	3675	404	0.44
EWTR21-00089	Tract 18100	-	3/29/2021	3675	51	0.06
PSUB20-00039	-	-	4/26/2021	3170	174	0.19
TMM 20341	-	-	5/6/2021	3675	208	0.22
Project Loki	-	-	6/4/2021	3170	44	0.05
PSUB20-00108	Tract 13816 & 16463		6/4/2021	3170	113	0.12
EWTR21-00008	PSUB21-00028	Seneca Villas Apartment	7/1/2021	3290	49	0.06
PSUB21-00051	Lot 43	Iron Mountain	7/23/2021	3170	20	0.02
PSUB21-00010	Tentative Tract 18005	-	7/1/2021	3170	46	0.05
EWTR21-00196	PLAN21-00011	Tentative Tract 20368	7/23/2021	3675	33	0.03
EWTR21-00257	Tract 16828	Diamond Ridge IV	8/13/2021	3065	16	0.02
EWTR21-00413	PLAN18-00020	APN 3092-381-03	10/27/2021	3170	12	0.01
EWTR19-00019	Tentative Tract 20262	-	11/1/2021	3485	113	0.12

Project Name	Additional Project Names		Final Water Feasibility Study Date	Project's Pressure Zone	Project MDD (gpm)	Project O&E Storage Allocation (MG)
EWTR21-00537	PLAN21-00033	Tract 20454	12/16/2021	3485	39	0.04
ADMN21-00162	Project Faring	-	12/22/2021	3170	18	0.02
EWTR21-00569	PSUB21-00096	Wyndham Garden Hotel	1/26/2022	3485	13	0.02
EWTR21-00554	PSUB21-00075	Tentative Tract 16681	1/21/2022	3290	63	0.07
EWTR21-00646	PSUB21-00208	Stoddard Wells Industrial Park	3/10/2022	2906	78	0.09
EWTR21-00648	Tentative Tract 14525	-	3/16/2022	2906	198	0.21
EWTR22-00138	Tract 14627	-	3/31/2022	3170	13	0.02
EWTR21-00135	PLAN21-00031	-	TBD	3170	51	0.06
				Total MDD	**3,972**	

[1]Tract 17046 replaced with Tract 20274.
[2]Tract 16805 replaced with Tract 20275.
[3]Tract 17033 replaced with Tract 16774.
[4]Tract 15297 replaced with TMM 20341.
[5]Tract 17486 replaced with EWTR21-00537.

Appendix C Hydraulic Mode Outputs

EWTR22-00213: *Available fire flow*

Junction ID	Static Pressure (psi)	Fire Flow Demand (gpm)	Available Fire Flow at 20 psi Residual Pressure or 15 fps Max Velocity (gpm)	Residual Pressure at Required Fire Flow Demand (psi)
J13378	46	3,500	3,213	21
J13380	47	3,500	4,293	27
J60552	47	3,500	4,369	28
J60554	47	3,500	4,676	30
J60556	43	3,500	3,717	22

EWTR22-00213: *Project Pipeline Properties*

ID	Length (ft)	Diameter (in)	Roughness	Velocity at Peak Hour (ft/s)
P-35069	1,251	16	130	0.01
P-35071	356	12	130	0.01
P-35073	643	16	130	0.01
P-35075	645	16	130	0.01