Appendix K:
Utilities Supporting Information

THIS PAGE INTENTIONALLY LEFT BLANK

K.1 - Water Supply Assessment

THIS PAGE INTENTIONALLY LEFT BLANK

FINAL REPORT | DECEMBER 2021

Tracy Alliance Project
Water Supply Assessment

PREPARED FOR

City of Tracy

PREPARED BY

WEST YOST
Water. Engineered.

Tracy Alliance Project
Water Supply Assessment

Prepared for

City of Tracy

Project No. 404-60-20-65

Project Manager: Amy W. Kwong, PE	12-20-21 Date
QA/QC Review: Elizabeth T. Drayer, PE	12-20-21 Date

WEST YOST
Water. Engineered.

FINAL REPORT | DECEMBER 2021

Table of Contents

Table of Contents

Table of Contents

LIST OF TABLES

LIST OF FIGURES

LIST OF APPENDICES

Table of Contents

LIST OF ACRONYMS AND ABBREVIATIONS

AB	Assembly Bill
af	Acre-feet
af/yr	Acre-Feet Per Year
ASR	Aquifer Storage and Recovery
BBID	Byron Bethany Irrigation District
BCID	Banta Carbona Irrigation District
bgs	Below Ground Surface
Water Code	California Water Code
CASGEM	California Statewide Groundwater Elevation Monitoring
CEQA	California Environmental Quality Act
City	City of Tracy
CSD	County Services District
CVP	Central Valley Project
DDW	SWRCB Division of Drinking Water
DMC	Delta-Mendota Canal
DOF	California Department of Finance
DWR	California Department of Water Resources
EIR	Environmental Impact Report
ETo	Evapotranspiration
GMO	City of Tracy Growth Management Ordinance
gpm	Gallons Per Minute
GSA	Groundwater Sustainability Agency
GSP	Groundwater Sustainability Plan
GWMP	Groundwater Management Plan
JJWTP	John Jones Water Treatment Plant
K/J/C	Kennedy/Jenks/Chilton
LAFCo	Local Agency Formation Commission
M&I	Municipal and Industrial
mgd	Million gallons per day
mg/L	Milligrams Per Liter
MOA	Memorandum of Agreement
msl	Mean Sea Level
NEI	Northeast Industrial
NEPA	National Environmental Policy Act
PPBP	Patterson Pass Business Park
Proposed Project	Proposed Tracy Alliance Project
RGA	Residential Growth Allotment

RWQCB	Regional Water Quality Control Board
SB	Senate Bill
SCADA	Supervisory Control and Data Acquisition
SCWSP	South County Water Supply Project
Semitropic WSD	Semitropic Water Storage District
SGMA	Sustainable Groundwater Management Act
SOI	Sphere of Influence
SSJID	South San Joaquin Irrigation District
SWP	State Water Project
SWRCB	State Water Resources Control Board
SWRU	Stored Water Recovery Unit
TDS	Total Dissolved Solids
TM	Technical Memorandum
UAFW	Unaccounted for Water
USBR	United States Bureau of Reclamation
UWMP	Urban Water Management Plan
WSA	Water Supply Assessment
WSID	West Side Irrigation District
WSMP Update	Water System Master Plan Update (October 2021 Draft Report)
WWTP	Wastewater Treatment Plant

EXECUTIVE SUMMARY

Purpose of Water Supply Assessment

The purpose of this Water Supply Assessment (WSA) is to perform the evaluation required by California Water Code Sections 10910 through 10915, as established by Senate Bill 610 (SB 610), in connection with the City of Tracy's (City) proposed Tracy Alliance Project (Proposed Project). This WSA evaluates the adequacy of the City's total projected water supplies, including existing water supplies and future planned water supplies, to meet the City's existing and projected future water demands, including those future water demands associated with the Proposed Project, under all hydrologic conditions (Normal Years, Single Dry Years, and Multiple Dry Years).

Since the Proposed Project does not meet the definition of a residential subdivision, this WSA does not include the requirements of California Government Code Section 66473.7(a)(1), as established by SB 221 in 2001.

Proposed Project Overview

The Proposed Project is located in unincorporated San Joaquin County, northeast of the intersection of Grant Line Road and Paradise Avenue. The project site is within the City's Sphere of Influence (SOI), but outside the existing City limits. The project site totals approximately 191 acres on six parcels of existing agricultural land that will be annexed into the City and become part of the Northeast Industrial (NEI) Specific Plan area when approved. The Proposed Project would include the development of these parcels with industrial buildings, parking areas, and a stormwater detention basin. Space is also reserved for a future interchange for Interstate 205.[1]

The Proposed Project meets the definition of a "Project" per California Water Code Sections 10910 through 10915, as established by SB 610 in 2001, thus requiring the preparation of this WSA.

Potable and Recycled Water Demands and Supply Availability

Projected water demands for buildout of the Proposed Project total approximately 294 acre-feet per year (af/yr) of which approximately 211 af/yr is industrial demand, approximately 55 af/yr is irrigation demand, and approximately 28 af/yr is unaccounted-for water.

It is anticipated that the Proposed Project, if approved by the City, would be served from the City's existing and future portfolio of water supplies. The inclusion of existing and planned future water supplies is specifically allowed by the California Water Code:

> *California Water Code Section 10631(b): Identify and quantify, to the extent practicable, the existing and planned sources of water available to the supplier over the same five-year increments described in subdivision (a).*

[1] It should be noted that development plans for the Suvik Farms, LLC and Zuriakat parcels are not specified at this time, but it is assumed that they would develop as industrial land use consistent with the NEI Specific Plan.

Since recycled water infrastructure may not be initially available to deliver recycled water to the Proposed Project, potable water supplies may be used in the interim period before recycled water becomes available to meet the non-potable water demands associated with the Proposed Project.

Proponents of the Proposed Project are expected to provide their proportionate share of required funding to the City for the acquisition, treatment and delivery of treated potable and recycled water supplies to the Proposed Project area.

Pursuant to California Water Code Section 10910(c)(4), and based on the technical analyses described in this WSA, this WSA demonstrates that the City's existing and additional planned future water supplies are sufficient during normal years. However, during a single dry year or a multiple dry year period, the City may experience a water supply shortfall. To close the gap between supply and demand, the City will need to implement its Water Shortage Contingency Plan to reduce water demands and rely more heavily on groundwater and proposed future supply projects.

As described in this WSA and the City's 2020 Urban Water Management Plan (UWMP), these findings are primarily due to projected reduced reliability of the City's Central Valley Project (CVP) supplies and South San Joaquin Irrigation District (SSJID) supplies in dry years. As noted in Section 6.5 of this WSA, the reliability of the City's surface water supply from SSJID has been significantly impacted by the 2018 Bay-Delta Water Quality Control Plan. Normal year allocations of the City's water supply from SSJID are assumed to be 100 percent of the City's contractual entitlement; however, water supply may be 56 to 76 percent of contractual entitlement during any single dry year, and 56 to 100 percent of contractual entitlement during multiple dry years. The water supply projections in single dry and multiple dry years include uncertainties that are summarized in Section 7.2.

Determination of Water Supply Sufficiency

As described in Section 7, water demand within the City's water service area is not expected to exceed the City's supplies at Buildout under normal hydrologic conditions if the City is able to fully implement its future planned projects, which include Aquifer Storage and Recovery Program Expansion, Recycled Water Distribution Network and Exchange Program for additional Central Valley Project water supplies, and recycled water distribution for non-potable use. During a single dry year or a multiple dry year period, the City must depend more heavily on water conservation efforts, groundwater, and the proposed future supply projects to overcome the gap between supply and demand. Investments in wet year water supplies will also be needed to refill storage in Semitropic and expand the City's ASR program. Delays in implementing the proposed future water supply projects could result in greater water supply shortages and the need for additional water conservation to meet demands.

The dry year shortfalls are based on water supply and demand projections with numerous uncertainties and the situation is dynamic as discussed in Section 7 of the 2020 UWMP and Section 7 of this WSA. The City continues to work on strategies and actions to address the projected water supply shortfall. The City's strategies and actions include the implementation of demand management measures as part of its water conservation program, consideration of net neutral policies to improve water use efficiency community-wide, and implementation of the future water supply projects described above and in this WSA.

1.0 INTRODUCTION

1.1 Legal Requirement for Water Supply Assessment

California Senate Bill 610 (SB 610) amended state law, effective January 1, 2002, to improve the link between information on water supply availability and certain land use decisions made by cities and counties. SB 610 sought to promote more collaborative planning between local water suppliers and cities and counties. It requires detailed information regarding water supply availability to be provided to the city and county decision-makers prior to approval of specified large development projects. The purpose of this coordination is to ensure that prudent water supply planning has been conducted, and that planned water supplies are adequate to meet existing demands, anticipated demands from approved projects and tentative maps, and the demands of proposed projects.

SB 610 amended California Water Code (Water Code) Sections 10910 through 10915 (inclusive) to require land use lead agencies to:

- Identify any public water purveyor that may supply water for a proposed development project; and
- Request a Water Supply Assessment (WSA) from the identified water purveyor.

The purpose of the WSA is to demonstrate the sufficiency of the purveyor's water supplies to satisfy the water demands of the proposed project, while still meeting the water purveyor's existing and planned future uses. Water Code Sections 10910 through 10915 delineate the specific information that must be included in the WSA.

1.2 Need for and Purpose of Water Supply Assessment

The purpose of this WSA is to perform the evaluation required by Water Code Sections 10910 through 10915 in connection with the City of Tracy's (City) proposed Tracy Alliance Project (Proposed Project). It is not to reserve water, or to function as a "will serve" letter or any other form of commitment to supply water (see Water Code Section 10914). The provision of water service will continue to be undertaken in a manner consistent with applicable City policies and procedures, consistent with existing law.

1.3 Water Supply Assessment Preparation, Format and Organization

The format of this WSA is intended to follow Water Code Sections 10910 through 10915 to clearly delineate compliance with the specific requirements for a WSA. The WSA includes the following sections:

- Section 1: Introduction
- Section 2: Description of Proposed Project
- Section 3: Required Determinations
- Section 4: City of Tracy Water Service Area
- Section 5: City of Tracy Water Demands

- Section 6: City of Tracy Water Supplies
- Section 7: Determination of Water Supply Sufficiency Based on the Requirements of SB 610
- Section 8: Water Supply Assessment Approval Process
- Section 9: References

Relevant citations of Water Code Sections 10910 through 10915 are included throughout this WSA in *italics* to demonstrate compliance with the specific requirements of SB 610.

2.0 DESCRIPTION OF PROPOSED PROJECT

2.1 Proposed Project Location

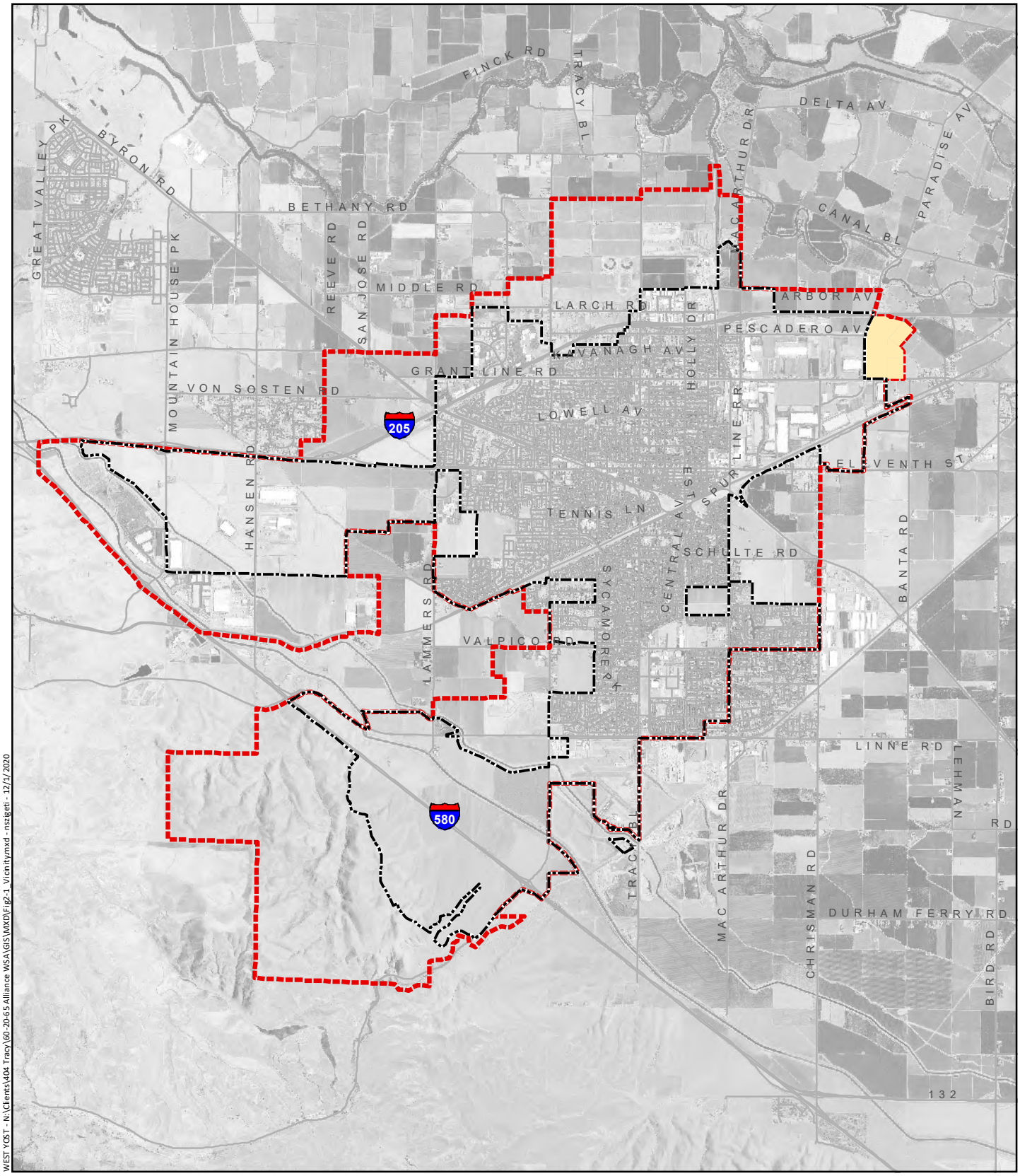
The Proposed Project is located in the City's Sphere of Influence (SOI) northeast of the intersection of Grant Line Road and Paradise Avenue in unincorporated San Joaquin County, California (see Figure 2-1). A close-up view of the six existing parcels is shown on Figure 2-2. If approved, the Proposed Project area would be annexed into the City limits and become part of the Northeast Industrial (NEI) Specific Plan area.

2.2 Proposed Land Uses and Acreages

The Proposed Project area has a City land use designation of "Industrial" and is surrounded by existing and future warehouse distribution and other industrial uses to the south and west, the small unincorporated community of Banta immediately to the east along Grant Line Road, and the Tom Paine Slough and agricultural land within unincorporated San Joaquin County to the north and northeast.

The Proposed Project includes approximately 191 acres of land and would develop six existing parcels with industrial buildings, parking areas, and a stormwater detention basin. Space is also reserved for a future interchange for Interstate 205.[2]

[2] Development plans for the Suvik Farms, LLC and Zuriakat parcels are not specified at this time, but are assumed to develop as industrial land use consistent with the NEI Specific Plan.



WEST YOST - N:\Clients\404 Tracy\60-20-65 Alliance WSA\GIS\MXD\Fig2-1_Vicinity.mxd - nszigeti - 12/1/2020

Symbology

- Tracy Alliance Project
- City Limit
- Sphere of Influence

N

0 4,000 8,000

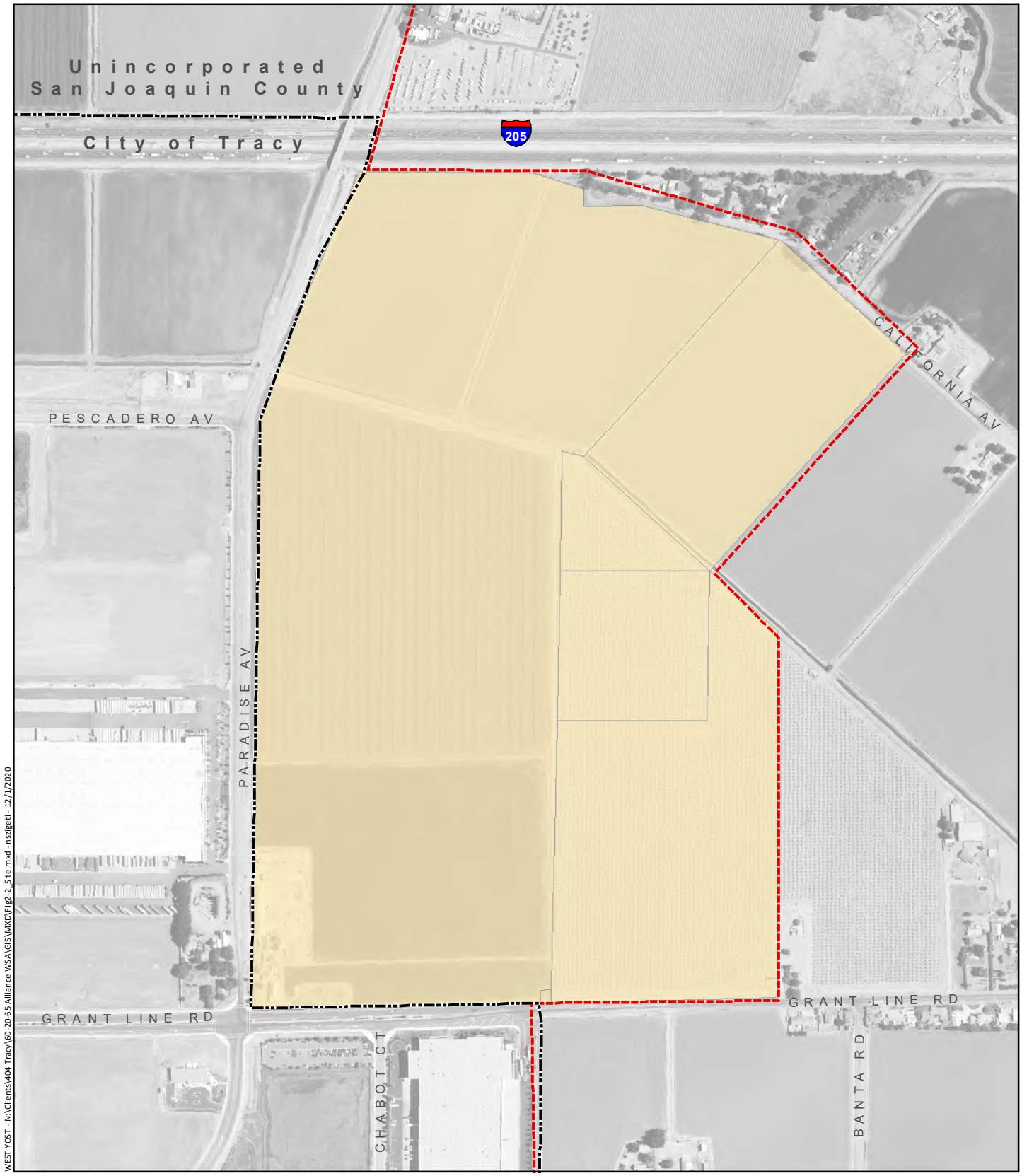
Scale in Feet

WEST YOST

Figure 2-1

Project Vicinity

City of Tracy
Water Supply Assessment
Tracy Alliance Project



Symbology

- Tracy Alliance Project Parcels
- City Limit
- Sphere of Influence

N

0 300 600

Scale in Feet

WEST YOST

Figure 2-2

Project Site

City of Tracy
Water Supply Assessment
Tracy Alliance Project

2.3 Projected Water Demand

In November 2020, a Technical Memorandum (2020 TM) was prepared by West Yost Associates to summarize findings of a hydraulic evaluation for the Proposed Project. The 2020 TM is included in Appendix A. For the purposes of the hydraulic evaluation, potable water was assumed to be used to meet all the Proposed Project's water demands. This is because until recycled water infrastructure is constructed, potable water supplies, if available, may be used to meet non-potable water demands within the Proposed Project area.

Table 2-1 below is from the 2020 TM and contains a summary of the Proposed Project's water use factors and projected potable water use. As noted, the water use factors are consistent with the City's WSMP Update.

Table 2-1. Estimated Annual Water Demand for the Proposed Project

Land Use Designation	Total Area, gross acres[(a)]	Potable Water Use Area, acres[(b)]	Landscaped Area, acres[(c)]	Unit Potable Water Use Factors[(d)], af/ac/yr	Annual Potable Water Use, af/yr
Industrial	191.2	162.5	-	1.3	211.3
Irrigation Demand	-	-	28.7	1.9	54.5
UAFW[(e)]	-	-	-	-	28.2
Total	**191.2**	**162.5**	**28.7**	**-**	**294**

(a) City's Notice of Preparation of an Environmental Impact Report and Public Scoping Meeting for the Tracy Alliance Project, dated August 28, 2020.
(b) Consistent with the City's Water System Master Plan (WSMP) Update (October 2021 Draft Report); 85 percent of gross acres are assumed to use potable water.
(c) Consistent with WSMP Update; 15 percent of gross acres are assumed to be landscaped.
(d) Based on the WSMP Update.
(e) Unaccounted-for water (UAFW) is equal to 9.6 percent.

As shown above, projected water demands for buildout of the Proposed Project total approximately 294 acre-feet per year (af/yr) of which approximately 211 af/yr is industrial demand, approximately 55 af/yr is irrigation demand, and approximately 28 af/yr is unaccounted-for water.

As described further in Section 3.4, the Proposed Project's water demand was included in the City's 2020 UWMP as a future projected water demand.

2.4 Projected Water Supply

Water demands for the Proposed Project will be served using the City's existing and future portfolio of water supplies. The inclusion of existing and planned future water supplies is specifically allowed by the Water Code:

> *Water Code Section 10631(b): Identify and quantify, to the extent practicable, the existing and planned sources of water available to the supplier over the same five-year increments described in subdivision (a).*

Proponents of the Proposed Project will provide their proportionate share of required funding to the City for the acquisition and delivery of treated potable and recycled water supplies to the Proposed Project area.

Recycled water infrastructure will need to be constructed to deliver recycled water supplies to the Proposed Project. The City's Water System Master Plan, currently being updated, herein referred to as the WSMP Update, included recommended capital improvement projects for the development of the City's recycled water system. In 2015, the City was awarded a Proposition 84 grant from the California Department of Water Resources (DWR) to fund construction of recycled water distribution facilities. Construction of these facilities is nearly complete. In March 2019, the City received an amended order from the State Water Resources Control Board (SWRCB) approving the change in place of use of its treated wastewater. The order allows for the City to change the point of discharge and place of use of treated wastewater by a reduction in discharge to Old River and use the treated wastewater for industrial and irrigation purposes within the service areas of the City's SOI, Byron Bethany Irrigation District (BBID) within the City's SOI, and West Side Irrigation District (WSID).

3.0 REQUIRED DETERMINATIONS

3.1 Does SB 610 apply to the Proposed Project?

Water Code Section 10910 (a) Any city or county that determines that a project, as defined in Section 10912, is subject to the California Environmental Quality Act (Division 13 (commencing with Section 21000) of the Public Resources Code) under Section 21080 of the Public Resources Code shall comply with this part.

Water Code Section 10912 (a) "Project" means any of the following:

(1) A proposed residential development of more than 500 dwelling units.

(2) A proposed shopping center or business establishment employing more than 1,000 persons or having more than 500,000 square feet of floor space.

(3) A proposed commercial office building employing more than 1,000 persons or having more than 250,000 square feet of floor space.

(4) A proposed hotel or motel, or both, having more than 500 rooms.

(5) A proposed industrial, manufacturing, or processing plant, or industrial park planned to house more than 1,000 persons, occupying more than 40 acres of land, or having more than 650,000 square feet of floor area.

(6) A mixed-use project that includes one or more of the projects specified in this subdivision.

(7) A project that would demand an amount of water equivalent to, or greater than, the amount of water required by a 500-dwelling unit project.

Based on the following facts, SB 610 does apply to the Proposed Project.

- The City has determined that the Proposed Project is subject to the California Environmental Quality Act (CEQA) and that an Environmental Impact Report (EIR) is required.
- The Proposed Project, with more than 40 acres of industrial land use, meets the definition of a "Project" as specified in Water Code Section 10912(a) paragraph (5) as defined for an industrial development.

The Proposed Project has not been the subject of a previously adopted WSA and has not been included in an adopted WSA for a larger project. Therefore, according to Water Code Section 10910(a), a WSA is required for the Proposed Project.

3.2 Does SB 221 apply to the Proposed Project?

In 2001, SB 221 amended State law to require that approval by a city or county of certain residential subdivisions requires an affirmative written verification of sufficient water supply. Per California Government Code Section 66473.7(a)(1), a subdivision means a proposed residential development of more than 500 dwelling units. As the Proposed Project does not include residential development, it is not subject to the requirements of SB 221.

3.3 Who is the Identified Public Water System?

Water Code Section 10910(b) The city or county, at the time that it determines whether an environmental impact report, a negative declaration, or a mitigated negative declaration is required for any project subject to the California Environmental Quality Act pursuant to Section 21080.1 of the Public Resources Code, shall identify any water system that is, or may become as a result of supplying water to the project identified pursuant to this subdivision, a public water system, as defined by Section 10912, that may supply water for the project.

Water Code Section 10912 (c) "Public water system" means a system for the provision of piped water to the public for human consumption that has 3,000 or more service connections…

As shown on Figure 2-1, the Proposed Project is located within the City's SOI, just outside of the City limits. The City's water system service area includes all areas within the City limits and the SOI as they are annexed into the City. Therefore, the City is the identified public water system for the Proposed Project.

3.4 Does the City have an adopted Urban Water Management Plan (UWMP) and does the UWMP include the projected water demand for the Proposed Project?

Water Code Section 10910(c)(1) The city or county, at the time it makes the determination required under Section 21080.1 of the Public Resources Code, shall request each public water system identified pursuant to subdivision (b) to determine whether the projected water demand associated with a proposed project was included as part of the most recently adopted urban water management plan adopted pursuant to Part 2.6 (commencing with Section 10610).

The City's most recently adopted UWMP (2020 UWMP) was adopted by the Tracy City Council in June 2021 and is incorporated by reference into this WSA[3]. The 2020 UWMP included water demand projections for current water demands within the City (baseline demand) and anticipated water demands associated with future development projects and planning areas within the City's SOI through 2045. The Proposed Project was included in the demand projections as a future service area in the 2020 UWMP.

The City's ability to meet the projected water demands for the Proposed Project, as defined in the 2020 UWMP, is described in Section 7 of this WSA.

[3] City of Tracy 2020 Urban Water Management Plan, prepared by Erler & Kalinowski, Inc., June 2021.

4.0 CITY OF TRACY WATER SERVICE AREA

4.1 Water Service Area

The City of Tracy is located in San Joaquin County, California, about 68 miles south of Sacramento and 60 miles east of San Francisco. The existing incorporated area of the City encompasses approximately 22 square miles. The City's General Plan includes the area outside of the City limits that the City expects to annex and urbanize in the future. It is the expected physical limit of the City based on the most current information. During the City's recent General Plan update process and in response to Local Agency Formation Commission (LAFCo) policies established in 2007, revisions to the City's SOI were made to more accurately reflect locations where the City may grow in the future and locations where no urban growth is expected. The recently adopted revised SOI encompasses an area of approximately 42 square miles and is 20 square miles larger than the current City limits.

The City's water service area is coterminous with the City limits. As future developments within the SOI, but outside the City limits, are approved, they will be annexed into the City and served by the City's water system. Figure 2-1 illustrates the current City limits and SOI boundaries. The Proposed Project is located outside the existing City limits, but within the SOI.

4.2 Population

The State of California Department of Finance (DOF) population estimate for the City as of January 1, 2020 was 95,931 people[4]. In 2020, the City also served 118 residences in the Larch Clover County Services District (CSD), and the average persons per household factor was 3.51 (per DOF). Therefore, the City's total population served in 2020 was estimated to be 96,345.

Future population projections for the City are described in the 2020 UWMP and are summarized as follows. Population growth was rapid in the City over the 15-year period of 1990 through 2005, with the City growing by 139 percent. Between 2005 and 2020, however, growth has slowed relative to historical rates; population increased approximately 68 percent during this 15-year period. The reduction in growth rate has likely been caused by a combination of economic forces, such as the economic downturn of 2008 through 2011, and measures taken by the City to limit growth. In 1987, the City adopted a residential Growth Management Ordinance (GMO), which was amended in 2000 by the voter-initiative Measure A. The objective of the GMO and Measure A is to achieve a steady and orderly growth rate that allows for the adequate provision of services and community facilities and includes a balance of housing opportunities. Under the GMO, builders must obtain a Residential Growth Allotment (RGA) to secure a residential building permit. The GMO limits the number of RGAs and building permits to an average of 600 housing units per year for market-rate housing, with a maximum of 750 units in any single year, although there are exceptions for affordable housing and certain active adult residential uses (General Plan, 2011).

[4] State of California, Department of Finance, Report E-5 Population Estimates for Cities, Counties, and the State, 2011-2020, with 2010 Benchmark, released May 1, 2020.

The population estimates for 2020 through 2045 presented in the 2020 UWMP are projected using the methodology used in the City's WSMP Update, which is currently in draft form. It incorporates assumptions about the number of dwelling units for each proposed development and planning area at buildout, an assumed number of people per dwelling unit (people/du), and the timing of planned development over this time frame.

Table 4-1 shows the City's projected population in five-year increments to the year 2045.

Table 4-1. City of Tracy Historical and Projected Population

Population	Year	Population
Historical	1990	32,827
	1995	44,906
	2000	57,298
	2005	78,613
	2010	83,312
	2015	85,707
	2020	96,345
Projected	2025	109,900
	2030	120,367
	2035	130,833
	2040	141,300
	2045	166,700

Source: City of Tracy 2020 UWMP, Table 3-1 Current and Projected Service Area Population, June 2021; includes residents served by the City in the Larch Clover CSD.

4.3 Climate

Spring, summer, and fall are generally hot in the City, with temperatures often reaching over 100 degrees Fahrenheit on summer days. The City's winters are usually mild, although the dense "Tule fog" can last for weeks. Annual rainfall averages 9.9 inches and is generally confined to the wet season from late October to early May. The average reference evapotranspiration (ETo) for the region is 48.4 inches.

Table 4-2 summarizes the City's average ETo, temperature, and rainfall data.

Table 4-2. City of Tracy Climate Data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Total or Average
Average ET_o, inches	1.0	1.5	2.9	4.5	6.1	7.3	7.9	6.7	5.3	3.2	1.3	0.7	48.4
Average Maximum Temperature, °F	54.1	61.0	66.7	73.1	80.7	88.0	93.6	92.1	87.9	78.5	64.9	54.7	74.6
Average Minimum Temperature, °F	36.7	40.0	42.6	45.5	50.4	55.2	57.1	55.7	53.9	48.7	42.1	36.6	47.0
Average Rainfall, inches	1.9	1.7	1.4	0.8	0.5	0.1	0.0	0.1	0.2	0.5	1.1	1.6	9.9

Source: City of Tracy 2020 UWMP, Table 3-3 Climate Characteristics, June 2021.

5.0 CITY OF TRACY WATER DEMANDS

> *Water Code Section 10910(c)(2) If the projected water demand associated with the proposed project was accounted for in the most recently adopted urban water management plan, the public water system may incorporate the requested information from the urban water management plan in preparing the elements of the assessment required to comply with subdivisions (d), (e), (f), and (g).*

The descriptions provided below for the City's water demands have been taken, for the most part, from the 2020 UWMP, which was adopted in June 2021. Supplemental information from other available reports has been included to provide the most recent data available and to meet the specific requirements of SB 610.

5.1 Historical and Existing Water Demand

The City's water demand has increased significantly in the last 30 years. In 1986, the City's water demand was 8,104 af/yr and by 2007 the City's water demand had increased to 19,176 af/yr. In recent years, the City's water demand has decreased as a result of the economic downturn of 2008 through 2011 and water use reductions in response to recent drought conditions. Water demands have rebounded (increased) somewhat in recent years with the end of drought conditions and increased development activity. Table 5-1 shows the City's water demand (based on water production) from 2012 to 2020.

Table 5-1. Historical Potable Water Demand

Condition	2012	2013	2014	2015	2016	2017	2018	2019	2020
Total Water Demand, af/yr	18,052	18,587	16,213	14,041	15,360	18,160	17,420	17,672	19,527

Source: City of Tracy 2020 UWMP, Table 4-2 Current and Historical Potable Water Demand and Population, June 2021.

5.2 Future Water Demand

The City's water demand is anticipated to continue to increase as approved projects build out and new developments are approved and constructed in accordance with the City's General Plan within the City's water service area. However, as discussed above, the rate of growth within the City's water service area has slowed as a result of the GMO and the slow economic recovery from the economic downturn between 2008 and 2011. Hence, water demands are not anticipated to increase as rapidly as they have in past years. Buildout for the City is not anticipated within the planning horizon of this WSA. However, in the 2020 UWMP and for the purposes of this WSA, buildout is assumed to occur in 2045 to be conservative in the water reliability analysis.

The 2020 UWMP projected water demands are shown in Table 5-2. The City's projected future water demand was determined based on adopted potable water use factors for various land uses, which were developed based on historical metered water use data, and anticipated timing of future development projects. Buildout of the Proposed Project is included in the 2040 and Buildout water demand projections. A detailed explanation of the adopted demand projection methodology is provided in the City's WSMP Update.

The water demand projections include consideration for reduced future water use as a result of new building codes, improved water use efficiency, and implementation of water conservation measures. The projections also include savings from passive conservation which refers to water savings resulting from actions and activities that do not depend on direct financial assistance or educational programs from the City. These savings result primarily from: (1) the natural replacement of existing plumbing fixtures with water-efficient models required under current plumbing code standards, and (2) the installation of water-efficient fixtures and equipment in new buildings and retrofits as required under CALGreen Building Code Standards.

Table 5-2. Projected Water Demand

Condition	2025	2030	2035	2040	2045
Potable Water Demand, af/yr	20,509	23,100	25,738	28,403	33,079
Recycled Water Demand, af/yr	1,000	2,067	3,133	4,200	6,300
Total Water Demand, af/yr	**21,509**	**25,167**	**28,871**	**32,603**	**39,379**

Source: City of Tracy 2020 UWMP, Table 4-8 Gross Water Use, June 2021.

5.3 Dry Year Water Demand

The City currently has a water conservation program in place, as described in Chapter 9 of the 2020 UWMP. The projected future water demand presented in Table 5-2 includes continued implementation of the City's existing water conservation program demand management measures and is based on future normal hydrologic years. In the 2020 UWMP, the additional water conservation which may occur in single dry or multiple dry years was not assumed to happen. This was a conservative assumption as additional water conservation would likely occur as a result of the City's implementation of additional water conservation measures as outlined in the City's Water Shortage Contingency Plan[5] in response to multiple dry years or other water supply shortages. The City's Water Shortage Contingency Plan includes shortage response actions to reduce water demand and manage supply for water shortage conditions of up to and greater than 50 percent.

As shown in Table 5-1, the City's 2015 demand was significantly lower than 2014 demand in response to the Governor's April 2015 Executive Order B-29-15 mandating 25 percent water conservation statewide. To reduce water use by 25 percent statewide, the SWRCB adopted a regulation which placed each urban water supplier into one of eight tiers which were assigned a conservation standard, ranging between 4 percent and 36 percent. Each month, the SWRCB compared every urban water suppliers' water use with their use for the same month in 2013 to determine if they were on track for meeting their conservation standard. The City was initially placed into Tier 7 with a water conservation standard of 28 percent as compared to 2013 use (the City's conservation standard was reduced to 25 percent in early 2016).

[5] The City's Water Shortage Contingency Plan is incorporated into the Water Management Chapter of the Tracy Municipal Code Chapter 11.28 and Appendix H of the City's 2020 UWMP.

In response, City Council authorized the implementation and amendment of the City's Phase III and IV water restrictions in June 2015 (as defined in Chapter 11.28 of the Tracy Municipal Code) to meet SWRCB emergency drought regulations described above. The City's water conservation efforts and results are an example of the City's ability to implement its Water Shortage Contingency Plan and reduce water demands in the event of an emergency water supply shortage. In May 2016, the City's water demand was 32.6 percent less than in May 2013, and the City's cumulative savings from June 2015 to May 2016 was 27.2 percent as compared to 2013, indicating the responsiveness of the City's residents to the call for water conservation[6].

As described above, in the 2012-2016 statewide drought, the City met (exceeded) its water conservation goals of 25 percent. For purposes of this WSA and to be conservative, the City assumes that dry year potable water demand is the same as normal year demand.

[6] SWRCB May 2016 Supplier Conservation Compliance (data from June 21, 2016), SWRCB Water Conservation Portal – Conservation Reporting .

6.0 CITY OF TRACY WATER SUPPLIES

Water Code Section 10910(c)(2) If the projected water demand associated with the proposed project was accounted for in the most recently adopted urban water management plan, the public water system may incorporate the requested information from the urban water management plan in preparing the elements of the assessment required to comply with subdivisions (d), (e), (f) and (g).

Water Code Section 10910(d)(1) The assessment required by this section shall include an identification of any existing water supply entitlements, water rights, or water service contracts relevant to the identified water supply for the proposed project, and a description of the quantities of water received in prior years by the public water system, or the city or county if either is required to comply with this part pursuant to subdivision (b), under the existing water supply entitlements, water rights, or water service contracts.

Water Code Section 10910(d)(2) An identification of existing water supply entitlements, water rights, or water service contracts held by the public water system, or the city or county if either is required to comply with this part pursuant to subdivision (b), shall be demonstrated by providing information related to all of the following:

(A) Written contracts or other proof of entitlement to an identified water supply.

(B) Copies of a capital outlay program for financing the delivery of a water supply that has been adopted by the public water system.

(C) Federal, state, and local permits for construction of necessary infrastructure associated with delivering the water supply.

(D) Any necessary regulatory approvals that are required in order to be able to convey or deliver the water supply.

Water Code Section 10910(e) If no water has been received in prior years by the public water system, or the city or county if either is required to comply with this part pursuant to subdivision (b), under the existing water supply entitlements, water rights, or water service contracts, the public water system, or the city or county if either is required to comply with this part pursuant to subdivision (b), shall also include in its water supply assessment pursuant to subdivision (c), an identification of the other public water systems or water service contract-holders that receive a water supply or have existing water supply entitlements, water rights, or water service contracts, to the same source of water as the public water system, or the city or county if either is required to comply with this part pursuant to subdivision (b), has identified as a source of water supply within its water supply assessments.

The Proposed Project, if approved by the City, is anticipated to be served from City's existing and future portfolio of water supplies. The inclusion of existing and planned future water supplies is specifically allowed by the Water Code:

Water Code Section 10631(b): Identify and quantify, to the extent practicable, the existing and planned sources of water available to the supplier over the same five-year increments described in subdivision (a).

The water supply for the Proposed Project will have the same water supply reliability and water quality as the water supply available to the City's other existing and future water customers. Proponents of the Proposed Project will provide their proportionate share of required funding to the City for the acquisition and delivery of treated potable and recycled water supplies to the Proposed Project area.

The water supplies needed to serve the Proposed Project (together with existing water demands and planned future uses) are predominantly described in the 2020 UWMP. Therefore, the descriptions provided below for the City's water supplies have been taken, for the most part, from the 2020 UWMP, which was adopted in June 2021. Supplemental information from other available reports, including the City's WSMP Update, has also been included to provide the most recent data available and to meet the specific requirements of SB 610.

6.1 Existing Potable Water Supplies

The City currently receives water from the following sources:

- Untreated surface water from the Central Valley Project (CVP) via the Delta-Mendota Canal (DMC) (treated at the City's John Jones Water Treatment Plant);
- Surface water from the Stanislaus River via the South County Water Supply Project (SCWSP) (delivered by the South San Joaquin Irrigation District [SSJID]);
- Groundwater pumped from nine groundwater wells located within the City; and,
- Untreated surface water from the BBID pre-1914 rights (treated at the City's John Jones Water Treatment Plant).

Also, the City has entered into an agreement with the Semitropic Water Storage District for storage of water supplies for use in dry years and has implemented an Aquifer Storage and Recovery (ASR) Program to allow for injection of surface water supplies into the underlying groundwater basin for storage and later extraction.

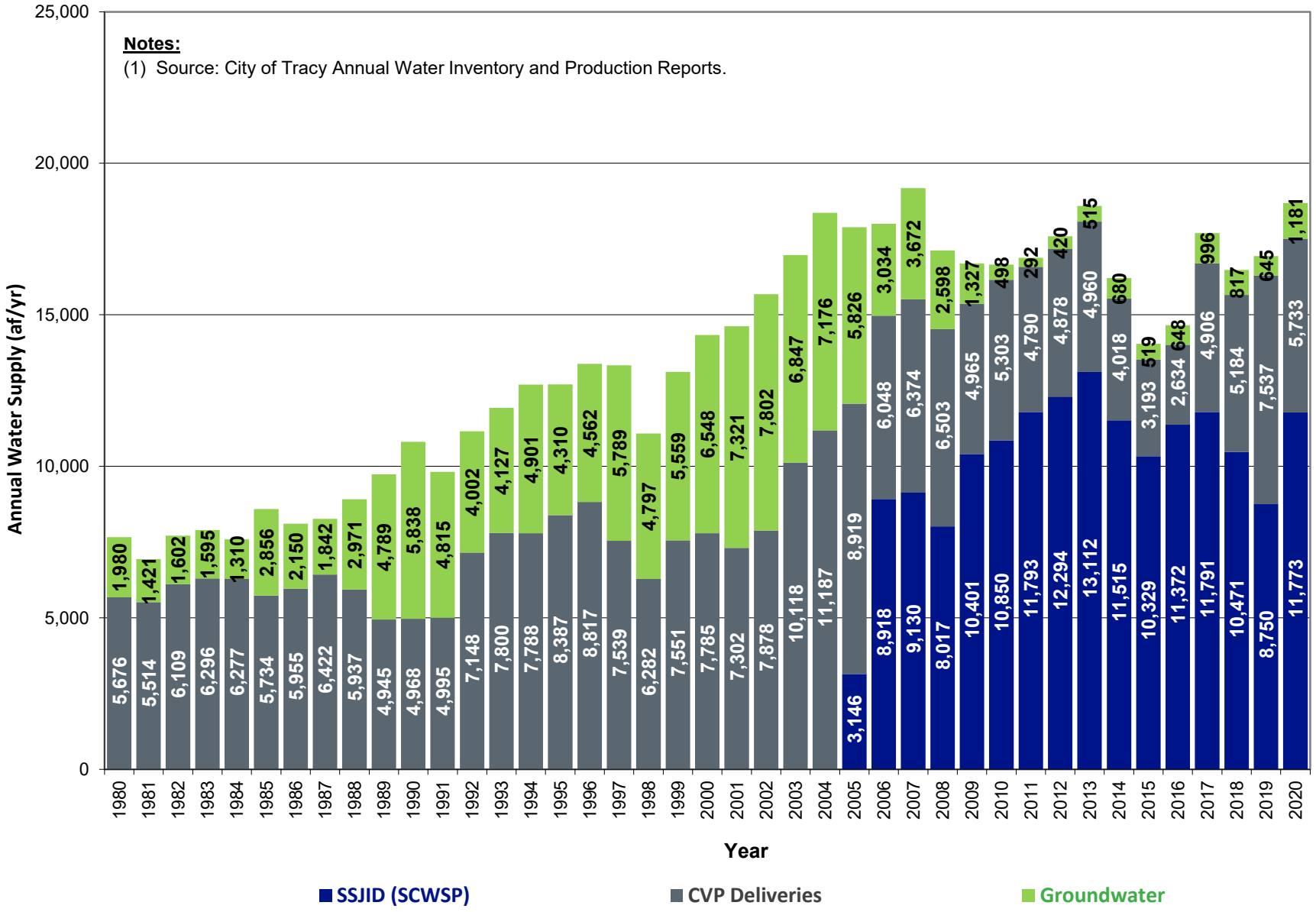
Each of these existing supplies is described below. Summary tables listing the City's existing and additional planned future water supplies, and historical and anticipated future quantities, are provided in Section 6.5, following the discussion of the City's additional planned future water supplies. Figure 6-1 shows the City's historical use of these existing water supplies.

6.1.1 Central Valley Project Water via the Delta-Mendota Canal

The City has contractual entitlements for Central Valley Project (CVP) water as detailed below. In the aggregate, the City's contractual entitlement to the municipal and industrial (M&I) reliability CVP water and assignments of agricultural (Ag) reliability water CVP water from BCID and WSID are referred to as the City's "Existing Contract" with the United States Bureau of Reclamation (USBR). The total quantity of CVP water available to the City under its Existing Contract is 20,000 af/yr (10,000 af/yr of M&I-reliability water and 10,000 af/yr of Ag-reliability water).

The City's CVP water supplies are treated at the City's John Jones Water Treatment Plant (JJWTP), which was originally constructed in 1979, expanded in 1988, and then expanded again in 2008. The JJWTP is located just north of the DMC in the southern portion of the City. With the latest plant expansion, the current treatment capacity of the JJWTP is 30 million gallons per day (mgd) which is sufficient to treat all of the City's CVP water supplies.

Figure 6-1. City of Tracy Historical Potable Water Supplies



The City also treats and serves CVP water purchased by others. Over the period 2010 through 2018, an average of approximately 630 af/yr of water from the Plain View Water District's (now BBID's) USBR allocation was treated at the JJWTP and delivered to the Patterson Pass Business Park through the City's water distribution system. A comparable quantity of BBID water is anticipated to be treated and delivered annually to the Patterson Pass Business Park in the future. Neither the water supply nor the demand for Patterson Pass Business Park are included in the City supply and demand estimates because the water supply is BBID's, not the City's, and the City only provides water treatment, delivery and billing services on a contractual basis for the Patterson Pass Business Park; the City does not manage either the supply or the demand.

6.1.1.1 Municipal and Industrial Reliability Contract

In July 1974, the City entered into a 40-year contract with the United States Bureau of Reclamation (USBR) for an annual entitlement of 10,000 af/yr of surface water from the CVP via the DMC. The original USBR contract expired in 2014; however, since December 2013, the City and USBR have entered into a series of two-year interim renewal contracts to provide water service to the City while the terms of the long-term contract renewal were negotiated. In November 2021, the Tracy City Council approved a new long-term contract with USBR which became effective on December 1, 2021. The new contract is for 20,000 af/yr, which aggregates the City's M&I-reliability supplies and Ag-reliability supplies (discussed below) from the CVP. The new contract does not have a termination date and would continue as long as water is available and delivered.

6.1.1.2 Agricultural Reliability Contract

In 2004, the USBR approved the assignment of 5,000 af/yr of Ag-reliability CVP contract entitlement to the City from the Banta Carbona Irrigation District (BCID). Concurrently, the USBR approved the assignment of 2,500 af/yr of Ag-reliability CVP contract entitlement water to the City from WSID, with the option to purchase an additional 2,500 af/yr of CVP contract entitlement from the WSID. In December 2013, the City and WSID approved the additional assignment in which the City's current assignment of WSID CVP water is 5,000 af/yr.

6.1.1.3 South-of-Delta Allocations

The City's CVP water supplies are subject to allocations determined by the USBR for 'South-of-Delta' contractors. Historical M&I and Ag allocations for the CVP water supplies are summarized in Table 6-1. Based on the historical record, the City's long-term average allocation of CVP water pursuant to the contract is anticipated to be at least 85 percent of the total entitlement. However, due to recent environmental concerns in the Delta and potential future impacts due to climate change, the normal year reliability of CVP water was assumed to be 75 percent in the 2020 UWMP. In addition, the City conservatively estimated that it will receive 50 percent of its Ag-reliability contractual entitlement in normal water years.[7]

During dry years, a CVP M&I contractor is typically eligible for a minimum shortage allocation equal to 75 percent of adjusted historical use. Per the CVP M&I Water Shortage Allocation Plan, the minimum shortage allocation may be reduced further when the allocation of Ag-reliability water in that year is reduced below 25 percent of contract entitlement. The component of the City's CVP supply that carries

[7] City of Tracy 2020 UWMP, June 2021, Section 7.1.2.1.

Ag-reliability is subject to more significant reductions and is much more dependent on yearly hydrologic conditions than the City's M&I-reliability allocation.

Table 6-1. Historical Allocations for USBR Central Valley Project Water Supplies

Year	M&I Allocation for South of Delta Contractors (% of contract supply unless otherwise noted)	Ag Allocation for South of Delta Contractors (% of contract supply unless otherwise noted)
2005	100	85
2006	100	100
2007	75	50
2008	75	40
2009	60	10
2010	75	45
2011	100	80
2012	75	40
2013	70	20
2014	50	0
2015	Public health and safety needs or 25 percent of historical use, whichever is greater	0
2016	55 percent of historical use	5
2017	100 percent of contract amount	100
2018	Public health and safety needs or 75 percent of historical use, whichever is greater	50
2019	100 percent of historical use	75
2020	Public health and safety needs or 70 percent of historical use, whichever is greater	20

6.1.1.4 CVP Water Supply Reliability

In February 2017, new guidelines and procedures went into effect associated with the updated CVP Municipal and Industrial Water Shortage Policy. In general, the policy provides for the following:

- When M&I contractor allocations are at 100 percent, the allocation of M&I water will be based on Contract Total.
- When M&I contractor allocations are below 100 percent, the allocation of M&I water will be based on a contractor's historical use of CVP M&I water.
- An M&I contractor's historical use will be determined by calculating the average quantity of CVP water put to beneficial use within the service area during the last three years of water deliveries that were unconstrained by the availability of CVP water.

The City's reliability assumptions in the 2020 UWMP are sufficiently conservative to adhere to the 2017 guidelines. The City's CVP water single dry year reliability is based on adjusted historical use and provided in its 2020 UWMP, and are assumed as 25 percent for M&I CVP water, and 0 percent for Ag CVP water. Similarly, the City's CVP water multiple dry year reliability is based on adjusted historical use and provided in its 2020 UWMP and are assumed as 40 percent for M&I CVP water, and 0 percent for Ag CVP water.

6.1.2 Surface Water from BBID Pre-1914 Water Rights

Part of the proposed Tracy Hills Specific Plan area was annexed into the BBID and is entitled to water service from BBID, using BBID's pre-1914 appropriative water rights. This water is delivered to the City via the DMC and is treated at the City's JJWTP before delivery to the Tracy Hills Specific Plan area. The City anticipates that up to 4,500 af/yr of pre-1914 water rights water could be provided by BBID on a year-round basis to serve the Tracy Hills Specific Plan in the BBID service area. However, the volume of water available to the City through this agreement is limited to the demand in the BBID service area portion of the Tracy Hills Specific Plan. The projected potable water demand in this area is estimated to be 3,330 af/yr at Buildout. Because the water supply is based on pre-1914 appropriative rights, the supply is considered to be firm and well-established.

6.1.3 Stanislaus River Water

The City receives Stanislaus River water, in partnership with the cities of Manteca, Lathrop and Escalon, and the SSJID. This partnership constructed the South County Water Supply Project (SCWSP), which consists of the 36 mgd Nick C. DeGroot Water Treatment Plant (DGWTP) near Woodward Reservoir in Stanislaus County and a transmission pipeline to deliver treated surface water to each city. The water supply source for the SCWSP is based on SSJID's senior pre-1914 appropriative water rights to the Stanislaus River, coupled with an agreement with the USBR to store water in New Melones Reservoir.

As part of the SCWSP, the City was initially allocated up to 10,000 af/yr of water based upon SSJID's senior water rights. In 2006, the City entered into a temporary contract with Escalon to purchase Escalon's allocation of 2,015 af/yr of SCWSP supply until Escalon constructs the necessary infrastructure to convey the SCWSP water.[8] In August 2013, SSJID and the Cities of Tracy and Lathrop approved a Lathrop-Tracy Purchase, Sale and Amendment Agreement for the sale of a portion of the City of Lathrop's SCWSP supply and capacity to the City of Tracy. The agreement provides the City with an additional 1,120 af/yr of SCWSP supply and 2 mgd of SCWSP capacity. Thus, the City's current contractual amount of SCWSP water is 13,135 af/yr in total. Once the agreement with Escalon sunsets (anticipated to occur in 2025), the City's contractual allocation will be reduced to 11,120 af/yr. This additional SCWSP supply has the same reliability as the City's original SCWSP supplies.

Treated water deliveries from the SCWSP commenced in July 2005, and deliveries have been essentially uninterrupted since then (see Figure 6-1). Although the City full allocation was available in first few years, deliveries to the City were less than its allocation because the full allocation was not needed. However, in some years since 2009 the City has actually received more than its allocation.

Due to the seniority of the water rights underling the SCWSP, SSJID's pre-1914 appropriative rights to Stanislaus River water, the City has historically assigned a high reliability to SCWSP water. However, in

[8] Escalon Amendment to Tracy- SSJID Water Supply Development Agreement, March 2006.

December 2018, the SWRCB released amendments to the Water Quality Control Plan for the San Francisco/Sacramento-San Joaquin Delta Estuary (Bay-Delta Plan Amendment) which included significant changes and could result in significant surface water cutbacks. In its 2020 UWMP, SSJID presented a water reliability analysis assuming that the Bay-Delta Plan Amendment will not be implemented given its uncertainties. As an SSJID retail agency customer, the City relies on SSJID for the reliability projections for the Stanislaus River water supply. Consistent with SSJID's approach, the City's 2020 UWMP assumes that the Bay-Delta Plan Amendment will not be implemented. However, to fully assess the potential impacts of the Bay-Delta Plan Amendment and better plan for the potential shortfalls, the City conducted a parallel set of reliability analyses assuming that the Bay-Delta Plan Amendment will be implemented and included it as Appendix G of its 2020 UWMP.[9] Uncertainties regarding dry year supply projections are discussed in Section 7.2.

Consistent with the City's 2020 UWMP and for the purposes of this WSA, the City is assumed to receive 100 percent of its SCWSP contractual entitlement in normal years. In future dry years, the City assumed that allocations would be based on the City's contractual entitlement, rather than consumption in a given year. In single dry years, the City expects to receive 76 percent of its SCWSP water supply allocation during 2025, 2030, and 2035 and 56 percent during 2040 and 2045, based on information received from SSJID. In multiple dry years, the City expects to receive 56 to 100 percent of its SCWSP water supply allocation, depending on hydrological conditions. In addition, SCWSP water transferred from Escalon is assumed to be unavailable after 2025.

The anticipated availability and reliability of the SCWSP supply under normal years, single dry years and multiple dry years may be revised based on updated evaluations in conjunction with resolutions of issues associated with the Bay-Delta Plan Amendment. Further, SSJID anticipates the likelihood that more water will be available for local purposes in 2040 based on more efficient water management and urban development displacing irrigated agricultural land uses.[10]

6.1.4 Groundwater

> *Water Code Section 10910(f) If a water supply for a proposed project includes groundwater, the following additional information shall be included in the water supply assessment.*
>
> *Water Code Section 10910(f)(1) A review of any information contained in the urban water management plan relevant to the identified water supply for the proposed project.*
>
> *Water Code Section 10910(f)(2) A description of any groundwater basin or basins from which the proposed project will be supplied. For those basins for which a court or the board has adjudicated the rights to pump groundwater, a copy of the order or decree adopted by the court or the board and a description of the amount of groundwater the public water system, or the city or county if either is required to comply with this part pursuant to subdivision (b), has the legal right to pump under the order or decree. For basins that have not been adjudicated, information as to whether the department has identified the basin or basins as overdrafted or has projected that the basin will become overdrafted if present management conditions continue, in the most current bulletin of the department that characterizes the condition of the groundwater basin, and a detailed description by the public water system, or the city or county if either is required to comply with this part pursuant to subdivision (b), of the efforts being undertaken in the basin or basins to eliminate the long-term overdraft condition.*

[9] City of Tracy 2020 UWMP, June 2021, Section 7.1.1.3.

[10] City of Tracy 2020 UWMP, June 2021, Section 7.1.1.2.

Water Code Section 10910(f)(3) A detailed description and analysis of the amount and location of groundwater pumped by the public water system, or the city or county if either is required to comply with this part pursuant to subdivision (b), for the past five years from any groundwater basin from which the proposed project will be supplied. The description and analysis shall be based on information that is reasonably available, including, but not limited to, historical use records.

A detailed description and analysis of the amount and location of groundwater that is projected to be pumped by the public water system, or the city or county if either is required to comply with this part pursuant to subdivision (b), from any basin from which the proposed project will be supplied. The description and analysis shall be based on information that is reasonably available, including, but not limited to, historical use records.

Water Code Section 10910(f)(4) An analysis of the sufficiency of the groundwater from the basin or basins from which the proposed project will be supplied to meet the projected water demand associated with the proposed project.

A water assessment shall not be required to include the information required by this paragraph if the public water system determines, as part of the review required by paragraph (1), that the sufficiency of groundwater necessary to meet the initial and projected water demand associated with the project was addressed in the description and analysis required by paragraph (4) of subdivision (b) of Section 10631.

The City's surface water supply is supplemented by local groundwater. The City overlies a portion of the San Joaquin Valley Groundwater Basin-Tracy Subbasin (Tracy Subbasin). The City currently operates nine groundwater wells, with a total extraction capacity of about 18,300 gallons per minute (gpm), or 26 mgd (GEI, 2015). Four wells (Production Wells 1, 2, 3 and 4) are located near the City's JJWTP and pump directly into the JJWTP clearwells, where the groundwater is blended with treated surface water. The other wells (Lincoln Well, Lewis Manor Well (Well 5), Park and Ride Well (Well 6), Ball Park Well (Well 7) and Well 8) are located throughout the City and pump water directly into the distribution system after disinfection. The City's newest well, Well 8, located near the intersection of Tracy Boulevard and 6th Street, was designed as an ASR well, and has been put into service as an ASR well as permitted by the Central Valley Regional Water Quality Control Board. The City's ASR use is described in Section 6.1.5.

6.1.4.1 Basin Description

The City overlies the Tracy Subbasin (Basin; Department of Water Resources [DWR] 5-22.15) of the San Joaquin Valley Groundwater Basin (DWR 5-22). The Tracy Subbasin is not adjudicated, and it is not in a condition of critical overdraft.

The following section describes the Tracy Subbasin, including its water-bearing formations, water levels, and water quality. Much of the following information has been incorporated from the 2020 UWMP. Except where noted, the description of the subbasin is based largely on information provided in the 2003 DWR Bulletin 118, in which the groundwater basin description was last updated in January 2006. The Tracy Subbasin is designated as a medium priority basin under DWR's 2019 Phase 2 Basin Prioritization (DWR, 2019a).

The Tracy Subbasin covers an area of approximately 373 square miles. It is bounded on the northwest by the Old River south to the tri-county confluence point and on the south by the Clifton Forebay where it then follows the Contra Costa-Alameda County line to the foothills of the Coastal Range mountains. The northeast boundary follows the San Joaquin River south to the San Joaquin County Line with a slight jog to include the City of Lathrop on the west side of the river. The southern border of the Subbasin generally follows the San Joaquin-Stanislaus County line, with some irregular areas belonging to the Delta-Mendota Subbasin to the south. The western border follows the Coastal Range foothills from the San Joaquin-Stanislaus County line; north to the Contra Costa-Alameda County line. The Subbasin is a mix of Delta islands (mostly agriculture) and waterways along with urban and agricultural communities on the southern edge.[11]

Adjacent to the Tracy Subbasin are the Eastern San Joaquin Subbasin to the east, the Delta-Mendota Subbasin to the south, and the Sacramento Valley Groundwater Basin to the north. The three subbasins, not including the Sacramento Valley Groundwater Basin, are part of the San Joaquin Valley Groundwater Basin. The San Joaquin River and one of its major west side tributaries, Corral Hollow Creek, provide drainage from the Tracy Subbasin. The San Joaquin River flows northward into the Sacramento and San Joaquin Delta and discharges into San Francisco Bay.

The Tracy Subbasin is comprised of continental deposits of Late Tertiary to Quaternary age. These deposits include the Tulare Formation, Older Alluvium, Flood Basin Deposits, and Younger Alluvium. The cumulative thickness of these deposits increases from a few hundred feet near the Coast Range foothills on the west to about 3,000 feet along the eastern margin of the subbasin.

Each of these formations is described below.

- The Tulare Formation is exposed in the Coast Range foothills along the western margin of the subbasin and dips eastward toward the axis of the San Joaquin Valley. The Tulare Formation is approximately 1,400 feet thick and consists of semi-consolidated, poorly sorted, discontinuous deposits of clay, silt, and gravel. The Corcoran Clay occurs near the top of the Tulare Formation and confines the underlying fresh water deposits. The eastern limit of the Corcoran Clay is near the eastern boundary of the subbasin. The Tulare Formation is moderately permeable, with most of the larger agricultural, municipal, and industrial wells completed below the Corcoran Clay and capable of producing up to about 3,000 gpm. Smaller, domestic wells are typically completed above the Corcoran Clay, where the groundwater is often of poor quality. Specific yield values for the Tulare Formation in the San Joaquin Valley and Delta area range from 7 to 10 percent.
- The Older Alluvium is approximately 150 feet thick and consists of loosely to moderately compacted sand, silt, and gravel deposited in alluvial fans during the Pliocene and Pleistocene eras. The Older Alluvium is widely exposed between the Coast Range foothills and the Delta and is moderately to locally highly permeable.

[11] GEI, 2020. Draft Tracy Subbasin Groundwater Sustainability Plan, Chapters 1-3, June 23, 2020.

- The Flood Basin Deposits occur in the Delta portion of the subbasin and are the distal equivalents of the Tulare Formation and Older and Younger alluvial units. The Flood Basin Deposits consist primarily of silts and clays with occasional interbeds of gravel along the present waterways. Because of their fine-grained nature, the Flood Basin Deposits have low permeability and generally yield low quantities of water to wells. Occasional zones of fresh water are found in the Flood Basin Deposits, but they generally contain poor quality groundwater. The maximum thickness of the Flood Basin Deposits is about 1,400 feet.
- The Younger Alluvium includes those deposits that are currently accumulating, including sediments deposited in the channels of active streams, as well as overbank deposits and terraces of these active streams. The Younger Alluvium, consisting of unconsolidated silt, fine- to medium-grained sand, and gravel, is present to depths of less than 100 feet below ground surface (bgs) along the channel of Corral Hollow Creek. Sand and gravel zones in the Younger Alluvium are highly permeable and, where saturated, yield significant quantities of water to wells.

6.1.4.2 Groundwater Management

6.1.4.2.1 Pre-SGMA Groundwater Management

Prior to the passage of the Sustainable Groundwater Management Act (SGMA) in 2014, the 1992 Groundwater Management Act, Assembly Bill (AB) 3030, established provisions by which local water agencies could develop and implement Groundwater Management Plans (GWMP). GWMPs are generally designed to prevent local and regional aquifer overdraft, which reduces available groundwater resources and which, under certain conditions, can lead to degradation of water quality and to land subsidence.

The City, BBID, Banta-Carbona Irrigation District (BCID), and San Joaquin County formed a Groundwater Advisory Committee to facilitate the development of a regional GWMP for the Tracy Subbasin. The planning area of the Tracy GWMP encompassed the portion of the Tracy Subbasin underlying San Joaquin County. The Tracy GWMP was adopted in 2007 and is available on the San Luis & Delta-Mendota Water Authority website:
http://sldmwa.org/OHTDocs/pdf_documents/Groundwater/GroundwaterManagementPlanNorthernApproved11_2011.pdf

The key results of the Tracy GWMP included the following:

- Developed a general consensus among stakeholders regarding the characterization of the area's water problems, current and future demands, and groundwater conditions;
- Documented the region's groundwater management goals and establishing basin management objectives to help measure progress in attaining the goals;
- Developed specific solutions and common programs for the basin; and
- Provided an implementation plan to direct future groundwater management activities.

The Tracy GWMP concluded that the Tracy Subbasin is full, but experiences groundwater quality issues in portions of the basin associated with nitrate, boron, sulfate, chloride, and total dissolved solids (TDS). As such, many of the groundwater management options that were recommended focused on creating available storage and managing pumping in order to increase water quality within the Tracy Subbasin.

San Joaquin County is the designated Monitoring Entity under CASGEM for the portion of the Tracy Subbasin underlying the county. However, upon submission of the GSP, the CASGEM program will be superseded by the SGMA monitoring efforts.

6.1.4.2.2 SGMA Groundwater Management

On August 29, 2014, the California Legislature passed comprehensive groundwater legislation contained in SBs 1168 and 1319, and AB 1739, which are collectively referred to as SGMA. This legislation was signed by Governor Brown on September 16, 2014 and it became effective on January 1, 2015. The legislative intent of SGMA is to provide sustainable management of groundwater basins, enhance local management of groundwater, establish minimum standards for sustainable groundwater management, and provide local groundwater agencies with the authority and the technical and financial assistance necessary to sustainably manage groundwater.

The Tracy Subbasin is designated by DWR as a medium priority basin (DWR, 2019a). As such, the Tracy Subbasin is subject to the requirements of SGMA, which include the formation of a one or more Groundwater Sustainability Agencies (GSAs) and the development and implementation of one or more Groundwater Sustainability Plans (GSPs) by January 31, 2022. If the statutory deadline is not met for GSP development and/or implementation, the State has the authority to intervene and manage groundwater within non-compliant subbasins. SGMA requires that adopted GSPs result in sustainable groundwater management which avoids undesirable results.

The Tracy Subbasin contained areas of San Joaquin, Contra Costa and Alameda Counties. The Banta-Carbona Irrigation District, Byron-Bethany Irrigation District, City of Tracy, City of Lathrop, Stewart Tract, West Side Irrigation District, and San Joaquin County are GSAs within the Tracy Subbasin. The GSAs recognize that developing and adopting a single GSP for the subbasin would be the most efficient way of achieving sustainability and preventing State intervention into local groundwater management.

Working with San Joaquin County and the Tracy Subbasin GSAs, a Memorandum of Agreement (MOA) has been developed for the development of the San Joaquin County GSP for the Tracy Subbasin. Under the terms of the MOA, San Joaquin County is designated as the lead entity to enter into an agreement with the City of Brentwood to coordinate the allocation of grant funds.

The City, BCID, BBID[12], City of Lathrop, San Joaquin County, and Stewart Tract are the six GSAs formed in the Tracy Subbasin and are working cooperatively to develop a single GSP. The Tracy Subbasin GSAs were awarded a DWR grant to develop the GSP. Pursuant to the Grant Agreement, each GSA designated an appointee to form the GSP Coordination Committee, and the San Joaquin County was appointed as the Grant Administrator. The Grant Administrator or any two appointees may call meetings of the GSP Coordination Committee as needed to in the GSP development process.

The GSP for the Tracy Subbasin has been completed and is currently in the process of being adopted by each of the GSAs. The Tracy City Council adopted the Final GSP on November 16, 2021. The other GSAs are anticipated to adopt the Final GSP in December 2021. The Final GSP must be submitted to DWR by the

[12] West Side Irrigation District officially merged with Byron-Bethany Irrigation District in September 2020, which occurred later than the release of the draft GSP chapters.

statutory deadline of January 31, 2022. The Draft Final GSP is available for public review on the Tracy Subbasin website: https://tracysubbasin.org/gsp-chapters/.

As one of the six GSAs that are managing the Tracy Subbasin., the City has been actively involved in GSP development activities and will continue to be involved throughout SGMA implementation. The City has one appointee (and an alternate) on the Tracy Subbasin GSP Coordination Committee, which meets quarterly, and the Technical Committee, which meets monthly.

6.1.4.3 Groundwater Yield

Based on a groundwater study the City completed in 2001 (Bookman-Edmonston, 2001), the City is able to withdraw up to 9,000 af/yr from the Tracy Subbasin on an average annual basis. However, groundwater production is constrained by the City's well production and treatment capacity, as the infrastructure is aging. Production is further limited by the water quality issues of the City's groundwater supplies, including high total dissolved solids (TDS) concentrations, hardness, and potential formation of chloramines. As the Groundwater Sustainability Plan (GSP) for the Tracy Subbasin is developed and implemented, the City's groundwater supply reliability may be revisited.

A 1990 Kennedy/Jenks/Chilton (K/J/C) study estimated a perennial groundwater yield of 6,700 af/yr in the Tracy Sub-basin within the Tracy Study Area. However, in 2001, to determine if additional groundwater resources were available in the Tracy Study Area, the City conducted an updated groundwater analysis. The Estimated Groundwater Yield Study, prepared by Bookman-Edmonston Engineering provided an evaluation of potential groundwater yield and determined that a 2,300 af/yr increase of the average annual operational groundwater yield above the groundwater yield recommended in the 1990 K/J/C study could be provided within the estimated safe yield of the Tracy Sub-basin in the Tracy Study Area, without adverse impact to groundwater resources or quality in the Tracy Study Area over a 50-year timeframe. This expansion of groundwater usage to 9,000 af/yr would be within the City's estimated 22,000 af/yr share of the aquifer's estimated total safe yield of 28,000 af/yr (total includes City groundwater usage as well as groundwater usage within West Side Irrigation District, Naglee-Burk Irrigation District, Plain View Water District (now part of the Byron Bethany Irrigation District), and Banta-Carbona Irrigation District). It was also estimated that this expansion of groundwater usage would result in a groundwater level drop of 10 feet but would stabilize at this level.

In 2015, the City hired GEI to perform an assessment on what the effects would be if the City were to pump between 16,000 and 22,000 af/yr for a single year to meet its demands during a drought emergency when no surface water supplies were available. The assessment considered potential impacts on groundwater levels, groundwater quality, and land subsidence. GEI's approach to this assessment was to estimate drawdown beneath the City, including drawdown caused by well interference, under scenarios wherein all of the City's wells were pumped for a single year at rates needed to meet the above stated demands. Drawdown estimates were made using analytical methods and aquifer hydraulic property data from pumping tests performed at two of the City's wells. Results showed that the City does have capacity to pump its wells to meet these single dry year demands, but that drawdown in the City's wells and at locations proximate to the City would exceed that which has been historically observed. GEI (2015) estimated that groundwater levels would recover from their drawdown within approximately seven years.

6.1.4.4 Groundwater Quality

Groundwater quality in the Tracy Subbasin varies spatially and with depth. In general, the northern part of the Tracy Subbasin is characterized by a sodium water type, and the southern part of the Tracy Subbasin is characterized by calcium-sodium water type (Sorenson, 1981). The northern part of the Tracy Subbasin is also characterized by a wide range of anionic water types, including bicarbonate; chloride; and mixed bicarbonate-chloride. Major anions in the southern part of the Tracy Subbasin include sulfate-chloride and bicarbonate-chloride.

There is also a difference between the water quality in the water-bearing zones above the Corcoran Clay (termed the "semi-confined aquifer") and below the Corcoran Clay (termed the "confined aquifer"). Generally, the water quality of the confined aquifer is better than that of the semi-confined aquifer (Stoddard & Associates 1996).

Constituents present at elevated concentrations throughout the Tracy Subbasin in both the semi-confined and confined aquifers include chloride, nitrate, sulfate, and boron. Elevated chloride occurs in several areas near Tracy and along the San Joaquin River. Areas of elevated nitrate occur in the northwestern part of the Tracy Subbasin and in the vicinity of Tracy. Elevated boron occurs over a large portion of the Tracy Subbasin from south of Tracy extending to the northwest side of the Tracy Subbasin. Sulfate concentrations of up to 500 mg/L have been detected in Tracy Subbasin groundwater. The groundwater near Tracy is considered to be very hard (Stoddard & Associates, 1996).

A summary of groundwater quality in the Tracy Subbasin is included in the GSP materials available on the Tracy Subbasin website (https://tracysubbasin.org/). The water quality conditions in groundwater represent conditions for source water, prior to treatment by the City and service to customers.

One water quality concern that the City actively manages is TDS. The City's groundwater supply typically meets the primary maximum contaminant level (MCL) of 1,000 milligrams per liter (mg/L) but frequently exceeds the secondary MCL of 500 mg/L. In 2019, the City's groundwater supply ranged from 386 to 876 mg/L of TDS, with an average concentration of 752 mg/L.[25] Because the TDS concentrations are significantly higher in the groundwater supply than in the City's other water supply sources, in order to meet the secondary MCL in its overall water supply, the City typically scales back its groundwater production from its estimated sustainable yield of 9,000 af/yr, particularly in normal rainfall years.

The City continues to rely on groundwater for peaking, and under drought conditions, it typically increases its groundwater production as needed to meet demands when surface water supplies become more limited. Groundwater quality is not expected to impact the reliability of available water supplies in the 2020 UWMP planning horizon.[13]

[13] City of Tracy 2020 UWMP, June 2021, Section 7.1.1.8.

6.1.4.5 Historical Groundwater Use

As discussed previously, the City currently operates nine groundwater extraction wells:

- Well 1 (at JJWTP)
- Well 2 (at JJWTP)
- Well 3 (at JJWTP)
- Well 4 (at JJWTP)
- Lincoln Well
- Well 5 (Lewis Manor Well)
- Well 6 (Ball Park Well)
- Well 7 (Park & Ride Well)
- Well 8 (for ASR)

The City's newest well, Well 8, was constructed in January 2004 and was permitted by the California Department of Public Health[14] for use as a municipal production well in September 2010, and was used as an ASR demonstration well during 2011, 2012 and 2013, In November 2013, the City received authorization from the Central Valley Regional Water Quality Control Board (RWQCB) to operate Well 8 as an ASR well.

Historically, groundwater had accounted for up to 50 percent of the City's water supply. Prior to 2001, groundwater extraction in Tracy totaled less than 6,000 af/yr. Between 2001 and 2004, to meet increased demands for water, Tracy began extracting additional groundwater, ranging from 6,878 to 7,717 af/yr. In 2005, groundwater extraction decreased to approximately 6,000 af/yr because: (1) the SCWSP was completed and the City began receiving Stanislaus River water, and (2) rainfall was above normal, meaning that the City received a high percentage of its DMC/CVP contractual entitlements. From 2006 to 2010, groundwater extraction ranged from 3,672 af/yr to 498 af/yr, declining as more water was used from SSJID. The City's groundwater production over the last several years is provided in Table 6-2.

Table 6-2. City of Tracy Historical Groundwater Production

Condition	2012[(a)]	2013[(a)]	2014[(a)]	2015[(a)]	2016[(b)]	2017[(b)]	2018[(b)]	2019[(b)]	2020[(b)]
Total Groundwater Production, af/yr	252	515	680	519	648	996	817	645	1,181

(a) Source: City of Tracy 2015 UWMP, Table 5-1 Current and Historical Potable Water Supply, May 2016.
(b) Source: City of Tracy WSMP Update, Table 6-1 Groundwater Volume Pumped, June 2021.

Other groundwater users in the Tracy area include the West Side Irrigation District, Naglee-Burk Irrigation District, Plain View Water District (now the Byron Bethany Irrigation District), and Banta-Carbona Irrigation District. Although current groundwater pumpage by these users was not available for inclusion in this WSA, the 2001 Estimated Groundwater Yield Study, which established the City's estimated groundwater yield of 9,000 af/yr, considered the cumulative groundwater usage in the study area by the City and other users in the Tracy area.

[14] As of July 1, 2014, the State's administration of the Drinking Water Program transferred from the State Department of Public Health to the SWRCB Division of Drinking Water (DDW).

6.1.4.6 Projected Future Groundwater Use

As discussed in Section 6.1.4.3, the City may sustainably pump up to 9,000 af/yr from the local groundwater basin. Since the hard, high TDS groundwater is of lower quality than the City's surface water sources, the City has scaled back its groundwater extraction in most years. However, the City will continue to rely on groundwater for peaking and drought and emergency water supply. Table 6-3 shows the anticipated future groundwater production during a normal year and during dry years.

As can be seen in Table 6-3, the City anticipates that total extraction during a normal year will be 2,500 af/yr through the planning horizon. By reducing groundwater extraction on an average annual basis, the City will: (1) increase the overall quality of its drinking water, thus increasing customer satisfaction and reducing system maintenance and repair caused by the lower-quality groundwater; and (2) recharge the underlying aquifer, effectively increasing the availability of groundwater during a drought or emergency condition (i.e., effectively "banking" groundwater). At the production volumes shown in Table 6-3, the City's groundwater supplies are considered to be 100 percent reliable.

The projected uses of groundwater during droughts shown in Table 6-3 are consistent with the City's Groundwater Management Policy (PMC, 2001). In the event that the City is unable to secure additional high-quality surface water supplies in the future, the City is able to expand groundwater production up to 9,000 af/yr. In the event of a severe water supply shortage or emergency, the City has the ability to increase production dramatically, up to 22,000 af/yr (GEI, 2015).

Table 6-3. City of Tracy Projected Future Groundwater Production in Normal and Dry Years

Condition	2025	2030	2035	2040	2045
Total Groundwater Production During a Normal Year, af/yr[(a)]	2,500	2,500	2,500	2,500	2,500
Total Groundwater Production During Dry Years, af/yr[(b)]	4,500	4,500	4,500	4,500	4,500

(a) *Source: City of Tracy 2020 UWMP, Table 7-2 Projected Water Supply in Normal Years, June 2021.*
(b) Source: *City of Tracy 2020 UWMP, Section 7.1.2.2 and Section 7.1.2.3, June 2021.*

6.1.4.7 Groundwater Sufficiency

The 2020 UWMP addressed the sufficiency of the City's groundwater supplies, in conjunction with the City's other existing and additional water supplies, to meet the City's existing and planned future uses[15]. Based on the information provided above and included in the 2020 UWMP, the City's groundwater supply, together with the City's other existing and additional planned future water supplies, is sufficient to meet the water demands of the Proposed Project, in addition to the City's existing uses.

As discussed above, the City's use of groundwater over the last few years has significantly declined, primarily due to the availability of higher-quality surface water supplies from the SCWSP. In the future, although the City can sustainably extract up to 9,000 af/yr of groundwater on a continuous basis, the City's

[15] Chapter 6, City of Tracy 2020 Urban Water Management Plan, prepared by Erler & Kalinowski, Inc., June 2021.

use of groundwater under normal hydrologic conditions is anticipated to be lower, as available higher-quality surface water supplies would be utilized first. As shown in Table 6-3, in the future, assuming normal year hydrologic conditions, annual groundwater use is anticipated to be 2,500 af/yr. This anticipated future groundwater pumpage is significantly below the City's maximum historical groundwater pumpage (see Figure 6-1) and the average annual operational yield of 9,000 af/yr.

6.1.5 Aquifer Storage and Recovery

The City has been implementing an ASR Program to store surplus treated surface water in the confined aquifer beneath Tracy and extract that water to meet peak demands or supplement surface water sources during dry years. The City has one former groundwater extraction well, Well 8, which has been operated as an ASR well since 2013 after the successful demonstration of ASR feasibility.[16] Well 8 is located near the intersection of Tracy Boulevard and 6th Street and penetrates the Lower Tulare Formation.

The recharge water source of the City's ASR Program is treated SCWSP water.[17] The City's SCWSP water supply is of exceptionally high water quality, with a TDS concentration of approximately 64 milligrams per liter (mg/L).[18] Since the TDS concentration of the recharge water source is much lower than that of the Lower Tulare Formation aquifer's native groundwater, operation of the City's ASR Program reduces the localized salinity of the aquifer, resulting in lower TDS content in water supplies extracted from Well 8 than would be expected in the absence of the ASR Program. Additionally, the reduced salinity in groundwater recovered from Well 8 results in lower salt loading at the City's wastewater treatment plant (WWTP), which eventually reduces the salinity of effluent from the WWTP. This helps the City meet its Regional Water Quality Control Board (RWQCB) effluent salinity requirements and provides environmental benefits to the river ecosystems.

Injection of SCWSP water into the ASR well occurs during the winter months (i.e., November through April), when City demands are low. Extraction occurs primarily in the summer months to meet increased demands associated with irrigation needs, and as needed during droughts and water shortage emergencies. It is estimated that between 685 and 915 af/yr of potable water could be injected into the aquifer, assuming a 5-month continuous injection rate of 1.5 to 2.0 mgd at Well 8. The City's strategic plan for ASR operations at Well 8 involves injecting up to 1,000 af/yr over six months during the winter and extracting 75 percent of the injection volume during the following summer. These operations would result in net injection into the Lower Tulare Formation aquifer, which will gradually create a "buffer supply" that the City can utilize in dry years or during water shortage emergencies. In 2020, a net volume of approximately 190 af was injected and stored at Well 8 for the following year.

The City plans to implement its ASR Program stages as new ASR wells are constructed. The ASR supply will be available to meet demands in dry years, thereby increasing the reliability of the City's water supply during drought conditions or water shortage emergencies.

[16] Notice of Applicability for General Water Quality Order 2012-0010-DWQ-RB5S-0002, Aquifer Storage and Recovery Program, City of Tracy (Well No. 8), San Joaquin County, dated 13 November 2013.

[17] Per the terms of its agreement with the RWQCB, the City is not permitted to inject treated DMC/CVP at Well 8.

[18] City of Tracy 2019 Water Quality Report, https://www.ci.tracy.ca.us/documents/2019_City_of_Tracy_Water_Quality_Report.pdf.

6.1.6 Semitropic Groundwater Storage Bank

The City has acquired the rights to store and recover water in the Semitropic Groundwater Storage Bank (Semitropic) operated by the Semitropic Water Storage District (Semitropic WSD). The Semitropic facilities are located in Kern County alongside the California Aqueduct and the DMC. The first phase of Semitropic was initiated in the early 1990s and established one million acre-feet of storage for a group of agencies referred to as the Original Banking Partners. In response to increased demand for banking capacity, up to 650,000 af of additional storage was created for the Stored Water Recovery Unit (SWRU). When an agency purchases storage capacity in Semitropic, it is able to recover the volume of water it has banked over a period of three consecutive years (i.e., 3,000 af equates to a maximum recovery rate of 1,000 af/yr for three years).

The City originally entered into a pilot agreement with Semitropic WSD in June 2006 for 1,000 af of water storage in Semitropic's SWRU. The pilot agreement was intended to establish the procedures for water deposits and withdrawals by the City and was terminated when the permanent agreement was implemented. In 2012, the City entered into a long-term agreement with Semitropic WSD for up to 10,500 af of storage volume.[19] This storage agreement allows the City to withdraw up to 3,500 af of water annually for three years. To store water in Semitropic, the City withdraws less than its available allocation of CVP water from the DMC. This water travels through the DMC where it is diverted by Semitropic and used for local groundwater recharge. When the City wishes to withdraw water that it has banked previously, Semitropic arranges for the City to divert CVP water beyond its allocation from the DMC. This source of water is provided through either an exchange of Semitropic WSD's contractual entitlement to State Water Project (SWP) water or through direct "pump back" of stored groundwater into the California Aqueduct by Semitropic WSD.

Though the City could utilize this supply in any year, it is most valuable during extended drought years when the City's surface water supplies are reduced. The City anticipates that banking water at Semitropic will increase the reliability of the City's water supply and help close the potential future gap between supply and demand during drought conditions or other water supply shortage emergencies. If the City uses water from the Semitropic water bank in any given year, it would manage its supplies during subsequent years such that it could refill the water bank for future use. The City plans to actively maintain storage in Semitropic as feasible.

As of December 2020, the City had 6,887 af of water in storage at Semitropic.

[19] "Agreement Between City of Tracy and Semitropic Water Storage District and Its Improvement Districts for Participation in the Stored Water Recovery Unit of the Semitropic Water Banking and Exchange Program" dated November 2012.

6.2 Additional Planned Future Potable Water Supplies

In addition to the City's existing potable water supplies described above, the City has a number of additional planned future potable water supplies to meet the City's existing and projected future water demands, including those associated with the Proposed Project. The inclusion of planned future water supplies in this WSA is specifically allowed by the Water Code:

> *Water Code Section 10631(b): Identify and quantify, to the extent practicable, the existing and planned sources of water available to the supplier over the same five-year increments described in subdivision (a).*

The City anticipates implementation of the following projects for additional future potable water supplies:

- ASR Program Expansion
- Recycled Water Distribution Network and Exchange Program for Additional CVP Water Supplies

The City also anticipates increased water supply to meet M&I demands as agricultural land is developed. However, additional water supply through land use conversion has associated constraints that must be resolved.

These additional planned future water supplies are described in further detail below. Summary tables listing the City's existing and additional planned future water supplies, and historical and anticipated future quantities are provided in Section 6.5.

6.2.1 ASR Program Expansion

As described above, the City currently has one ASR well (Well 8) which allows the City to inject excess SCWSP water supplies into the groundwater basin for later extraction when needed. The current injection and extraction capacity is 700 af/yr. The City is planning to expand the ASR program with the installation of additional ASR wells. According to the WSMP Update, the City's ASR Program will be expanded to provide up to 1,000 af/yr of water supplies from the existing and new ASR wells by 2040. The ASR supply will be used to meet demands during dry years, thereby increasing the reliability of the City's water supply and helping to close the potential gap between supply and demand during drought conditions or water shortage emergencies.

One constraint with the City's ASR Program is that the permit only allows for SCWSP water to be injected. This means that the City has to shut down the JJWTP and the groundwater wells during the injection period so that only SCWSP supplies are being utilized. A potential alternative to avoid this operational restriction, if the City's ASR permit cannot be modified to allow for other water supplies to be injected, would be to construct a dedicated SCWSP water pipeline to the ASR well(s). Future expansion of the ASR program will need to fully evaluate these operational restrictions and potential alternatives.

6.2.2 Recycled Water Distribution Network and Exchange Program for Additional CVP Water Supplies

The City is evaluating indirect reuse of its recycled water through an exchange agreement with the USBR, where a portion of the City's recycled water would be discharged into the DMC, and a like amount of water would be diverted from the DMC for treatment at the JJWTP for potable use. This project is considered an essential part of the City's projected future water supply portfolio as it provides the following multiple benefits:

- Provides for the beneficial use of recycled water;
- Provides an additional potable water supply for the City;
- Improves water supply reliability and reduces the City's dependence on other imported supplies;
- Builds on the existing wastewater and recycled water infrastructure; and
- Reduces salt loading in the Delta as USBR has to release additional water from the New Melones Reservoir to meet Delta salinity standards.

The Recycled Water Distribution Network and Exchange Program would require development of a project description, National Environmental Policy Act (NEPA) / California Environmental Quality Act (CEQA) review, an exchange agreement with the USBR, and design and construction of a new recycled water pipeline to discharge recycled water to the DMC downstream of the City's JJWTP intake. Assuming such a project is implemented, the City expects that it would initially provide an estimated 1,925 af/yr of potable water, and future expansion of the program could be implemented as needed to meet future demands up to 7,500 af/yr. This supply would be 100 percent reliable and would not be subject to drought cutbacks.

6.2.3 Additional Central Valley Project Water Supplies from BBID via the Delta-Mendota Canal

Additional BBID DMC/CVP water supplies may be available to the City as agricultural land is converted to M&I uses. The land area that could potentially provide this additional water supply includes the portion of BBID's service area that falls within the City's planning areas (excluding the BBID Raw Water Service Area 2). Eligible land area is estimated to be approximately 2,600 acres. While the exact quantity of water that would be available is unknown, a contractual entitlement equal to 3.4 af/yr/acre may be available, resulting in a total supply of up to 8,800 af/yr (2,600 acres x 3.4 af/yr/acre).

The additional water supplies would, however, have agricultural reliability similar to the City's Ag reliability CVP supplies described in Section 6.1.1.2 above and would be subject to significant cutbacks in dry years. Agreements between the City and BBID, as well as environmental review, would need to occur before such a transaction could take place.

Because of the uncertainty associated with the availability and reliability of this supply source, especially in dry years, for purposes of the City's 2020 UWMP and this WSA, this future water supply is assumed to be unavailable to the City.

6.3 Additional Planned Future Non-Potable Water Supplies

6.3.1 Recycled Water

The City has invested in infrastructure to produce and deliver recycled water. The City's WWTP has sufficient treatment capacity to produce approximately 9.0 mgd of tertiary-treated recycled water meeting the Title 22 requirements, which can be reused for landscape irrigation and other non-potable uses. The City's current recycled water system consists of a pump station at the WWTP and approximately 7.6 miles of recycled water transmission line from the WWTP west to Lammers Road and south to W. Schulte Road. Currently the only service connection is for the Legacy Fields Sports Complex.

6.3.1.1 Planned Uses Within Service Area

At this time, no recycled water is used within the City's service area. The City is planning to expand the existing recycled water system to serve future development areas, as well as a small number of existing parks and irrigated areas. New developments in the City are required to include recycled water distribution systems in accordance with the City's Recycled and Non-Potable Water Ordinance (Tracy Municipal Code, Chapter 11.30). The City's Department of Utilities and Development Services are coordinating planning efforts to connect existing water customers and new development to recycled water.

The City intends to expand the existing recycled water system to serve non-potable water demands in most of the new development areas. Recycled water is planned to be used at: (a) parks, sports fields, and other landscape areas; (b) industrial facilities such as the Tracy Power Plant; (c) fill stations for dust control during construction, street sweeping, and residential emergency landscape irrigation; and (d) the proposed lakes at Tracy Village. The future recycled water use was estimated to be 1,000 af/yr in 2025, increasing to 6,300 af/yr in 2045 as new development areas build out, based on the adopted unit water demand factors and the future dwelling units or gross acreage.

Several future service areas already have recycled water distribution pipelines installed by developers, including Cordes Ranch, Ellis Specific Plan Phase 1, and Tracy Hills Phase 1. These pipelines are not yet connected to the recycled water mains, but instead are temporarily connected to the potable water system to meet irrigation demands. Once recycled water system construction is complete and the appropriate permitting is completed, the pipelines will be connected to the recycled water system and the temporary connections to the potable water system will be removed.

6.3.1.2 Other Potential Future Uses

The City is considering other potential future uses for recycled water. As described in Section 6.2.2, the City is evaluating the use recycled water in exchange for additional CVP supply through the proposed Recycled Water Distribution Network and Exchange Program.

The City is also considering the potential for direct potable reuse of recycled water in the future. With direct potable reuse, recycled water would be discharged directly into the DMC and then conveyed to downstream users, including the City. However, the project is in the conceptual evaluation stage and therefore the future recycled water use associated with this potential approach is not quantified.

6.3.2 Shallow Non-Potable Groundwater

The Tracy Subbasin underlying the City has two aquifers: semi-confined and confined. The City's production wells draw groundwater solely from the confined portion of the Lower Tulare Formation aquifer. Above the confining Corcoran Clay is shallow groundwater that is not currently used for groundwater production. The water quality is considered to be not suitable for direct use due to the poor water quality. Thus, it is not included as a future supply source.

6.4 Summary of Existing and Additional Planned Future Water Supplies

Table 6-4 provides a summary of the City's existing and additional planned future water supply entitlements. As indicated in the table and discussed in Section 6.1, the City has historically used its existing water supply entitlements.

A discussion of the future anticipated availability of these existing and additional planned future water supplies during normal year, single dry year, and multiple dry years is provided in Section 6.5.

Table 6-4. Summary of Existing and Additional Planned Future Water Supplies

Supply	Water Supply Entitlement, af/yr	Supply Used by City
Existing Water Supplies		
USBR CVP - Tracy Contract[a]	10,000	Yes
USBR CVP - BCID Contract[b]	5,000	Yes
USBR CVP - WSID Contract[c]	5,000	Yes
BBID (pre-1914)[d]	3,330	Yes
SCWSP (SSJID) (pre-1914)[e]	11,120	Yes
Groundwater[f]	9,000	Yes
Dry Year Supplies		
Semitropic Water Storage Bank[g]	3,500	Yes
Aquifer Storage and Recovery	1,000	Yes
Additional Planned Future Water Supplies		
Additional USBR CVP (BBID contract)[h]	—	No
Recycled Water Exchange (Potable)	7,500	No
Recycled Water (for non-potable uses)[i]	6,300	No

(a) M&I-reliability CVP water. Assumes the terms of the long-term renewal contract with the USBR are consistent with those of the interim renewal contract entered into between the City and USBR in February 2016.

(b) In June 2001, the USBR approved the assignment of 5,000 af/yr of BCID's contractual entitlement to Ag-reliability CVP water.

(c) In August 2001, the USBR approved the assignment of 2,500 af/yr of WSID's contractual entitlement to Ag-reliability CVP water, with the option to purchase an additional 2,500 af/yr in the future. In December 2013, the City and WSID approved the additional assignment; the City's current assignment of WSID CVP water is 5,000 af/yr.

(d) The City anticipates that up to 4,500 af/yr of BBID pre-1914 water will be available to serve the Tracy Hills Specific Plan development. This water is only available for use in the portion of Tracy Hills that lies within BBID Raw Water Service Area 2 the CVP Consolidated Place of Use, so the quantity of supply is limited to potable water demand in this area. Therefore, the maximum BBID supply delivered to this area is reduced to 3,330 af/yr.

(e) Includes the 10,000 af/yr allocation and the additional 1,120 af/yr obtained through the 2013 Lathrop-Tracy Purchase, Sale, and Amendment Agreement. Does not include the interim purchase from Escalon.

(f) The City is able to withdraw up to 9,000 af/yr of groundwater from the Tracy Subbasin. However, due to the aging infrastructure and water quality issues in the City's groundwater supplies, the City is projecting to be able to withdraw up to 2,500 af/yr in normal years. During dry years, the City anticipates increasing its groundwater production on a short-term basis from the normal year production of 2,500 af/yr to 4,500 af/yr.

(g) The City has purchased 10,500 af of water storage in the Stored Water Recovery Unit, which allows the City to withdraw up to 3,500 af/yr for three consecutive years.

(h) While up to 8,800 af/yr of BBID's Ag-reliability CVP water may be available as agricultural lands are converted to other uses, for purposes of water supply planning, the City assumes this supply will not be available.

(i) Based on the total projected recycled water demand at buildout of the City WSMP Update.

6.5 Water Supply Availability and Reliability

Water Code Section 10910 (c)(4) requires that a WSA include a discussion with regard to "whether total projected water supplies, determined to be available by the city or county for the project during normal, single dry, and multiple dry water years during a 20-year projection, will meet the projected water demand associated with the proposed project, in addition to existing and planned future uses, including agricultural and manufacturing uses." Accordingly, this WSA addresses these three hydrologic conditions through the Year 2045. Further, this WSA provides a discussion of the availability and reliability of the City's available water supplies to meet the City's water demands in the event that the City's surface water supplies are limited under emergency water supply conditions.

The reliability of each of the City's existing and additional planned water supplies and their projected availability during normal, single dry, and multiple dry years is described in Section 6 of the 2020 UWMP. Water supply and demands for these hydrologic years, from 2025 to 2045, are compared in Section 7 of the 2020 UWMP and summarized herein. These hydrologic year types are characterized as follows:

- A **normal year** represents the water supplies available under normal conditions, this could be an averaged range of years or a single representative year;
- A **single dry year** represents the lowest available water supply; and
- A **multiple dry year drought** (also referred to as five-consecutive-year drought) represents the driest five-year period in the historical record.

A summary of the reliability of the City's water supply sources is provided in Table 6-5 and discussed in the following sections.

Table 6-5. Water Supply Reliability in Normal, Single Dry and Multiple Dry Years

Supply Source	Anticipated Reliability (% of Entitlement)		
	Normal Years	Single Dry Years	Multiple Dry Years
Current Water Supplies			
USBR CVP			
M&I Reliability Water (Tracy Contract)[a]	75	25	40
Ag Reliability Water (BCID & WSID Contract)	50	0	0
BBID for Tracy Hills Demand	100	100	100
South County Water Supply Project (SSJID)	100	56-76[b]	56-100[b]
Groundwater[c]	100	100	100
Current Dry Year Supplies			
Semitropic Water Storage Bank[d]	—	0	67
Aquifer Storage and Recovery	—	100	100
Additional Planned Future Water Supplies			
USBR CVP (BBID contract) (Ag Reliability Water)	0	0	0
Recycled Water Exchange (Potable)	100	100	100
Recycled Water (for non-potable uses)[e]	100	100	100

Source: City of Tracy 2020 UWMP, Tables 7-2 and 7-3, and Section 7.1.2.3, June 31, 2020.

(a) Anticipated reliability percentage is based on historical use in accordance with 2017 USBR CVP Municipal and Industrial Water Shortage Policy Update.

(b) Based on information from SSJID.

(c) Although the City can sustainably extract up to 9,000 af/yr of groundwater on a continuous basis, the City is planning to scale back its groundwater extraction in normal years to increase the overall quality of its water supply. With these reduced supply volumes, the groundwater resource is considered 100 percent reliable.

(d) Due to the difficulties experienced by the City in accessing stored water via the DMC, the City has conservatively assumed that 0 percent of the City's Semitropic water supply will be available in the first year of a multiple dry year period and 100 percent will be available in the second and third year. The 67 percent presented in this table for multiple dry years is the average value for a three-year period.

(e) Although recycled water supplies are currently available from the City's WWTP, required recycled water pipelines and pump stations to convey and deliver the recycled water to the recycled water use areas have not yet been constructed. See Section 6.3.1 of this WSA for additional information regarding the City's plan for implementation of its recycled water system.

6.5.1 Normal Years

Normal or wet water years are those that match or exceed median rainfall and runoff levels. The reliability of each of Tracy's existing and future water supplies and their projected availability during normal year is outlined below:

- The City's contract with the USBR for 10,000 af/yr of DMC/CVP water is subject to M&I reliability. Based on the historical record, the City's long-term average allocation of DMC/CVP water pursuant to this contract is anticipated to be at least 85 percent of the total entitlement. However, due to recent environmental concerns in the Delta and potential future impacts due to climate change, the normal year supply of DMC/CVP M&I water is assumed to be 75 percent of the City's historical use. Based on a historical use of 5,930 af/yr (i.e., the average quantity of CVP water put to beneficial use by the City during the last three years of water deliveries that were unconstrained by the availability of CVP water), the projected normal year supply is 4,448 af/yr.
- The City has received acquired assignments from Banta-Carbona Irrigation District (BCID; 5,000 af/yr) and West Side Irrigation District (WSID; 5,000 af/yr) for a total entitlement of 10,000 af/yr of DMC/CVP water. These supplies are subject to Ag-reliability. The City is conservatively estimating that it will receive 50 percent of its Ag-reliability contractual entitlement, or 5,000 af/yr, in normal years.
- The City has acquired up to 4,500 af/yr of pre-1914 appropriative water rights water from BBID. These supplies are restricted in their place of use, and therefore the supply is anticipated to be equal to the projected demand within that place of use (i.e., the Tracy Hills area) ranging from 800 af/yr in 2025 to 3,300 af/yr in 2045. The City anticipates being able to receive 100 percent of this supply in normal years.
- The City has a total contractual entitlement of 13,135 af/yr of Stanislaus River water provided through the SCWSP, including 10,000 af/yr from its original contract with SSJID, 1,120 af/yr purchased from Lathrop, and 2,015 af/yr purchased on an interim basis from Escalon. The agreement between Tracy and Escalon is assumed to terminate after 2025. Based on information provided by SSJID, the City expects to receive 100 percent of its SCWSP water supply allocation during a normal water year. As such, the City anticipates being able to receive 13,135 af/yr of SCWSP supply in 2025 and 11,120 af/yr afterwards, assuming normal year conditions.
- The City is able to withdraw up to 9,000 af/yr of groundwater from the Tracy Subbasin. However, due to the aging infrastructure and water quality issues in the City's groundwater supplies, the City is projecting to be able to withdraw up to 2,500 af/yr in normal years. This groundwater supply is considered to be 100 percent reliable.
- The City does not anticipate using its Semitropic water or ASR water in normal years.
- The City anticipates that a Recycled Water Distribution Network and Exchange agreement will be executed with the USBR by 2030 to provide additional CVP supplies to the City in exchange for the City discharging a like amount of tertiary-treated recycled water to the DMC. The City assumes that the Recycled Water Distribution Network and Exchange will be implemented as needed to meet future demand conditions and is currently projected to supply an amount ranging from 1,925 af/yr in 2030 to 7,500 af/yr in 2045. This water supply is considered to be 100 percent reliable.

- The City's recycled water supply is expected to be 100 percent reliable. Based on the projected non-potable demands and assuming that the City makes investments in infrastructure and permitting, the City estimates that they will have access to 1,000 af/yr of recycled water supply in 2025, increasing to 6,300 af/yr in 2045.

The reliability of each of the City's existing and additional planned future water supplies and their projected availability during normal years at buildout is shown in Table 6-6.

Table 6-6. Projected Existing and Additional Planned Future Water Supplies Available in Normal Years at Buildout

Supply	Percent Allocation/ Entitlement	Projected Available Supplies, af/yr
Existing Water Supplies		
USBR CVP - Tracy Contract[a]	75	4,448
USBR CVP - BCID Contract	50	2,500
USBR CVP - WSID Contract	50	2,500
	Total CVP Supplies	**9,448**
BBID (pre-1914 to meet Tracy Hills demand)	100	3,300
SCWSP (SSJID) (pre-1914)	100	11,120
Groundwater	100	2,500
Semitropic Water Storage Bank[b]	0	0
	Total Existing Potable Supplies	**26,368**
Additional Planned Future Water Supplies[a]		
Additional USBR CVP (BBID contract)	0	0
Aquifer Storage and Recovery[b]	0	0
Recycled Water Exchange	100	7,500
Recycled Water (non-potable)	100	6,300
	Total Additional Planned Future Potable Supplies	**7,500**
	Total Potable Supplies	**33,868**
	Total Additional Planned Future Non-Potable Supplies	**6,300**
	TOTAL WATER SUPPLY	**40,168**

Source: City of Tracy 2020 UWMP, Table 7-2, June 2021.

(a) Percent of historical use
(b) Not used in normal years.

6.5.2 Single Dry Years

During a single dry year, all of the City's existing surface water allotments are subject to some level of reduction. Assumed reductions are based on actual reductions in CVP deliveries experienced in the recent drought and the new USBR M&I Reliability Policy adopted in 2017. The actual reductions will vary with the severity of the regional water supply shortage and climatic conditions, and the consideration of contract agreements.

The reliability of each of Tracy's existing and future water supplies and their projected availability during a single dry year is outlined below and summarized in Table 6-7.

- The City's contract with the USBR for 10,000 af/yr of DMC/CVP water is subject to M&I reliability. During a single dry year, the City estimates to receive 25 percent of the City's historical use. Based on the historical use of 5,930 af/yr, the projected supply is 1,483 af/yr.
- The City has a total entitlement of 10,000 af/yr of DMC/CVP Ag-reliability water. The City anticipates receiving 0 percent of its DMC/CVP Ag-reliability water in a single dry year.
- The City has acquired up to 4,500 af/yr of pre-1914 appropriative water rights water from BBID. This supply is restricted with regard to the place of use (Tracy Hills). The City anticipates being able to receive 85 percent of its contractual entitlement in a single dry year (3,825 af/yr). As the projected demand is 3,300 af/yr in 2045 and is lower than the 3,825 af/yr of available supply, the reduction in reliability does not result in a reduction to actual amount of water used. Therefore, the supply in a single dry year is anticipated to be equal to the projected demand within the Tracy Hills area, ranging from 800 af/yr in 2025 to 3,300 af/yr in 2045.
- The City has a total contractual entitlement of 13,135 af/yr of Stanislaus River water provided through the SCWSP. Based on information provided by SSJID, the City expects to receive 76 percent of its SCWSP water supply allocation during 2025, 2030, and 2035 and 56 percent during 2040 and 2045. In addition, the SCWSP water transferred from Escalon is assumed to be unavailable after 2025. As such, the City estimates 9,974 af/yr of SCWSP supply in 2025, 8,444 af/yr in 2030 and 2035, and 6,177 af/yr afterwards.
- During a single dry year, the City anticipates increasing its groundwater production on a short- term basis from the normal year production of 2,500 af/yr to 4,500 af/yr. The groundwater supply is considered to be 100 percent reliable.
- The City anticipates that 700 af/yr of water will be available for use in a single dry year through operation of its ASR well. An additional 300 af/yr is estimated to be available by 2040 for a total of 1,000 af/yr. This water supply is considered to be 100 percent reliable assuming that the City is consistently able to refill the ASR storage during non-drought years to maintain at least 1,000 af in storage at the beginning of a single dry year.
- The City has acquired 10,500 af/yr of storage in Semitropic, which allows the City to withdraw up to 3,500 af/yr for three consecutive years. Due to the difficulties experienced by the City in accessing stored water via the DMC on a short timeframe, the City has conservatively assumed that the Semitropic water will not be available in a single dry year.
- The City anticipates that a Recycled Water Distribution Network and Exchange agreement will be executed with the USBR by 2030 to provide additional CVP supplies to the City in exchange for the City discharging a like amount of tertiary-treated recycled water to the

DMC. The City assumes that the Recycled Water Distribution Network and Exchange will be implemented as needed to meet future demand conditions and is currently projected to supply an amount ranging from 1,925 af/yr in 2030 to 7,500 af/yr in 2045. This water supply is considered to be 100 percent reliable.

- The City's recycled water supply is expected to be 100 percent reliable. Based on the projected non-potable demands and assuming that the City makes investments in infrastructure and permitting, the City estimates that they will have access to 1,000 af/yr of recycled water supply in 2025, increasing to 6,300 af/yr in 2045.

The reliability of each of the City's existing and additional planned future water supplies and their projected availability during a single dry year at buildout is shown in Table 6-7.

Table 6-7. Projected Existing and Additional Planned Future Water Supplies Available in Single Dry Years at Buildout

Supply	Percent of Entitlement	Projected Available Supplies, af/yr
Existing Water Supplies		
USBR CVP - Tracy Contract[a]	25	1,483
USBR CVP - BCID Contract	0	0
USBR CVP - WSID Contract	0	0
Total CVP Supplies		**1,483**
BBID (pre-1914 to meet Tracy Hills demand)	100	3,300
SCWSP (SSJID) (pre-1914)[b]	56	6,177
Groundwater[c]	100	4,500
Semitropic Water Storage Bank	0	0
Total Existing Potable Supplies		**15,460**
Additional Planned Future Water Supplies		
Additional USBR CVP (BBID contract)	0	0
Aquifer Storage and Recovery[c] [d]	100	1,000
Recycled Water Exchange[c]	100	7,500
Recycled Water (non-potable)[c]	100	6,300
Total Additional Planned Future Potable Supplies		**8,500**
Total Potable Supplies		**23,959**
Total Additional Planned Future Non-Potable Supplies		**6,300**
TOTAL WATER SUPPLY		**30,259**

Source: City of Tracy 2020 UWMP, Table 7-3, June 2021.

(a) Percent of historical use.
(b) Percentage of contract entitlement is based on information from SSJID for 2040 and later.
(c) Groundwater and recycled water volumes assume the City invests in infrastructure and/or permitting.
(d) ASR volumes assume surplus supplies are available in wet years to inject and store, as well as additional investment in ASR construction and operation.

6.5.3 Multiple Dry Years

During multiple dry years, the City's surface water supplies (from both the CVP and SCWSP) may be significantly reduced. Thus, in the event of drought, the City will have to depend more heavily on conservation efforts, groundwater, and the proposed future supply projects.

The reliability of each of Tracy's existing and future water supplies and their projected availability during a five consecutive year drought is outlined below and summarized in Table 6-8.

- The City's contract with the USBR for 10,000 af/yr of DMC/CVP water is subject to M&I reliability. During multiple dry years, the City estimates that it will receive 40 percent of the City's historical use. Based on the historical use of 5,930 af/yr, the projected supply is 2,372 af/yr.
- The City has a total entitlement of 10,000 af/yr of DMC/CVP Ag-reliability water. The City anticipates receiving 0 percent of its DMC/CVP Ag-reliability water in multiple dry years.
- The City has acquired up to 4,500 af/yr of pre-1914 appropriative water rights water from BBID. This supply is restricted with regard to the place of use (Tracy Hills). The City anticipates being able to receive 85 percent of its contractual entitlement in multiple dry years (3,825 af/yr). As the projected demand is 3,300 af/yr in 2045 and is lower than the 3,825 af/yr of available supply, the reduction in reliability does not result in a reduction to actual amount of water used. Therefore, the supply in multiple dry years is anticipated to be equal to the projected demand within the Tracy Hills area, ranging from 800 af/yr in 2025 to 3,300 af/yr in 2045.
- The City has a total contractual entitlement of 13,135 af/yr of Stanislaus River water provided through the SCWSP. Based on information provided by SSJID, the City's SCWSP water supply reliability during multiple dry years range from 56 to 100 percent. In addition, the SCWSP water transferred from Escalon is assumed to be unavailable after 2025. The City's projected SCWSP supply is presented in Table 6-8.
- During multiple dry years, the City anticipates increasing its groundwater production on a short-term basis from the normal year production of 2,500 af/yr to 4,500 af/yr. The groundwater supply is considered to be 100 percent reliable.
- The City anticipates that 700 af of water will be available for use in multiple dry years through operation of its ASR well. An additional 300 af is estimated to be available by 2040 for a total of 1,000 af. The City is assumed to be unable to refill the ASR storage during multiple dry years. Therefore, the annual ASR supply available is assumed to equal one fifth of the total stored volume (i.e., 140 af/yr between 2025 and 2035 and 200 af/yr between 2040 and 2045). This water supply is considered to be 100 percent reliable assuming that the City is consistently able to refill the ASR storage in non-drought years to maintain at least 1,000 af in storage at the beginning of a multiple dry year sequence.

- The City has acquired 10,500 af/yr of storage in Semitropic, which allows the City to withdraw up to 3,500 af/yr for three consecutive years. Due to the difficulties experienced by the City in accessing stored water via the DMC on a short timeframe, the City has conservatively estimated that the 0 percent of the City's storage will be available in the first year of a five-consecutive-year drought, and 100 percent will be available over the following four years. Based on the City's current storage at Semitropic of 6,887 af, the amount available in the second to fifth year of a five- consecutive-year drought is assumed to be 1,722 af/yr (6,887 af divided by four). A similar reliability estimate is provided for all dry-year sequences under the assumption that the City is consistently able to re-fill the water bank in non-drought years to maintain at least 7,000 af/yr in storage at the beginning of a multiple dry year sequence.
- The City anticipates that a Recycled Water Distribution Network and Exchange agreement will be executed with the USBR by 2030 to provide additional CVP supplies to the City in exchange for the City discharging a like amount of tertiary-treated recycled water to the DMC. The City assumes that the Recycled Water Distribution Network and Exchange will be implemented as needed to meet future demand conditions and is currently projected to supply an amount ranging from 1,925 af/yr in 2030 to 7,500 af/yr in 2045. This water supply is considered to be 100 percent reliable.
- The City's recycled water supply is expected to be 100 percent reliable. Based on the projected non-potable demands and assuming that the City makes investments in infrastructure and permitting, the City estimates that they will have access to 1,000 af/yr of recycled water supply in 2025, increasing to 6,300 af/yr in 2045.

The reliability of each of the City's existing and additional planned future water supplies and their projected availability during a five-consecutive-dry year (multiple dry year) period at buildout is shown in Table 6-8.

Table 6-8. Projected Existing and Additional Planned Future Water Supplies Available Five-Consecutive-Dry Years at Buildout

Supply	Percent of Entitlement	Projected Available Supplies, af/yr				
		Year 1	Year 2	Year 3	Year 4	Year 5
Existing Water Supplies						
USBR CVP - Tracy Contract[(a)]	40	2,372	2,372	2,372	2,372	2,372
USBR CVP - BCID Contract	0	0	0	0	0	0
USBR CVP - WSID Contract	0	0	0	0	0	0
Total CVP Supplies		**2,372**	**2,372**	**2,372**	**2,372**	**2,372**
BBID (pre-1914 to meet Tracy Hills demand)	100	3,300	3,300	3,300	3,300	3,300
SCWSP (SSJID) (pre-1914)	*See Note (b)*	11,120	11,120	6,177	6,177	11,120
Groundwater[(c)]	100	4,500	4,500	4,500	4,500	4,500
Semitropic Water Storage Bank	100	0	1,722	1,722	1,722	1,722
Total Existing Potable Supplies		**21,292**	**23,014**	**18,071**	**18,071**	**23,014**
Additional Planned Future Water Supplies						
Additional USBR CVP (BBID contract)	0	0	0	0	0	0
Aquifer Storage and Recovery[(c)(d)]	100	200	200	200	200	200
Recycled Water Exchange[(c)]	100	7,500	7,500	7,500	7,500	7,500
Recycled Water (non-potable)[(c)]	100	6,300	6,300	6,300	6,300	6,300
Total Additional Planned Future Potable Supplies		**7,700**	**7,700**	**7,700**	**7,700**	**7,700**
Total Potable Supplies		**28,992**	**30,714**	**25,771**	**25,771**	**30,714**
Total Additional Planned Future Non-Potable Supplies		**6,300**	**6,300**	**6,300**	**6,300**	**6,300**
TOTAL WATER SUPPLY		**35,292**	**37,014**	**32,071**	**32,071**	**37,014**

Source: City of Tracy 2020 UWMP, Tables 7-4 and 7-5, June 2021.

(a) Percent of historical use.

(b) Information provided by SSJID. SSJID's reliability estimates for a five consecutive year drought were based on the historical supplies available during the 2012 to 2016 drought period. During 2012, 2013, and 2016 (the first, second, and fifth years), SSJID was able to provide the full allocation, whereas during 2014 and 2015 (the third and fourth years), SSJID was only able to provide 75 percent of the full allocation.

(c) Groundwater and recycled water volumes assume the City invests in infrastructure and/or permitting.

(d) ASR volumes assume surplus supplies are available in wet years to inject and store, as well as additional investment in ASR construction and operation.

6.5.4 Emergency Water Supply Conditions

During the recent drought conditions in California, water supply deliveries from the SWP and CVP (and other surface water supply sources throughout California) were severely reduced and even the availability of pre-1914 water rights was challenged. Many water supply agencies, including the City, implemented their Water Shortage Contingency Plans, including mandatory water conservation measures, to reduce water use. Even with 0 percent deliveries from the City's USBR CVP agricultural supplies in 2014, the diversity of the City's water supply portfolio together with water conservation efforts by the City's customers allowed the City to meet all water demands. If the recent drought were to re-occur, and deliveries of surface water supplies are reduced further, the City's Water Shortage Contingency Plan would be enacted as needed.

The City's Water Shortage Contingency Plan includes shortage response actions for six water shortage levels up to greater than 50 percent shortage due to foreseeable or unforeseeable events. The City's Water Shortage Contingency Plan is included in Appendix H of the 2020 UWMP. The City may implement demand reduction actions, supply augmentation, mandatory restrictions, and other actions as appropriate for the shortage level to reduce the gap between supply and demand.

Further, the City has prepared a Water System Emergency Response Plan which provides a framework for emergency response by the City's Utilities Department by describing the department's emergency management organization, roles, and responsibilities and emergency policies and procedures. The Water System Emergency Response Plan provides action plans to be implemented to address the emergency.

7.0 DETERMINATION OF WATER SUPPLY SUFFICIENCY BASED ON REQUIREMENTS OF SB 610

Water Code Section 10910 states:

> *10910(c)(4) If the city or county is required to comply with this part pursuant to subdivision (b), the water supply assessment for the project shall include a discussion with regard to whether the total projected water supplies, determined to be available by the city or county for the project during normal, single dry, and multiple dry water years during a 20-year projection, will meet the projected water demand associated with the proposed project, in addition to existing and planned future uses, including agricultural and manufacturing uses.*

Pursuant to Water Code section 10910(c)(4), analyses were conducted to assess the sufficiency of total projected water supply for existing and planned future demands, including the demands of the Proposed Project, during normal, single dry, and multiple dry water years over a 20-year projection. A service reliability analysis was conducted in Section 7 of the City's 2020 UWMP, which compared future supplies and demand to buildout, assumed as 2045 but is certain to occur beyond that planning horizon. As discussed in Section 5.2, the Proposed Project's demands are included in the City's future water demand projections.

7.1 Sufficiency of Water Supply

Table 7-1 summarizes the projected availability of the City's existing and planned future potable water supplies compared with projected water demands in normal, single dry and multiple dry years at Buildout. Figure 7-1 shows the City's existing and planned future potable water supplies and the City's projected water demands in normal, single dry and multiple dry years under the Buildout time frame, which is expected to occur after 2045.

To be conservative, water demands were assumed to be at normal levels. With future planned projects implemented, the results of the assessment show that water supply is sufficient during normal years. However, during a single dry year or a multiple dry year period, the City must depend more heavily on conservation efforts, groundwater, and the proposed future supply projects to overcome the gap between supply and demand. As described in this WSA and the City's 2020 UWMP, these findings are primarily due to projected reduced reliability of the City's CVP supplies and SSJID supplies in dry years.

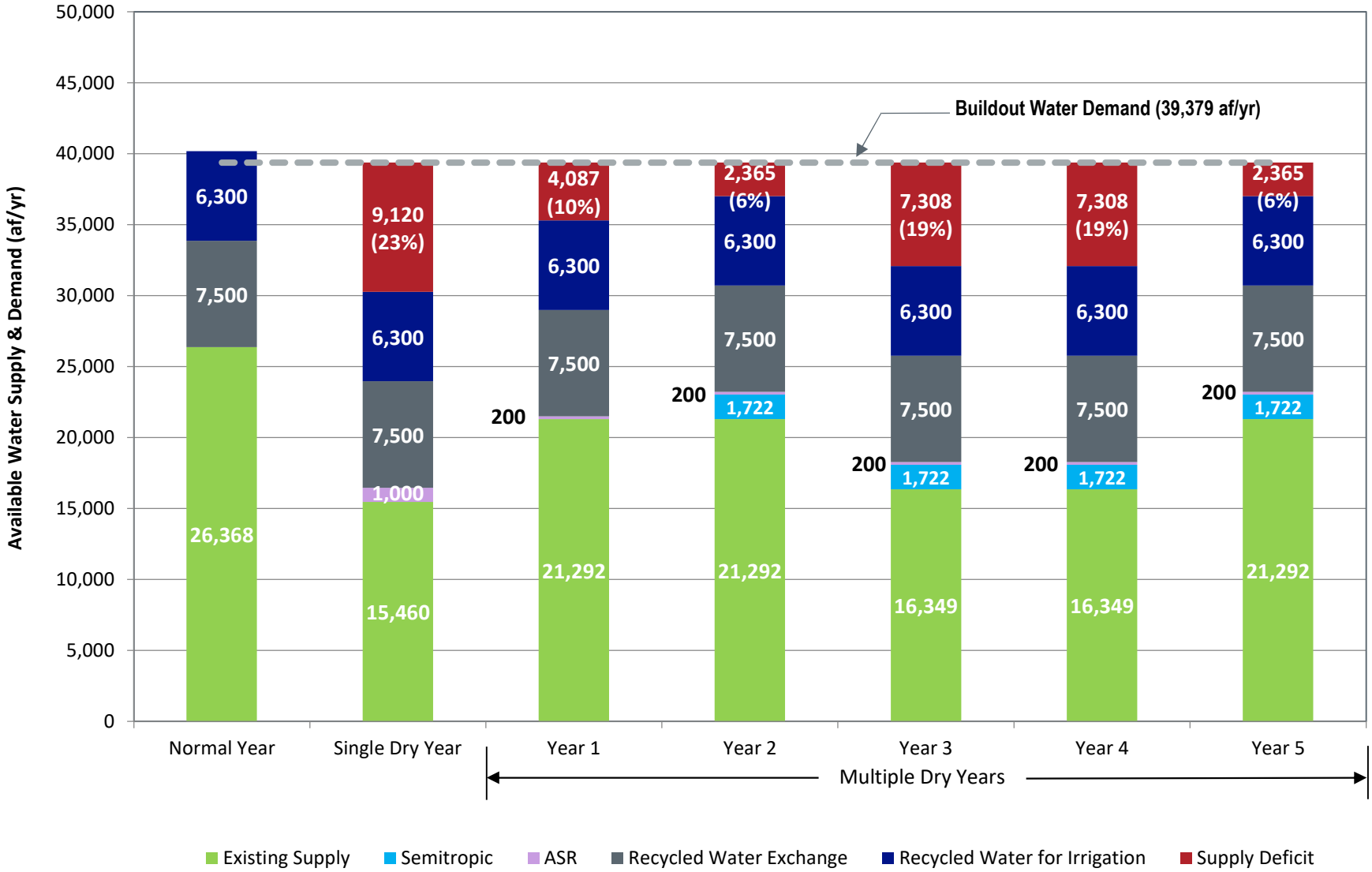
To close the gap between supply and demand during dry years, the City will need to implement its Water Shortage Contingency Plan to reduce water demands. As discussed in Section 5.3, the City has shown that it can achieve its water conservation goals. During the 2012-2016 statewide drought, the City exceeded its water conservation goals of 25 percent. Further, the City must fully implement its proposed future water supply projects, including the Recycled Water Distribution Network and Exchange Program and expansion of the ASR Program. Investments in wet year water supplies will also be needed to refill storage in Semitropic and expand the City's ASR program. Delays in implementing the proposed future water supply projects could result in greater water supply shortages and the need for additional water conservation to meet demands.

Table 7-1. Summary of Buildout Total Water Supply Versus Demand During Hydrologic Normal, Single Dry, and Multiple Dry Years[a]

Hydrologic Condition		Supply and Demand Comparison, af/yr
Normal Year[b]		
Available Total Water Supply		40,168
Total Water Demand (with Proposed Project)		39,379
	Potential Surplus (Deficit)	789
	Percent Shortfall of Demand	-
Single Dry Year[c]		
Available Total Water Supply		30,259
Total Water Demand (with Proposed Project)		39,379
	Potential Surplus (Deficit)	(9,120)
	Percent Shortfall of Demand	23%
Multiple Dry Years[d]		
Year 1	Available Total Water Supply[e]	35,292
	Total Water Demand (with Proposed Project)	39,379
	Potential Surplus (Deficit)	(4,087)
	Percent Shortfall of Demand	10.4%
Year 2	Available Total Water Supply	37,014
	Total Water Demand (with Proposed Project)	39,379
	Potential Surplus (Deficit)	(2,365)
	Percent Shortfall of Demand	6.0%
Year 3	Available Total Water Supply	32,071
	Total Water Demand (with Proposed Project)	39,379
	Potential Surplus (Deficit)	(7,308)
	Percent Shortfall of Demand	18.6%
Year 4	Available Total Water Supply	32,071
	Total Water Demand (with Proposed Project)	39,379
	Potential Surplus (Deficit)	(7,308)
	Percent Shortfall of Demand	18.6%
Year 5	Available Total Water Supply	37,014
	Total Water Demand (with Proposed Project)	39,379
	Potential Surplus (Deficit)	(2,365)
	Percent Shortfall of Demand	6.0%

(a) Water demands are from Table 5-2 .
(b) Normal Year supplies are from Table 6-6.
(c) Single Dry Year supplies are from Table 6-7.
(d) Multiple Dry Year supplies are from Table 6-8.
(e) Assumes 0 percent of the City's storage in Semitropic is available for the first year.

Figure 7-1. City of Tracy Existing and Planned Future Potable Water Supplies vs. Projected Demand - Buildout



The dry year shortfalls presented in Table 7-1 are based on water supply and demand projections with numerous uncertainties and the situation is dynamic as discussed in Section 7 of the 2020 UWMP. The City continues to work on strategies and actions to address the projected water supply shortfall. Uncertainties are itemized below, along with the City's water management strategies and options.

7.2 Uncertainties in Dry Year Water Supply Projections

Significant water supply shortfalls are currently projected in future single and multiple dry years. These projections include numerous sources of uncertainty as summarized below:

- The Bay-Delta Plan Amendment implementation is under negotiation. The SSJID and others are continuing negotiations with the SWRCB on implementation of the Bay-Delta Plan Amendment for water supply cutbacks, particularly during droughts. This is a dynamic situation and the projected drought cutback allocations may need to be revised before the next (i.e., 2025) UWMP depending on the outcome of ongoing negotiations. The City has considered a conservative estimate of the potential impacts of the Bay-Delta Plan Amendment on the SCWSP (and therefore the City), which is provided in Appendix G of its 2020 UWMP.
- The supply yield of the City's development of additional ASR and recycled water supplies are accounted for in current supply projections. However, implementation of these projects will require significant investment by the City. Similarly, investments in wet years supplies will be needed to refill storage in Semitropic and expand the City's ASR program.
- The City continues to work closely with the USBR and SSJID on their rationing policies to ensure that M&I needs can be met. Rationing policies may potentially be revised.
- The City's projected water demands are subject to change in the future based on water conservation policies and regulations for current and future development, and the pace and extent of development.
- Frequency and duration of cutbacks and, therefore, the shortfalls are also uncertain. In addition to the supply volumes, the above listed uncertainties would also impact the projected frequency and duration of shortfalls.

7.3 Water Management Strategies and Options

The City has developed strategies and actions to address the projected supply shortfalls discussed in the City's 2020 UWMP and provided below.

7.3.1 Recycled Water for Non-Potable Use

The City continues to develop recycled water supplies as discussed in Section 6.2. Recycled water is planned to augment non-potable demands that would otherwise be supplied with potable water. Buildout potable water demands could be less than the current projections and therefore the resultant supply shortage will likely to be smaller.

7.3.2 Future Water Supply Projects

The City continues to evaluate the expansion of its existing supply and to obtain new supply sources, including the ASR Program and Recycled Water Distribution Network and Exchange Program. Other potential supply options, such as direct potable reuse of recycled water, are also being considered.

7.3.3 Implementation of Demand Management Measures

The City has an active water conservation program and continues to implement the demand management measures described in Section 9 of its 2020 UWMP. Further, in response to the anticipated future shortfalls, the City has developed a robust Water Shortage Contingency Plan (WSCP) that systematically identifies ways in which the City can reduce water demands. The WSCP is included in Section 8 of its 2020 UWMP.

7.3.4 Policy-Based Water Efficiency Tools

The City is currently exploring other policy-based water efficiency tools that other supply-constrained agencies across California have implemented. These policy-based tools are often bundled together and referred to as Water Demand Offset (WDO) or Water Neutrality policies. Through these policies, project developers are generally required to offset the new demand anticipated by the development through some combination of demand mitigation options, such as:

- **On-site retrofits.** Project developer with existing property reduces total projected water demand by retrofitting existing property with efficient water fixtures. If projected water demand is reduced below baseline for existing property, no off-site WDOs are required. If not, offsite WDOs are required.
- **Off-site retrofits.** Project developer coordinates and pays for installation of water efficient fixtures at other properties or converts existing irrigation systems to recycled water for other off- site properties, typically those owned by other entities.
- **On-site reuse.** Larger scale developments are required to implement on-site reuse of water, including rainwater, greywater, stormwater, and blackwater, as has recently been implemented by the Cities of San Francisco and Menlo Park.
- **Supply augmentation.** Project developer secures its own water supply to serve the development, either through direct provision of water to the development or through an agreement to transfer rights to the water supplier.
- **WDO fees.** Project developer pays fees to implementing entity based on the amount of water offset, and the agency uses the fees to fund water conservation programs. Such conservation programs could include system water loss mitigation projects (e.g., capital improvement, Advanced Metering Infrastructure [AMI] meters, etc.), purchase of water efficient equipment (e.g., NO-DES hydrant flushing machine to recycle water used to flush mains), and recycled water system infrastructure, as well as fixture rebate or retrofit and education-based conservation programs.

Such policies could be designed as a “net neutral” policy wherein the new development is required to offset all new demands associated with the development project and minimize the overall supply reliability impacts for the existing customers.

8.0 WATER SUPPLY ASSESSMENT APPROVAL PROCESS

Water Code Section 10910 (g)(1) Subject to paragraph (2), the governing body of each public water system shall submit the assessment to the city or county not later than 90 days from the date on which the request was received. The governing body of each public water system, or the city or county if either is required to comply with this act pursuant to subdivision (b), shall approve the assessment prepared pursuant to this section at a regular or special meeting.

Water Code Section 10911 (b) The city or county shall include the water supply assessment provided pursuant to Section 10910, and any information provided pursuant to subdivision (a), in any environmental document prepared for the project pursuant to Division 13 (commencing with Section 21000) of the Public Resources Code.

As the approving agency for the Proposed Project, the Tracy City Council must approve this WSA at a regular or special meeting. Furthermore, the City must include this WSA and its findings in the Draft Environmental Impact Report (EIR) that is being prepared for the Proposed Project.

9.0 REFERENCES

Bookman-Edmonston. 2001. *Estimated Groundwater Yield Study.*

City of Tracy. 2011. *General Plan Amendment*, adopted by City Council on February 1, 2011.

City of Tracy. 2016. 2015 Urban Water Management Plan, prepared by Erler & Kalinowski, Inc., adopted by City Council on May 17, 2016.

City of Tracy. 2021. 2020 Urban Water Management Plan, prepared by EKI Environment and Water, adopted by City Council on June 15, 2021.

GEI Consultants. 2014. *Summary of Groundwater Conditions*, October 2011 through September 2013, prepared for City of Tracy. November 25, 2014.

GEI Consultants. 2015. *Groundwater Assessment for Drought Emergency Conditions Requiring Groundwater to be Used as the Sole Source of Potable Water Supply*, prepared for City of Tracy. August 10, 2015.

Kennedy/Jenks/Chilton. 1990. *Tracy Area Groundwater Yield Evaluation*, Appendix B, Table B-2.

Pacific Municipal Consultants. 2011. *Groundwater Management Policy Mitigated Negative Declaration*, prepared for City of Tracy. December 7, 2011.

Pueblo Water Resources. 2011. *Interim (Final) Status Report for Well 8 ASR Demonstration Program Memorandum, prepared for City of Tracy.* December 7, 2011.

Sorenson, S.K. 1981. *Chemical Quality of Groundwater in San Joaquin and Part of Contra Costa Counties, California,* Water Resources Investigation 81-26, USGS.

Stoddard & Associates. 1996. *Groundwater Management Plan for the Northern Agencies in the Delta-Mendota Canal Service Area and a Portion of San Joaquin County.* Revised April 1996.

West Yost Associates. 2012. *Citywide Water System Master Plan*, Final Report, prepared for City of Tracy. December 2012.

West Yost Associates. 2020. *Technical Memorandum: Hydraulic Evaluation of Tracy Alliance Project,* prepared for City of Tracy. November 2020.

West Yost Associates, 2021. *Citywide Water System Master Plan Update*, Draft Report, prepared for City of Tracy. October 2021.

Appendix A

2020 Hydraulic Evaluation of Tracy Alliance Project Technical Memorandum

WEST YOST
Water. Engineered.

6800 Koll Center Parkway
Suite 150
Pleasanton CA 94566

925.426.2580 phone
530.756.5991 fax
westyost.com

TECHNICAL MEMORANDUM

DATE: November 20, 2020

Project No.: 404-60-20-63
SENT VIA: EMAIL

TO: Paul Verma, City of Tracy

CC: Robert Armijo, City of Tracy
Al Gali, City of Tracy

FROM: Roger Chu, PE, RCE #87591
Nathaniel Homan, PE, RCE #89903

REVIEWED BY: Amy Kwong, PE, RCE #73213

SUBJECT: Hydraulic Evaluation of Tracy Alliance Project

This Technical Memorandum (TM) summarizes West Yost's technical evaluation of the ability of the City of Tracy's (City) existing potable water distribution system to meet the required minimum pressures and flows for the proposed Tracy Alliance Project (Project).

This TM is submitted in accordance with West Yost's May 2020 Scope of Work for engineering services to the City; however, the following evaluation is based on the updated methodologies and standards specified in the 2020 Citywide Water System Master Plan update (2020 WSMP) and not the previously adopted 2012 Citywide Water System Master Plan. The scope of this evaluation does not include review of water supply availability or water treatment plant capacity for the Project, as these items are discussed in other documents, such as the City's Water System Master Plan. In addition, this evaluation does not determine the adequacy of any private pipelines to serve the Project.

The following sections summarize West Yost's findings and conclusions:

- Project Description
- Estimated Water Demand for the Project
- Storage Capacity Evaluation
- Hydraulic Evaluation Findings
- Summary of Evaluation and Recommendations

PROJECT DESCRIPTION

As shown on Figure 1, the Project is located outside the existing City limits (but within its Sphere of Influence and General Plan area) in unincorporated San Joaquin County, northeast of the intersection of

Grant Line Road and Paradise Avenue. The Project consists of six parcels that will be annexed into the City and become part of the Northeast Industrial (NEI) Specific Plan area.

The Project will develop approximately 191 acres of agricultural land into industrial buildings, parking areas, and a stormwater detention basin. Space is also reserved for a future interchange for Interstate 205. It should be noted that development plans for the Suvik Farms, LLC and Zuriakat parcels are not specified at this time, but it is assumed that they would develop as industrial land use consistent with the NEI Specific Plan. Potable water service for the Project will be provided by the City's existing Pressure Zone 1 (Zone 1) pipelines located in Paradise Avenue and Grant Line Road.

ESTIMATED WATER DEMAND FOR THE PROJECT

Water demands were projected for the Project using the unit water demand factors adopted in the 2020 WSMP. Table 1 shows the Project's proposed land use, water use factors, and projected annual potable water use. Project acreages are based on information provided in the City's Notice of Preparation memo[1], with two parcels (owned by Tracy Alliance Group) totaling approximately 122.4 acres, three parcels (Suvik Farms, LLC) totaling approximately 46.6 acres, and one parcel (Zuriakat) at approximately 22.2 acres. The total potable water demand for the Project (domestic and irrigation) is estimated at 294 acre-feet per year (af/yr).

This evaluation assumes potable water will be used to meet all Project water demands. The City has yet to construct infrastructure to deliver recycled water to the Project, so potable water will be used to meet non-potable water demands in the interim. Once the City's recycled water system can supply the Project, potable water demands should decrease.

Table 1. Estimated Annual Water Demand for the Project

Land Use Designation	Total Area[(a)], gross acres	Potable Water Use Area[(b)], acres	Landscaped Area[(c)], acres	Unit Potable Water Use Factor[(d)], af/acre/yr	Annual Potable Water Use, af/yr
Industrial	191.2	162.5	-	1.3	211.3
Irrigation Demand	-	-	28.7	1.9	54.5
UAFW[(e)]	-	-	-	-	28.2
Total	**191.2**	**162.5**	**28.7**	**-**	**294**

(a) City's Notice of Preparation of an Environmental Impact Report and Public Scoping Meeting for the Tracy Alliance Project, dated August 28, 2020.
(b) Consistent with the 2020 WSMP, 85 percent of gross acres are assumed to use potable water.
(c) Consistent with the 2020 WSMP, 15 percent of gross acres are assumed to be landscaped.
(d) Based on the 2020 WSMP.
(e) Unaccounted-for water (UAFW) is equal to 9.6 percent.

[1] City of Tracy. August 28, 2020. *Notice of Preparation of an Environmental Impact Report and Public Scoping Meeting for the Tracy Alliance Project*.

Table 2 summarizes the estimated average day, maximum day, and peak hour water demands for the Project. The average day demand (ADD) for the Project is approximately 182 gallons per minute (gpm). Maximum day demands (MDD) and peak hour demands (PHD) were calculated using the City's peaking factors (adopted from the 2020 WSMP) of 1.7 and 2.9 times the ADD, respectively, resulting in an MDD of about 310 gpm and a PHD of about 529 gpm.

Table 2. Summary of Average Day, Maximum Day, and Peak Hour Water Demands for the Project

Average Day Demand[(a)]		Maximum Day Demand[(b)]		Peak Hour Demand[(c)]	
gpm	mgd	gpm	mgd	gpm	mgd
182	0.26	310	0.45	529	0.76

(a) The ADD is based on the total annual potable water use, 294 af/yr, calculated in Table 1.
(b) MDD Is 1.7 times the ADD, per the 2020 WSMP.
(c) PHD is 2.9 times the ADD, per the 2020 WSMP.
mgd = million gallons per day

STORAGE CAPACITY EVALUATION

The storage requirement for the City's potable water system consists of three components:

- **Operational Storage**: 30 percent of a maximum day demand;
- **Emergency Storage**: 1.5 times an average day demand; and
- **Fire Flow Storage**: The required fire flow rate multiplied by the associated fire flow duration period. *In larger pressure zones like Zone 1, the City requires the fire flow storage to equal the volume required for two concurrent fire flow events: a Single Family Residential fire (0.18 million gallons (MG)) and an Industrial fire in a sprinklered building (0.96 MG)[2]. Thus, the total Zone 1 fire flow storage required is 1.14 MG.*

The required fire flow storage component for this Project would be shared with other existing and proposed developments served by Zones 1 and 2. However, the Project's required operational and emergency storage capacity would be in addition to the requirements from existing buildings and proposed developments in Zone 1 and Pressure Zone 2 (Zone 2). Based on the above criteria, the required operational and emergency storage components for the Project are 0.14 and 0.39 MG, respectively. Based on the City's available storage capacity and emergency storage credit in Zones 1 and 2, there is a storage capacity surplus of approximately 2.7 MG after accounting for the Project's storage requirements.

[2] Per the 2020 WSMP, Single Family Residential fire flow requirement is 1,500 gpm for 2 hours. In sprinklered Industrial buildings, the fire flow requirement is 4,500 gpm for 4 hours, which includes 500 gpm for on-site sprinkler flow. Fire flow storage does not include sprinkler flow, so fire flow storage for sprinklered Industrial buildings is based on 4,000 gpm for 4 hours. Refer to Table 6-1 of the 2020 WSMP for additional details.

HYDRAULIC EVALUATION FINDINGS

Hydraulic evaluation of the Project is based on system performance and operational criteria developed in the 2020 WSMP. These criteria are provided in Attachment 1 for reference. Starting with the existing system hydraulic model developed from the 2020 WSMP, a new developer hydraulic model[3] was created and updated to include the water demands for the Project. This updated model was then used to simulate PHD and MDD plus fire flow conditions to determine the Project's impacts on the City's potable water system. In addition, this TM evaluates whether the Project's service laterals in the public right-of-way meet the pipeline velocity criteria detailed in Attachment 1. Results from this hydraulic evaluation are discussed below.

Peak Hour Demand Evaluation

The Project proposes three domestic service connection points to the City's potable water system: (1) two in Paradise Avenue and (2) one at the eastern end of the 12-inch diameter water main in Grant Line Road. Per preliminary site plans for the Tracy Alliance Group parcels[4], nearly all the demand for these parcels (i.e., Buildings 1 and 2) will be served from Paradise Avenue (with the much smaller Building 3 served from Grant Line Road). Since site plans were not available for the Suvik Farms, LLC or Zuriakat parcels, it was assumed that demands for those parcels would be served from Grant Line Road.

Figure 2 displays the parcel owners and service connection points, in addition to the system pressure and pipeline velocities during a PHD condition. Pressures at service connection points on Paradise Avenue and Grant Line Road are approximately 62 and 61 pounds per square inch (psi), respectively, while pressures at other service locations in Zone 1 remain above 40 psi. No distribution pipelines exceed the maximum pipeline velocity limit of 8 feet per second (fps).

Maximum Day Demand plus Fire Flow Evaluation

To meet fire flow requirements, the water system must be able to provide 4,500 gpm to the Project and adjacent industrial sites during an MDD condition while maintaining 20 psi residual system pressure (primary criterion) and pipeline velocities below 12 fps (secondary criterion). Figure 3 shows the Project does not meet a fire flow requirement of 4,500 gpm, as available fire flow along Grant Line Road is between approximately 4,120 and 4,230 gpm. This deficiency is due to the 12-inch diameter dead-end pipeline located east of the intersection of Paradise Road and Grant Line Road, where flow is restricted by the 12 fps pipeline velocity limit.

Pipeline improvements in the Project area are not critical, as the distribution system can meet fire flow requirements for the Project if the secondary pipeline velocity criterion is disregarded. However, it is recommended that the Project install additional 12-inch diameter pipelines on-site to create loops with the existing public water mains in Paradise Avenue and Grant Line Road. This recommended improvement is consistent with the buildout distribution system evaluation performed in the 2020 WSMP and would eliminate high velocities in the Grant Line Road dead-end pipeline during fire flow conditions. The recommended improvements and updated fire flow evaluation results are shown on Figure 4.

---

[3] The City's developer hydraulic model includes all previously evaluated development projects and is separate from the 2020 WSMP model.

[4] Kier & Wright, July 9, 2020. *Preliminary Site Improvement Plans of Tracy Alliance for Ridge Capital, Inc*.

One other location in the NEI Specific Plan area also fails to meet fire flow requirements. This location on Paradise Road was previously identified as part of the Project Big Bird TM5. Because this deficiency is not triggered by the Project, the corresponding improvements are outside the scope of this hydraulic evaluation.

Service Lateral Evaluation

The utility plan for the Tracy Alliance Group parcels shows the following water service laterals:

- Three 10-inch diameter laterals for fire service, and
- Three 10-inch diameter laterals for domestic service.

Pipeline velocities for each service lateral were calculated using the fire flow requirements and peak hour demands specified above. During a fire flow of 4,500 gpm in a 10-inch fire service lateral, the velocity would be approximately 18 fps, exceeding the maximum limit of 12 fps. Upsizing the fire service laterals to 14-inch diameter would decrease the velocity to an acceptable 9 fps. The domestic service laterals can deliver anticipated peak hour demands at velocities well below the 8 fps limit.

Utility plans for the Suvik Farms, LLC and Zuriakat parcels were not yet available. Since those parcels should have the same fire flow requirement (4,500 gpm), planned fire service laterals should also be 14 inches in diameter.

SUMMARY OF EVALUATION AND RECOMMENDATIONS

Based on storage capacity criteria in the 2020 WSMP, the City currently has sufficient storage capacity in Zones 1 and 2 to meet the needs of the proposed Project.

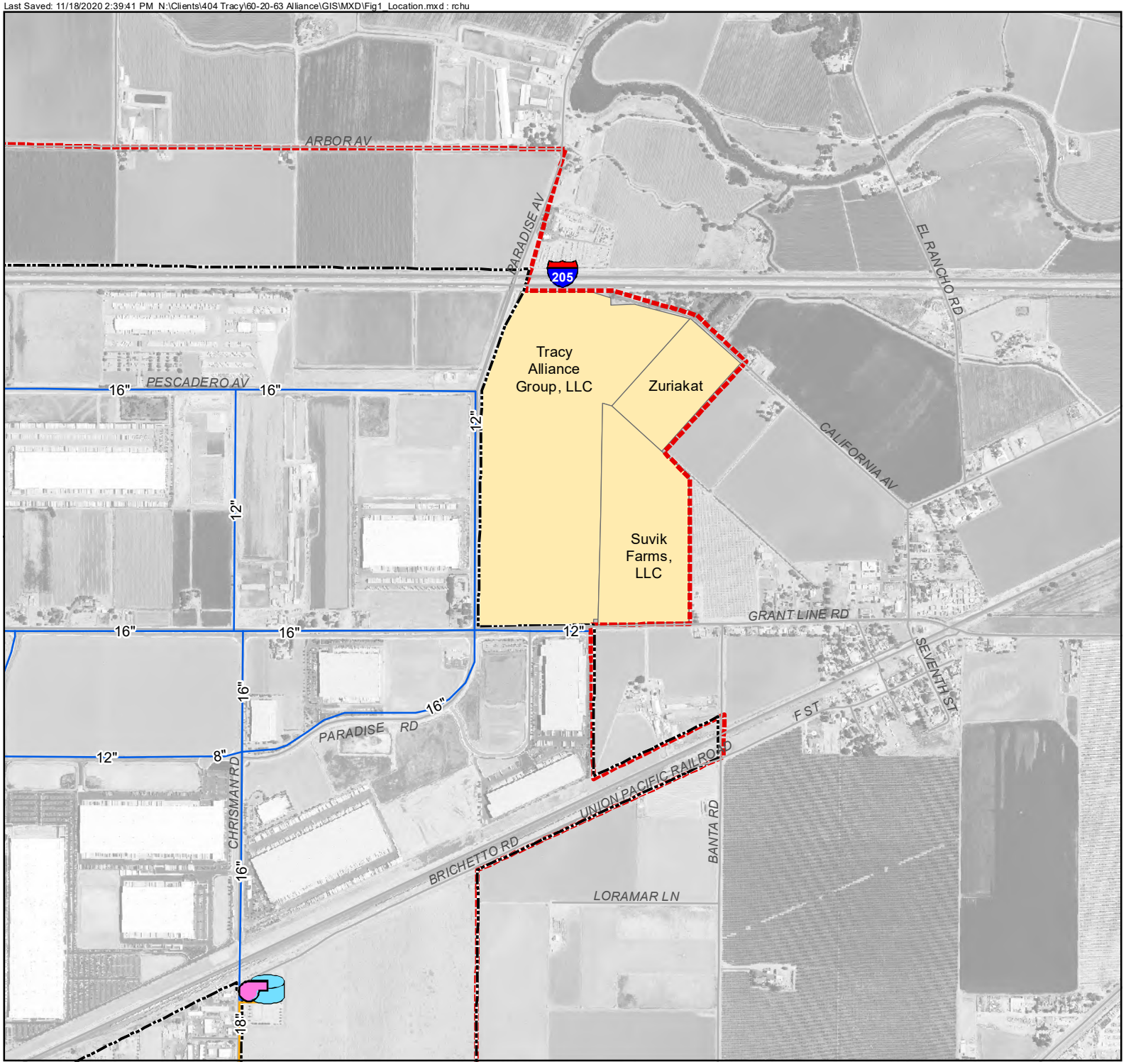
Under PHD conditions, the City's existing water system infrastructure can provide adequate flows and pressures to the Project and adjacent sites in the NEI Specific Plan area. Under MDD plus fire flow conditions, the distribution system can deliver fire flows to the Project while maintaining 20 psi residual pressure, but the 12-inch diameter dead-end pipeline in Grant Line Road has a velocity exceeding 12 fps. As a result, it is recommended that the Project install additional 12-inch diameter pipelines on-site, as shown on Figure 4.

To meet the City's pipeline velocity criterion during fire flow conditions, West Yost recommends upsizing the Project's fire service laterals to 14-inch diameter. The proposed domestic service laterals serving the Project are adequately sized.

The hydraulic evaluation performed for the proposed Project is based on the various assumptions stated above. If any of these items are modified in any way, other than as described in this TM, additional hydraulic evaluation will be required.

[5] West Yost Associates. August 12, 2020. *Hydraulic Evaluation of Project Big Bird*.

Last Saved: 11/18/2020 2:39:41 PM N:\Clients\404 Tracy\60-20-63 Alliance\GIS\MXD\Fig1_Location.mxd : rchu



0 750 1,500

Scale in Feet

- NEI Booster Pump Station
- NEI Reservoir

Pipeline Zone

- Zone 1
- SSJID
- Tracy Alliance Project
- City Limit
- Sphere of Influence

TRACY

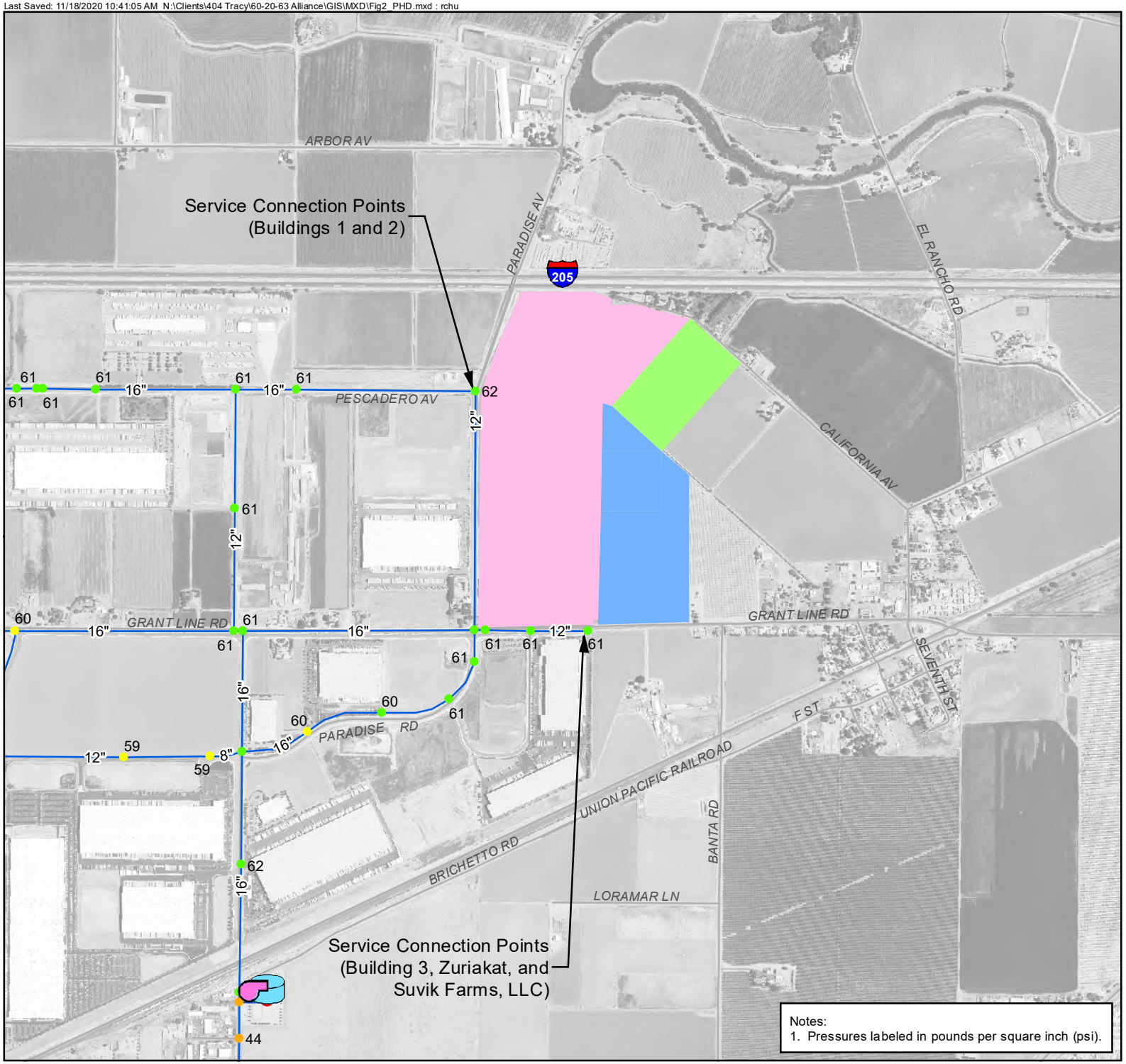
WEST YOST

Figure 1

Existing Potable Water System

City of Tracy
Tracy Alliance Project
Hydraulic Evaluation

Last Saved: 11/18/2020 10:41:05 AM N:\Clients\404 Tracy\60-20-63 Alliance\GIS\MXD\Fig2_PHD.mxd : rchu



N

0 750 1,500

Scale in Feet

NEI Booster Pump Station

NEI Reservoir

Peak Hour Pressure

- Less than 40 psi
- 40 to 50 psi
- 50 to 60 psi
- 60 to 70 psi
- 70 to 80 psi
- Greater than 80 psi

Pipeline Velocity

- Less than or equal to 8 fps
- Greater than 8 fps

Parcel Owner

- Suvik Farms, LLC
- Tracy Alliance Group, LLC
- Zuriakat

TRACY

WEST YOST

Figure 2

Peak Hour Results

City of Tracy
Tracy Alliance Project
Hydraulic Evaluation

N

0 750 1,500

Scale in Feet

NEI Booster Pump Station

NEI Reservoir

Available Fire Flow

Does not meet Requirements

Meets Requirements

Pipeline Zone

Zone 1

SSJID

Tracy Alliance Project

Notes:
1. The available fire flow shown is the maximum flow available while maintaining 20 psi residual system pressure and limiting maximum pipeline velocities to 12 fps.
2. Fire flow requirements vary by land use type. Tracy Alliance Project and adjacent locations require 4,500 gpm.

TRACY

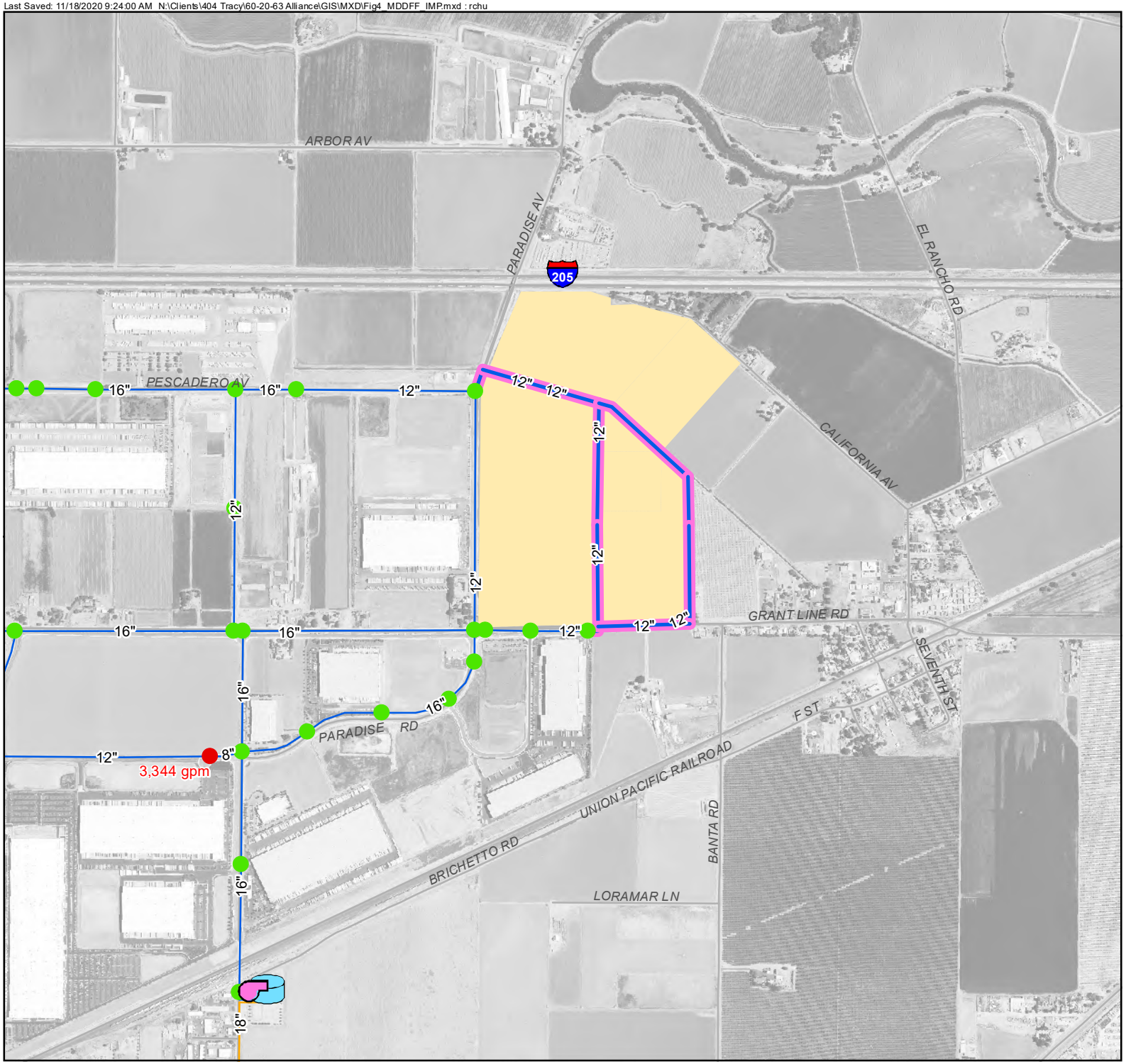
WEST YOST

Figure 3

Fire Flow Results

City of Tracy
Tracy Alliance Project
Hydraulic Evaluation

Last Saved: 11/18/2020 9:24:00 AM N:\Clients\404 Tracy\60-20-63 Alliance\GIS\MXD\Fig4_MDDFF_IMP.mxd : rchu



N

0 750 1,500

Scale in Feet

- NEI Booster Pump Station
- NEI Reservoir

Available Fire Flow

- Does not meet Requirements
- Meets Requirements

Pipeline Zone

- Zone 1
- SSJID

Recommended Improvements

- New Pipeline
- Tracy Alliance Project

Notes:
1. The available fire flow shown is the maximum flow available while maintaining 20 psi residual system pressure and limiting maximum pipeline velocities to 12 fps.
2. Fire flow requirements vary by land use type. Tracy Alliance Project and adjacent locations require 4,500 gpm.

TRACY

WEST YOST

Figure 4

Fire Flow Results with Recommended Improvements

City of Tracy
Tracy Alliance Project
Hydraulic Evaluation

Attachment 1

Planning and Modeling Criteria

Planning and modeling criteria used to evaluate the proposed Project are based on the system performance and operational criteria developed in the 2020 Citywide Water System Master Plan update (2020 WSMP). The criteria used to evaluate the existing water system and the proposed pipelines for the Project are listed as follows:

- Residual pressure at the flowing hydrant (during an assumed maximum day demand plus fire flow condition) and throughout the water system must be equal to or greater than 20 pounds per square inch (psi) during the simulated fire condition.
- Minimum allowable service pressure is 40 psi during all other non-fire demand conditions.
- Maximum allowable service pressure is 80 psi. A pressure reducing valve (PRV) will be required on all water services with a static pressure greater than 80 psi and should conform with the requirements from the Uniform Plumbing Code.
- Maximum allowable distribution pipeline velocity is 12 feet per second (fps) during the simulated fire flow demand condition.
- Maximum allowable transmission and distribution pipeline velocity is 6 fps and 8 fps, respectively, during a non-fire demand condition.
- Maximum allowable head loss rate is 10 feet per 1,000 feet (ft/kft) during the simulated fire demand condition.
- Maximum head losses in distribution system pipelines should be limited to 7 ft/kft during a non-fire demand condition.
- New and required pipelines will be modeled with a roughness coefficient (C-factor) of 130.
- Available fire flow demand must meet a minimum flow of 1,500 gpm, 2,500 gpm, 3,500 gpm, or 4,500 gpm depending on land use during a maximum day demand condition. These required fire flow demands assume that buildings are sprinklered.
- The 2020 WSMP hydraulic model of the City's existing water distribution system was used as the basis for evaluation.[1]

[1] This existing system hydraulic model was updated to include projected water demands from new and planned developments such as Valpico and MacDonald Apartments; Sierra Hills (Aspire I) Apartments; I 205 Parcels M1 and M2 and Infill Parcels 7 and 13; Grant Line Road Apartments; Rocking Horse; Aspire II Development; Ellis Specific Plan Phases 1, 2, and 3; Marriott TownePlace Suites; Larch Clover Interim Annexation; IPC Buildings 3, 4, and 12; IPC Building 25; IPC Buildings 22, 23, and Thermo Fisher; Tracy Village Specific Plan; Avenues Specific Plan; IPC Buildings 9, 10, and 14; NEI Specific Plan; Tracy Hills Phases 1A, 1B, and 1C; IPC Building 19A; Costco Depot; West Parkway Village; KT Project; IPC Prologis Sales Office Building; and IPC Building 2. City staff also requested West Yost to incorporate the following developments, which were evaluated by Black Water Consulting Engineers, Inc. into the City's hydraulic model: Barcelona Infill, Berg Road Properties, Harvest Apartments, 321 E. Grant Line Apartments, and Home 2 Suites.

THIS PAGE INTENTIONALLY LEFT BLANK