DRAFT

2020 Urban Water Management Plan

Prepared for
City of Antioch
Antioch, CA
May 2021

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154001

Brown AND Caldwell
201 N Civic, Suite 300
Walnut Creek, CA 94596

Project Participants

City of Antioch

- Scott Buenting
- Tim Coley
- Shaun Connelly
- Matt Taylor
- Zac Hylton

Brown and Caldwell

- Rachel Philipson
- Paul Selsky
- Bill Faisst
- Marissa Tsuruda
- Micaela Nino

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List of Abbreviations

AB	Assembly Bill
Act	Urban Water Management Act
AF	acre-feet
AFY	acre-feet per year
AWIA	America's Water Infrastructure Act
AWWA	American Water Works Association
Bureau	United States Bureau of Reclamation
Canal	Contra Costa Canal
CCR	California Code of Regulations
CCWD	Contra Costa Water District
CII	commercial, institutional/government, and industrial
City	City of Antioch
CVP	Central Valley Project
CWS	community water system
DD	Delta Diablo
DDW	Division of Drinking Water
Delta	Sacramento/San Joaquin Rivers Delta
DMM	Demand Management Measure
DRA	Drought Risk Assessment
DU	dwelling unit
DWD	Diablo Water District
DWR	California Department of Water Resources
ERP	Emergency Response Plan
ET	evapotranspiration
ft	feet
GPCD	gallons per capita day
GSA	Groundwater Sustainability Agency
GSP	Groundwater Sustainability Plan
HMP	Contra Costa County Hazard Mitigation Plan
IPR	Indirect Potable Use
IRWM	Integrated Regional Water Management
kWh	kilowatt-hours
M&I	Municipal and Industrial
MG	million gallons
MGY	million gallons per year
mgd	million gallons per day
opt	optional
RO	reverse osmosis
RRA	Risk and Resilience Assessment
RUWMP	Regional Urban Water Management Plan
SB	Senate Bill
SWP	State Water Project
UWMP	Urban Water Management Plan
WSCP	Water Shortage Contingency Plan
WSMP	Water System Master Plan
WTP	water treatment plant
WWTP	Wastewater Treatment Plant

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Section 1

Introduction

This Urban Water Management Plan (UWMP) addresses the City of Antioch's (City) water system and includes a description of the water supply sources, historical and projected water use, water supplies, and water conservation activities.

This section provides an overview of the UWMP and UWMP organization.

1.1 Urban Water Management Planning Act

The UWMP was prepared in accordance with the Urban Water Management Act (Act). The California Water Code, Division 6, Part 2.6, and Sections 10610 through 10657 defines the Act. The Act became part of the California Water Code with the passage of Assembly Bill (AB) 797 during the 1983-1984 regular session of the California legislature. The Act requires every urban water supplier providing water for municipal purposes to more than 3,000 connections or supplying more than 3,000 acre-feet (AF) of water annually to adopt and submit a plan every five years to the California Department of Water Resources (DWR). The Act describes the contents of the UWMP as well as how urban water suppliers should adopt and implement the UWMP.

This 2020 UWMP includes newly required and changes to previously required components to address the recent revision of the Act, including but not limited to:

- UWMP summary lay description
- Description of current and projected land uses in service area
- Five previous years of system water losses
- Water savings
- Energy analysis
- Seismic Risk assessment and mitigation plan
- 5-year Drought Risk Assessment (DRA)
- Additional components within the Water Shortage Contingency Plan (WSCP)

1.2 UWMP Organization

This section provides a summary of the sections in this UWMP.

- **Section 2:** UWMP Preparation presents the basis for preparing the UWMP, UWMP identification, units of measure, coordination, and outreach
- **Section 3:** Water System Description provides a description of the service area, climate, and historical and projected population
- **Section 4:** System Water Use presents historical and projected water use
- **Section 5:** Senate Bill (SB) X7-7 Baseline and Targets describes baselines and targets for per capita water use as well as compliance with 2020 targets
- **Section 6:** System Water Supplies describes system water supplies including recycled water
- **Section 7:** Water Supply Reliability and DRA addresses water supply reliability
- **Section 8:** WSCP describes the City's WSCP process.
- **Section 9:** Demand Management Measures (DMMs) describes DMMs

- **Section 10:** UWMP Adoption, Submittal, and Implementation describes actions taken by the City to address the California Water Code requirements for UWMP adoption, submittal, and implementation
- **Section 11:** References lists references
- Appendices A through M provide relevant supporting documents

Based upon the Act DWR has provided a checklist of the items that each UWMP must address. The checklist was completed for this UWMP and provided in Appendix A. It references the sections in the UWMP where specific DWR checklist items are addressed.

1.3 UWMP Summary Lay Description

The City treats and distributes surface water from two main sources: the Sacramento/San Joaquin Rivers Delta (Delta) and Contra Costa Water District's (CCWD's) Contra Costa Canal. The City Municipal Reservoir also captures a small quantity of surface runoff. The City maximizes water pumped from the Delta when water quality meets salinity requirements and uses water from CCWD to meet additional water demands. The City also receives recycled water from Delta Diablo (DD), which it uses to irrigate several City parks and golf courses.

The City has diverted water from the western Delta since the 1870s. Water quality at the City's western Delta intake currently limits the City's ability to fully utilize its water rights. In recent years, due to droughts, changes in Delta management, and climate change, the City has needed to rely more on CCWD water. Delta water quality decreases in the summer and fall and can become too salty for the City to use. Currently the City is constructing a brackish water desalination facility, to enable use of Delta water year-round. This project will improve water supply reliability and water quality for customers. The City also maintains a water conservation plan and coordinates with other agencies in the region to manage reliability risks and take a proactive approach to meeting challenges ahead.

The City projects future water use by adding estimated water use for planned developments through 2045 to existing demands. The projected water demands consider climate change, the City's on-going water conservation program, and future reductions in water use due to changing building codes and water efficient policies. This UWMP shows that the City has adequate water supply to meet its projected demands though 2045.

1.4 Consistency with the Delta Plan

In 2009, California's elected leadership approved a package of bills designed to address statewide issues of water supply reliability and restore the Delta ecosystem. The legislation created the Delta Stewardship Council to adopt and implement a comprehensive and enforceable sustainable management plan to achieve the coequal goals, now known as the Delta Plan (Delta Stewardship Council, 2013). The Delta Plan was most recently amended in January 2019 (Delta Stewardship Council, 2019).

Although not required to be included as part of the 2020 UWMP, per California Code of Regulations (CCR), Title 23, Section 5003, suppliers that anticipate participating in, or receiving water from, a proposed project (covered action) may consider demonstrating consistency with the Delta Plan's policy to reduce reliance on the Delta. Covered actions include, but are not limited to projects such as a:

- Multiyear water transfer
- Conveyance facility
- New diversion that involves transferring water through, exporting water from, or using water in the Delta

The City certified the Brackish Water Desalination project is consistent with the Delta Plan in Spring 2020[1]. Since the City pumps water from the Delta and purchased Delta water from CCWD, Section 6 includes a discussion on the City's dependency on the Delta. The reader can find further information on approaches to reducing reliance on the Delta in CCWD's 2020 UWMP and in Appendix M.

[1] https://coveredactions.deltacouncil.ca.gov/profile_summary.aspx?c=804db0bd-b149-410c-8043-02d5c6194ce4

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Section 2

UWMP Preparation

This section presents the basis for preparing the UWMP, UWMP identification, units of measure, coordination, and outreach.

2.1 Basis for Preparing the UWMP

The Urban Water Management Planning Act requires every urban water supplier providing more than 3,000 acre-feet per year (AFY) of water or serving more than 3,000 customers prepare and adopt a UWMP, every five years. The City is a retail urban water supplier providing about 15,000 AFY (5,000 million gallons per year--MGY) to about 110,000 people. Table 2-1 presents the Public Water System name and number.

Table 2-1. Public Water Systems (DWR Table 2-1)

Public Water System Number[a]	Public Water System Name[a]	Number of Municipal Connections, 2020[b]	Volume of Water Supplied in 2020[b], MG
CA0710001	City of Antioch	32,333	5,091

Notes:

a. Data from the Public Drinking Water Watch search system.

b. Connection and demand data from 2020 City records.

The City is a member of the CCWD Alliance, but has selected individual reporting for this UWMP, as identified in Table 2-2. As noted, in Table 2-2, this UWMP reports on a calendar year basis using million gallons (MG) as the unit of measure as noted in Table 2-3.

Table 2-2. UWMP Identification (DWR Table 2-2)

Select One	Type of Plan		Name of RUWMP or Regional Alliance
✓	Individual UWMP		
		Water supplier is also a member of a RUWMP	
	✓	Water supplier is also a member of a regional alliance	CCWD Alliance
	Regional UWMP (RUWMP)		

Table 2-3. Supplier Identification (DWR Table 2-3)	
Type of Agency (select one or both)	
	Supplier is a wholesaler
✓	Supplier is a retailer
Fiscal or Calendar Year (select one)	
✓	UWMP Tables are in calendar years
	UWMP Tables are in fiscal years
Units of Measure Used in UWMP (select one)	
Unit	MG

2.2 Coordination and Outreach

The Act requires the City to coordinate its UWMP preparation with other appropriate agencies in the area, including other water suppliers that share a common source, water management agencies, and relevant public agencies, to the extent practicable.

2.2.1 Wholesale and Retail Coordination

The City is one of twelve cities in central and eastern Contra Costa County that are contract customers to CCWD for the wholesale purchase of water. The City has and continues to participate with CCWD to implement water conservation measures as a part of CCWD's wholesaler water conservation program. In accordance with California Water Code (CWC) 10631, the City has informed CCWD of projected water use for the period of 2025-2045 as shown in Table 2-4.

Table 2-4. Water Supplier Information Exchange (DWR Table 2-4)
The retail supplier has informed the following wholesale supplier(s) of projected water use in accordance with CWC 10631.
Wholesale water supplier name: CCWD

2.2.2 Coordination with Other Agencies and the Community

The City must coordinate with other agencies and the community in preparation of its UWMP. Table 2-5 summarizes the cities, counties, municipalities, and other agencies or organizations that the City consulted in the development of this UWMP. The City also must provide 60-day notification to cities and counties to which they serve water, that the City is updating and reviewing its UWMP. Notifications to cities and counties is discussed in Section 10 and included in Appendix B.

Table 2-5. Coordination and Notification for UWMP Preparation			
Organization/Agency Name	Consulted in the Development of the UWMP	Received a 60-day Notification	Received a Notice of Public Hearing
CCWD	✓	✓	✓
Delta Diablo	✓	✓	✓
General public		✓	✓

Section 3

System Description

This section describes the City's water system. It contains a description of factors that impact water demand such as service area and climate change effects and served population.

3.1 Service Area

The City is in northeastern Contra Costa County between the cities of Pittsburg, Oakley, and Brentwood and unincorporated County land. The City's existing service area covers approximately 29.5 square miles of area and largely is consistent with Antioch's City limits. A small portion of the service area extends past the City limits on the west side of the City near Somerville Road and Buchanan Road and on the northeast side near Wilbur Avenue.

The City's principal sources of water supply are surface water diverted directly from the Delta or purchased from CCWD and delivered via the Contra Costa Canal. The City currently pumps water from the Delta intake and stores it in the Municipal Reservoir before treating it at the Antioch Water Treatment Plant (WTP). The City can pump CCWD water from the Contra Costa Canal (Canal) either into the Municipal Reservoir or directly to the WTP. On an as-needed basis, or in an emergency, the City also can purchase treated water from its neighboring agencies including CCWD, Diablo Water District (DWD) and City of Pittsburg (intertie is currently out of service). Section 6 discusses the City's supply sources in further detail.

The City's water service area and distribution system facilities are shown in Figure 3-1.

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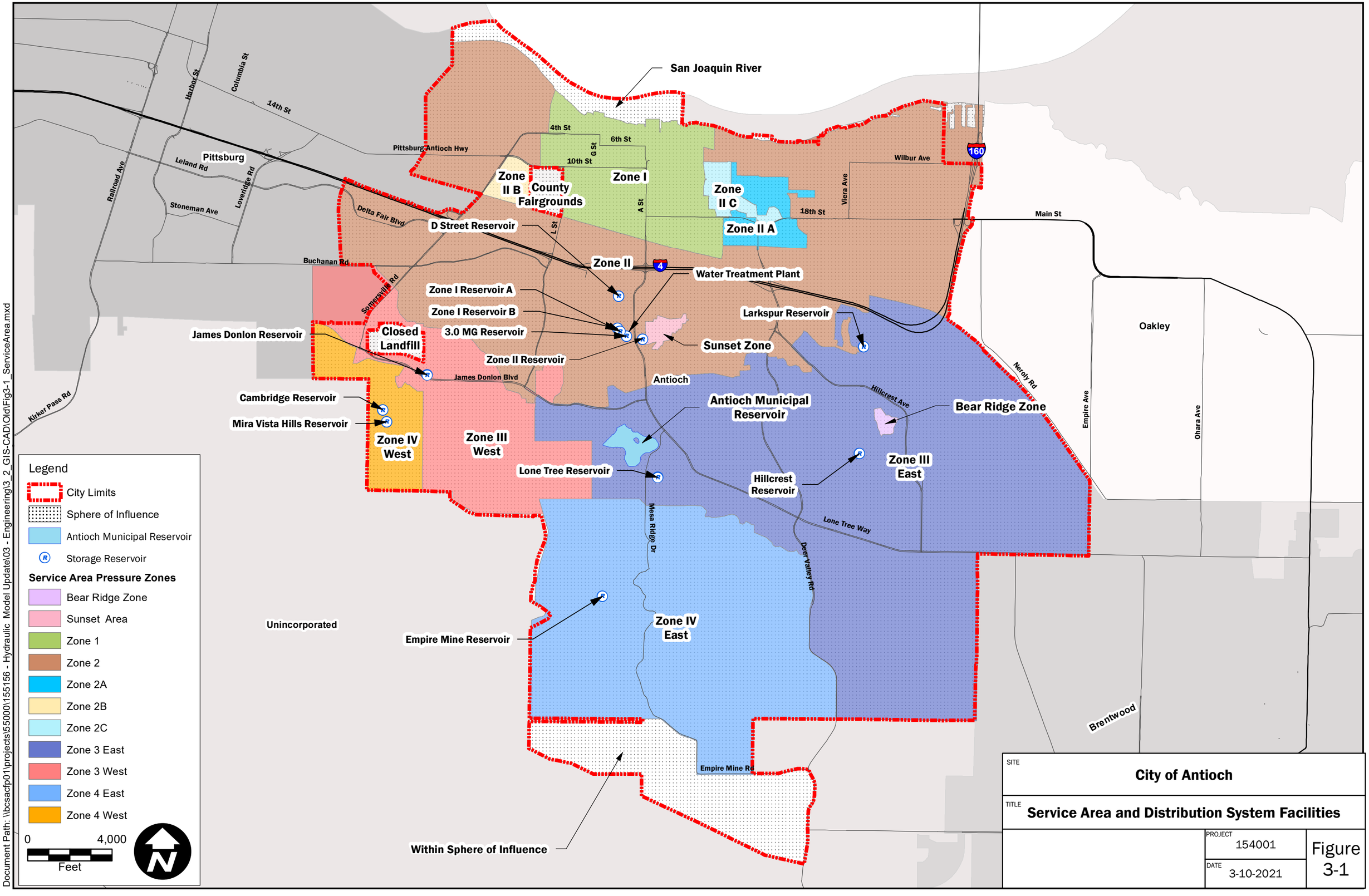

SITE
City of Antioch

TITLE
Service Area and Distribution System Facilities

PROJECT 154001

DATE 3-10-2021

Figure 3-1

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3.2 Service Area Climate

The area's Mediterranean climate causes cool and humid winters, and hot and dry summers. Temperatures are semi-arid with the summer highs above 100 and the winter lows in the high 30's. The high temperature and low humidity that usually occur in the summer are a major contributor to the high summer water demands.

Based on the Brentwood climate station data obtained from the California Irrigation Management Information System (CIMIS), the City's average monthly temperature ranges from 37 to 91 degrees Fahrenheit. The Brentwood CIMIS station is about 11 miles from the City and provides data representative of Antioch's climate. The annual average precipitation is approximately 12 inches. The rainy season normally begins in November and ends in March. Evapotranspiration (ET) records, which measure the loss of water from the land cover both by evaporation and by transpiration from the plants growing thereon, indicate average monthly values ranging from 1.2 inches in the City's wet January to 8.2 inches in drier July. Low humidity usually occurs in the summer months, from May through September. The combination of hot and dry weather results in high water demands during the summer. Table 3-1 summarizes the City's average climate conditions.

Table 3-1. Monthly Average Climate Data Summary

Month	Standard Monthly Average ET (inches)	Average Total Rainfall (inches)	Average temperature (°F)	
			Max	Min
January	1.18	2.44	56.24	38.94
February	2.05	2.22	60.23	40.61
March	3.66	1.41	65.24	43.49
April	5.29	0.80	70.23	45.40
May	6.95	0.54	76.47	48.93
June	7.87	0.30	83.67	51.71
July	8.20	0.15	88.51	54.97
August	7.33	0.17	90.47	55.84
September	5.75	0.26	86.55	54.12
October	3.97	0.68	77.90	49.03
November	2.01	1.13	65.39	42.02
December	1.27	2.23	55.93	37.58

Note:
Data recorded January 1986 to December 2020 from Brentwood Station 47, CIMIS www.cimis.water.ca.gov, accessed on January 25, 2021.

3.3 Climate Change Effects

This section discusses climate change and its effects on the City's supply and demand. The potential climate change effects were an important driver in the City's decision to implement the Brackish Water Desalination Project. Increases in the frequency and duration of droughts due to climate change likely will cause further declines in western Delta water quality. To improve the resiliency of the City's water supply infrastructure, the City factored anticipated sea-level rise into the design of the new intake and pump station facility now under construction as part of the Brackish Desalination Facility.

The East Contra Costa County Integrated Regional Water Management (IRWM) Plan discusses the potential effects of climate change on a regional level.

The 2019 IRWM Plan includes discussion on the regional impacts of climate change to supply and demand projections, relevant to projections in the City's 2020 UWMP. Most of the water suppliers in the region depend upon surface water supplies from the Delta to meet the majority of regional demand. Sea-level rise and extreme weather can impact water quality through introduction of salinity into freshwater supplies, increased runoff and pollutants entering the system, increased turbidity and sediments, and the potential to inundate low-elevation critical infrastructure. In addition, the timing and volume of flows likely will change due to changing temperature patterns.

The San Francisco Bay Area Region Report examines the impacts of 21st century climate change on the physical climate, built environment, and natural and agricultural systems of the Bay area (California's Fourth Climate Change Assessment, 2018). The report indicates that the Bay Area's average annual maximum temperature increased by 1.7 °F from 1950-2005, and likely will continue to see increasing temperatures, which will cause longer California droughts. Bay Area sea-level has risen over 8 inches in the last 100 years and will continue to intrude on waterfront land causing vulnerabilities to wastewater treatment plants that are typically built on the water. In addition, precipitation in the Bay area will continue to exhibit "booms and busts" with very wet and very dry years which can lead to a declining Sierra Nevada snowpack.

Water supply in the Delta is already unreliable and changes in seasonal runoff patterns from climate change are likely to reduce water supply reliability further. Changes in precipitation and temperature in the Sierra Nevada region affect the timing and quantity of tributary flows. This change affects the region's availability of fresh surface water. Contributing factors include a reduced Sierra snowpack, earlier snowmelt, and extended drought periods punctuated by intense precipitation events. Additionally, the availability of high-quality freshwater in the Delta is heavily dependent on the operation of Central Valley Project (CVP)/State Water Project (SWP) reservoirs; therefore, operation of these projects can impact water quality at the City's and CCWD's Delta intakes.

The City has concern that the City's Delta intake could become threatened by climate change-related sea-level rise. Sea-level rise has the potential to inundate infrastructure and cause increasingly brackish or saline water to reach the Delta intake (reducing water quality) more frequently and for longer periods of time throughout the year. Fortunately, the City has begun construction of a desalination plant (Section 6) to allow the City to use its water right and Delta supply year-round, thereby adapting to climate change effects on its Delta surface water supply. Additionally, DD is expanding its abilities to supply recycling water to appropriate users in the region to help mitigate effects of sea-level rise.

It is likely that water demand in the region will increase due to climate change, putting a greater strain on the region's limited water supply. Regional water shortages could occur if the region's supply is not able to keep up with demand. Quantitative impacts to supply and demand due to

climate change are difficult to quantify, thus this UWMP analyses have a 5 percent demand increase over the planning horizon.

3.4 Service Area Population, Demographics, and Socioeconomics

The historical and projected population and land uses provide a basis for projected demands.

3.4.1 Population

As discussed in Section 3.1, the City's water service area includes the area in the City limits plus some adjacent land on the west and on the northeast sides of the City. The 2020 population is estimated to be 112,250 using data from the California Department of Finance (DOF), because more than 95 percent of the City's service area is within the City limits. The population projections have no adjustments for the small population outside the City limits. Table 3-2 summarizes historical and projected population within the City's limits in 5-year increments from 2020 to 2045.

Table 3-2. Population - Current and Projected (DWR Table 3-1)

	2020[a]	2025[b]	2030[b]	2035[b]	2040[b]	2045 (opt)[b]
Population Served	112,520	115,540	118,560	121,580	124,600	127,660

Notes:

a. *2020 population for the City is from DOF 2020 population estimate.*

b. *2040 population is from the 2015-2023 Housing Element; BC estimated intermediate years using linear interpolation and extrapolated to 2045 using the same growth rate.*

3.4.2 Other Social, Economic, and Demographic Factors

This section includes a description of the social, economic, and demographic factors that may affect the City's water management and planning. These factors include but are not limited to income and poverty levels, major languages spoken or cultural clusters, education levels, general health status and age distribution of population served, types of housing, and age of buildings. These various factors likely will impact the City's water use patterns.

Antioch is an older city in California and has many old buildings in its downtown area. According to the 2015-2023 City Housing Element (Housing Element) approximately 46 percent of housing units were built before 1980 and 16.5 percent were built before 1960 (City of Antioch, 2015). This pattern suggests that a significant portion of the City's housing is entering a period when substantial repairs likely will become necessary. Retrofitting plumbing fixtures in these older buildings likely will result in water savings.

Antioch is a bedroom community with many families settling in the City and commuting to other parts of the Bay Area for work. It is known for being one of the few cities offering affordable housing in the Bay Area. Housing in Antioch is typically 20 to 30 percent less than comparable space in central Contra Costa County (City of Antioch, 2020). A high percentage of the population is between the ages of 10 to 59. The City has a large percentage of renters (36 percent) compared to the Bay Area overall, but most residents own their households.

The average household income is $76,601 (US Census, 2021). Most residents have a high school education (86 percent) or some college education (21 percent). This value is slightly lower than the median household income for California, which was $80,440 in 2019, according to the Census American Community Survey (ACS) 1-year survey (most data available until 2020 census data is released) (US Census, 2019).

Approximately 36 percent of residents speak a language other than English at home (US Census, 2021). Most of the City is single-family and multi-family housing. Section 3.5 includes further information on the City's land uses. Section 4.7 discusses low-income households in the City.

3.5 Current and Projected Land Use

The water system must deliver treated water for residential CII (commercial, institutional/government, and industrial), and landscape uses. Figure 3-2 provides an overview of existing land use planning designations based on the 2019 Antioch General Plan and Use Element Map (City of Antioch, 2019) and City GIS files (November 2019).

Figure 3-3 summarizes land use information for future planned developments. The proposed developments include residential, commercial, and other land uses. Per discussion with the City Community Development Department, it is assumed that all developments will occur by 2045 and that development growth will occur linearly. Appendix C summarizes proposed developments and respective land use quantities.

Harbor St
Columbia St
14th St
Leland Rd
Loveridge Rd
Stoneman Ave
Pittsburg-Antioch Hwy
4th St
6th St
G St
10th St
A St
L St
Delta Fair Blvd
Buchanan Rd
Somersville Rd
James Donlon Blvd
Wilbur Ave
Viera Ave
18th St
Main St
160
4
Neroly Rd
Empire Ave
Hillcrest Ave
Lone Tree Way
Mesa Ridge Dr
Deer Valley Rd

Legend

City Limits

General Plan Land Use

- Business Park
- Convenience Commercial
- Estate Residential
- High Density Residential
- Low Density Residential
- Medium Density Residential
- Medium Low Density Residential
- Mixed Use
- Neighborhood Community Commercial
- Office
- Open Space
- Public/Institutional
- Water

0 3,000
Feet

N

Source: City's geographic information system (GIS) (received November 2019) data.

SITE
City of Antioch

TITLE
Land Use Zoning Map

PROJECT 154001

DATE 11-20-2020

Figure 3-2

Document Path: \\bcwckfp01\projects\154000\154001-2019-Antioch Water MP\04 - Engineering\GIS\mxd\Report Figures\Fig3-2_Landuse .mxd

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Baby Yale Academy
76,400 sf
school/church
(change in land use)

Delta Courtyard Apts
MF Units: 126

Wildflower Station
SF Units: 22
MF Units: 98
(7 acres)
10.45 acres
commercial

USA Trucking Yard
6.23 acres

Vineyard Self Storage
6.68 acres storage

Element 7
1.31 acres Cannabis

One Plant
2.78 acres
Cannabis

Acorn Business Park
5.44 acres self storage
10.52 acres business park
13.79 acres commericial and
hospitality businessess

Alluvium Inc
1.15 acres
Cannabis

Contra Costa
Farms LLC
8.97 acre
Cannabis

Windsor at Shaddick
SF Units: 3

Almond Knolls
MF Units: 58

Delta Fair Village
Commercial Bldg
MF Units: 210

Buchanan Crossings
Shops Bldg E
13.5 acres
shopping

San Joaquin River

160

4

Oakley Knolls
SF Units: 28

AMCAL Apartments
MF Units: 394
(affordable apt.)

Nelson Ranch
SF Units: 244

K. Hovnanian Homes
SF Units: 100

Black Diamond Ranch
SF Units: 9

Laurel Ranch
SF Units: 180

Golden Bow Estates
SF Units: 12

Park Ridge
SF Units: 525

Heidorn Village
SF Units: 117

Quail Cove
SF Units: 30

Ducky's Car Wash
1.3 acres car wash

Deer Valley
Business Park
1.06 acres
Office Bldgs

The Ranch
SF Units: 1,100
54,000 sf commercial
3.5 ac public/inst.

Vineyards at
Sand Creek
SF Units: 640

Unknown Development
SF Units: 121

Ginochio Oil and
Gas Drilling
158 acres oil/gas
drilling

Albers Ranch
SF Units: 301

Aviano Farms
Total Units: 533

Legend

NAME

- City Limits
- Future Developments
- Parcel Boundaries

Land Use

- Business Park
- Convenience Commercial
- Estate Residential
- High Density Residential
- Low Density Residential
- Medium Density Residential
- Medium Low Density Residential
- Mixed Use
- Neighborhood Community Commercial
- Office
- Open Space
- Public/Institutional
- Water

0 1,500 3,000 6,000 Feet

N

Source: City's geographic information system (GIS) (received November 2019) data.

SITE	City of Antioch
TITLE	Proposed Developments
PROJECT	154001
DATE	11-24-2020
	Figure 3-3

Document Path: \\bcwckfp01\projects\154000\154001-2019-Antioch Water MP\04 - Engineering\GIS\mxd\Report Figures\Fig3-3_Development.mxd

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Section 4

System Water Use

This section presents the current and projected retail water demands by customer type, distribution system water losses, and water savings from codes.

4.1 Current Water Use by Sector

For 2020 water demands for potable water by sector are from metered customer use. The system delivers treated water for single-family, multi-family, commercial, industrial, and institutional and landscape uses. The City's predominant land use and water users are residential customers.

The City's 2020 water use by customer sector is shown in Table 4-1. Table 4-1 does not show recycled water use but Section 6 summarizes such use.

Table 4-1. Demands for Potable and Raw Water – Actual (DWR Table 4-1)

	2020 Actual		
Use Type	Additional Description (as needed)	Level of Treatment when Delivered	Volume (MG)
Single-family		Drinking water	3,263
Multi-family		Drinking water	446
CII	Includes commercial, industrial, and institutional/governmental	Drinking water	520
Landscape	Includes commercial and City irrigation meters	Drinking water	825
Losses	Non-revenue water	Drinking water	38
TOTAL			5,091

Note:

a. *The City reports its AWWA water audits on a fiscal year basis, but as this UWMP uses calendar years, losses (non-revenue water) were calculated using the difference between 2020 production and consumption.*

4.2 Historical Water Demand

Annual water use peaked in the mid-2000s and has generally declined since. Water use further declined in 2014 and 2015 from the 2013 pre-drought (state baseline year) values because of the Governor's drought declaration and the City's water conservation program designed to reduce water use. Water use rebounded slightly 2016, 2017, 2018, 2019, and 2020 but remains below the 2013-pre drought usage. Figure 4-1 illustrates the historical monthly demands and reductions since 2013.

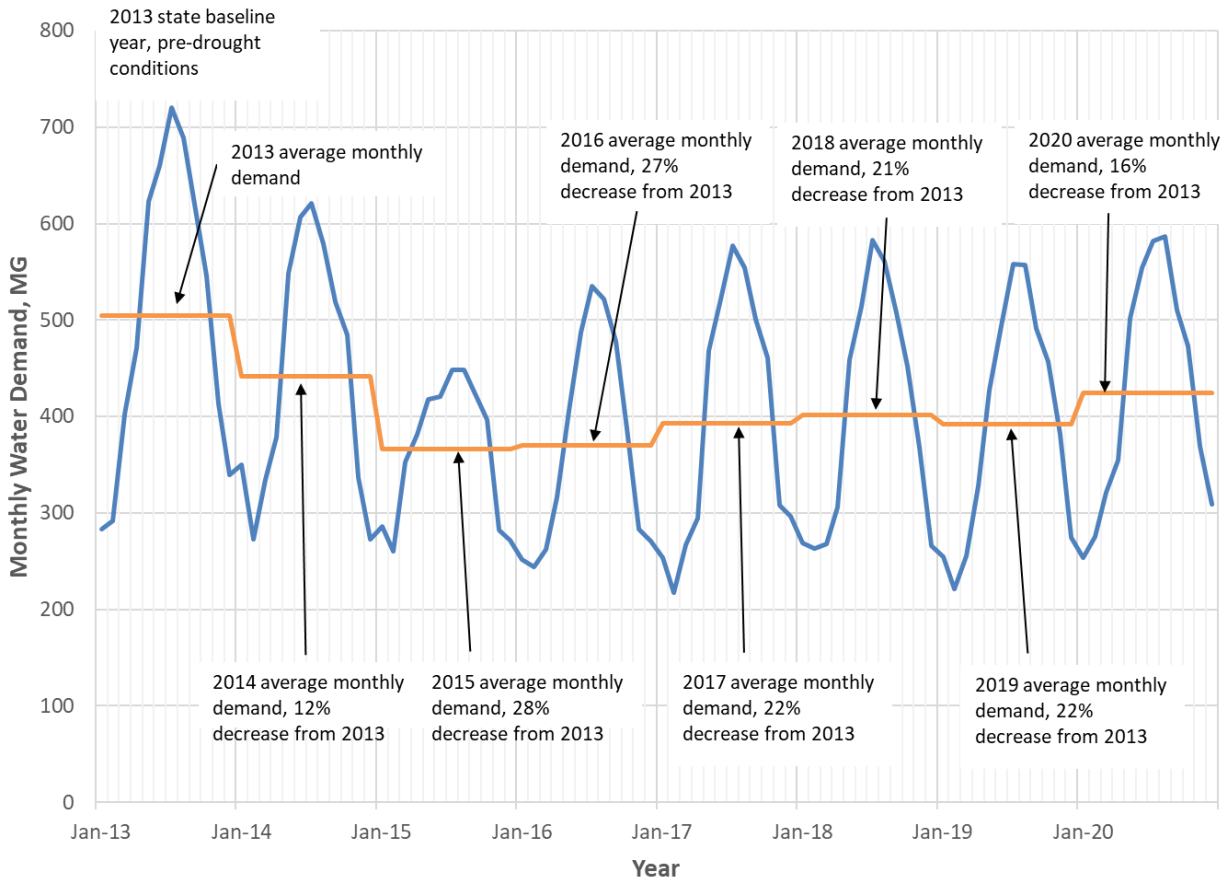

Figure 4-1. Historical monthly demand and reductions since 2013

4.3 Gallons per Capita per Day

Figure 4-2 illustrates the historical, projected, and target GPCDs for the City. The City met its 2020 SBx7-7 goal (165 GPCD) (described in Section 5 of this UWMP) with a calculated 125 GPCD. With increased water conservation (discussed in Section 4.5), overall per capita demand for a normal year type is expected to be 106 GPCD in 2045.

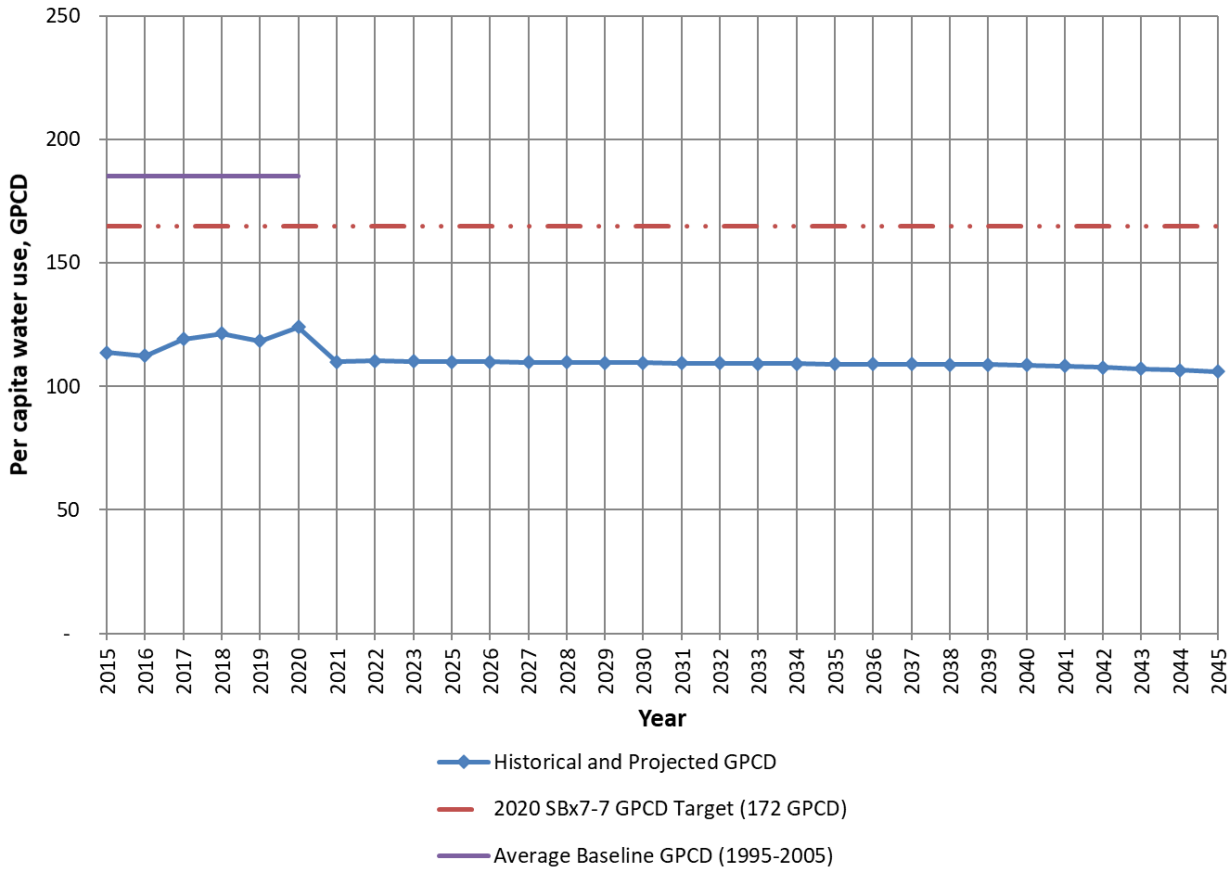

Figure 4-2. Historical and projected per capita water use versus target GPCD

4.4 Non-Revenue Water

Non-Revenue Water (NRW) as a component of total system production has several components as summarized in Figure 4-3. It is important to understand the components as they related to water use accounting and water use legislation implications on future water loss requirements and objectives.

<table>
<tr><td rowspan="8">System Input Volume</td><td rowspan="4">Authorized Consumption</td><td rowspan="2">Billed Authorized Consumption</td><td>Billed Metered Consumption</td><td rowspan="2">Revenue Water</td></tr>
<tr><td>Billed Un-Metered Consumption</td></tr>
<tr><td rowspan="2">Unbilled Authorized Consumption</td><td>Unbilled Metered Consumption</td></tr>
<tr><td>Unbilled Un-Metered Consumption</td></tr>
<tr><td rowspan="4">Water Losses</td><td rowspan="2">Apparent Losses (Commercial Losses)</td><td>Unauthorized Consumption</td><td rowspan="5">NRW</td></tr>
<tr><td>Customer Meter Inaccuracies and Data Handling Errors</td></tr>
<tr><td rowspan="3">Real Losses (Physical Losses)</td><td>Leakage in Transmission and Distribution Mains</td></tr>
<tr><td>Storage Leaks and Overflows from Water Storage Tanks</td></tr>
<tr><td>Service Connection Leaks Up to the Meter</td></tr>
</table>

Figure 4-3. Breakdown of revenue and Non-Revenue Water components

The breakdown of total water produced is:

- Revenue water
  - Billed Authorized Consumption – Described in Table 4-1 as use type: single-family, multi-family, commercial, institutional/governmental, and landscape
- NRW - Described in Table 4-1 as use type: losses
  - Unbilled Authorized Consumption – Operational usage such as flow tests and pipeline flushing
  - Water Losses – Sum of the real losses and apparent losses
    - Apparent Losses – Water theft and meter inaccuracies
    - Real Losses – Physical water losses from the water distribution system and the City's storage facilities up to the point of delivery to the customer's system (e.g., up to the residential water meter).

4.4.1 Historical Water Loss

Since 2015, water suppliers must quantify their distribution system losses using the American Water Works Association (AWWA) Method water audit (Title 23 CCR Section 638.1 et seq.). The City submits the water audit to DWR by October 1 of each year. Appendix D contains the AWWA water audits. Table 4-2 shows the reported water loss volume for the preceding five years. The City's maintenance staff actively pursues and repairs leaks. The year-to-year differences may be due in part to a difference in time periods between production data and meter readings. The City measures water production daily and measures and bills water use monthly through meter readings, e.g., water consumed in December is billed in January.

Table 4-2. Last Five Years of Water Loss Audit Reporting (DWR Table 4-4)

Reporting Period Start Date	7/2015	7/2016	7/2017	7/2018	7/2019
Volume of water loss, MG	125	391	159	63	87

Note:
The City prepares its water audits on a fiscal year basis. Volume of water loss from the field "Water Losses" (a combination of apparent losses and real losses) from the AWWA water audit worksheets (Appendix D).

4.4.2 Future Water Loss

In accordance with 2018 legislation (AB 1668 and SB 606), the City must calculate urban water use objectives beginning in 2023. Allowable water loss volume is a key basis for the objectives. Objectives developed from these bills will monitor for efficient indoor and outdoor residential and non-residential usages. Section 4.5.4 discusses this topic further. The UWMP demand projections do not include this estimated water loss performance standard. Figure 4-4 illustrates the NRW historical components for the last 5 years.

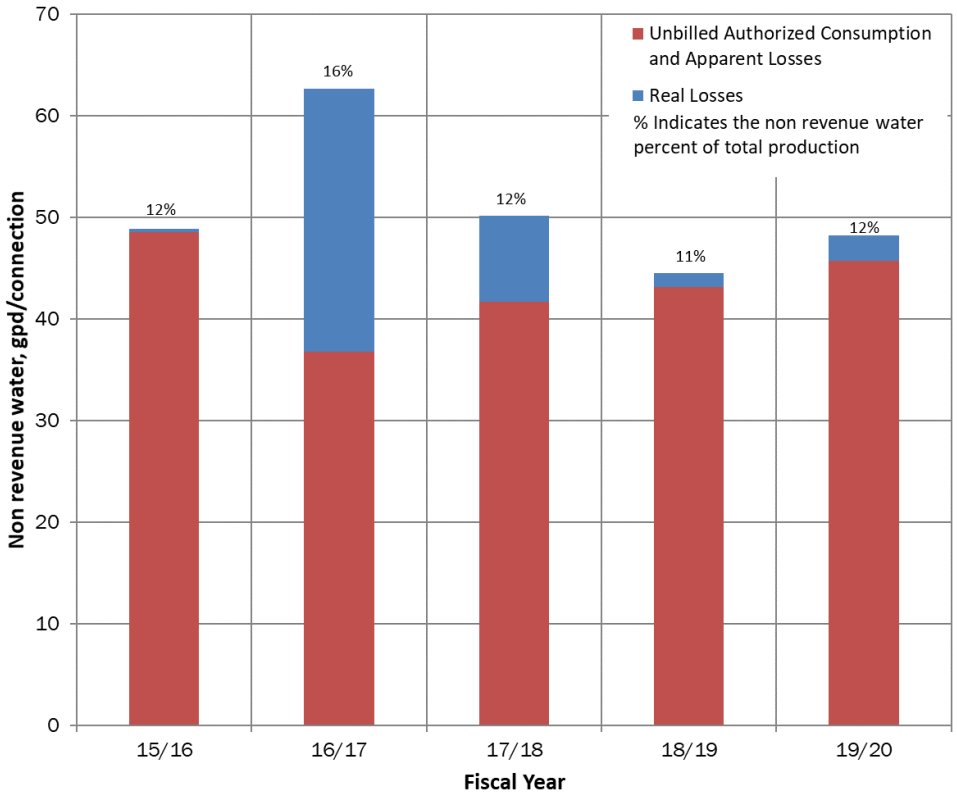

Figure 4-4. Losses (NRW) – historical

4.5 Estimated Future Water Savings

BC estimated future water savings in this analysis in terms of active and passive conservation activities. The analyses presented herein do not include the new demand requirements that DWR has under development for achieving long-term efficient water use per the provisions described in Section 4.5., but the new demand requirements may result in a change in the future demand projections for the City.

4.5.1 Active Conservation Program Savings

Active conservation activities are those activities that the City implements as part of the City's water conservation program. In this analysis, the active conservation program is estimated to maintain the historical conservation achievements. In addition active conservation would achieve additional savings of approximately 5 percent throughout the planning horizon. Section 9 describes the City's active water conservation program.

4.5.2 Passive Water Savings

The water industry defines water savings from codes, standards, ordinances, or transportation and land use plans as passive savings. Below is a summary of the applicable state codes and ordinances considered in this analysis to reduce the City's future water demand based on information provided in the DWR 2020 UWMP Guidebook (DWR, 2020).

Model Water Efficient Landscape Ordinance – Effective on December 1, 2015, DWR estimates that this ordinance will reduce the typical residential outdoor landscape demands for new construction of 20 percent from the estimated demand using the prior ordinance provisions. Similarly, the ordinance will reduce outdoor water demand by 35 percent for new construction commercial landscape t over the prior ordinance.

California Energy Commission Title 20 appliance standards for toilets, urinals, faucets, and showerheads. This standard impacts both new construction and replacement fixtures in existing homes. The CALGreen assumption for new construction described below includes this standard, with an assumed 5 percent reduction in indoor water use of existing homes.

CALGreen Building Code – The code requires residential and non-residential water efficiency and conservation measures for new buildings and structures. It is assumed that this code will result in a reduction of residential and non-residential indoor water use on new construction by 20 percent.

To apply the estimated percent reduction to the appropriate indoor or outdoor usage, the City's indoor and outdoor usage for each customer category is estimated. The residential indoor usage would be 95 percent of January 2018 demand. The CII indoor usage would be 95 percent of CII January 2019 demand. It is assumed outdoor usage is the remaining amount in each sector plus any dedicated irrigation meter water usage for that sector. Table 4-3 lists the indoor and outdoor percentages for each customer category based on this approach.

Table 4-3. Estimated Indoor and Outdoor Usage by Sector

	Indoor (%)	Outdoor (%)
Single-Family	73	27
Multi-Family	82	18
CII	89	11
Landscape	0	100

Note:
a. Indoor usage is estimated to be 95 percent of January demand in 2018

4.5.3 Summary of Estimated Future Water Savings

Table 4-4 presents a summary of the estimated future active and passive water savings for the City's service area.

Table 4-4. Estimated Future Active and Passive Water Savings, MG

	2025	2030	2035	2040	2045
Passive					
Single-family	121	136	150	165	180
Multi-family	20	22	23	25	26
CII	2	4	7	9	11
Passive subtotal	143	162	180	199	218
Active					
Single-family	150	153	157	161	165
Multi-family	23	23	24	24	25
CII	25	26	26	27	27
Landscape	20	20	20	20	20
Active subtotal	217	222	227	231	236
Total	360	383	407	430	453

Based on these assumed reductions in water use by customer sector, it is estimated that the City could realize approximately 453 MG of active and passive water savings annually by 2045. The water use projections presented in Section 4.6 do account for these active and passive water savings that may be realized from these codes and ordinances and the City's active water conservation program.

4.5.4 Upcoming New Efficient Water Use Standards

AB 1668 and SB 606, passed in 2018, establish guidelines for efficient water use and a framework developed for the implementation and oversight of the new standards. They require water suppliers to calculate their own individual urban water use objective beginning in 2023. The suppliers will calculate the objectives based on efficient indoor and outdoor water use, CII water use, and an allowable water loss volume. AB 1668 and SB 606 build on the Governor's ongoing efforts to make water conservation a way of life in California and create a new foundation for long-term improvements in water conservation and drought planning. The two bills should strengthen the state's water resiliency in the face of future droughts with three provisions that apply to urban water suppliers. The provisions include:

1. Establishing water use objectives and long-term standards for efficient water use that apply to urban retail water suppliers; comprised of indoor residential water use, outdoor residential water use, CII irrigation with dedicated meters, water loss, and other unique local uses.
2. Providing incentives for water suppliers to recycle water
3. Requiring urban and agricultural water suppliers to set annual water budgets and prepare for drought

The legislation identifies additional provisions related to small water suppliers, rural communities, and agricultural water suppliers, though these provisions do not apply to the City. The projected demands discussed in Section 4.6 do not include these future water use objectives.

4.6 Projected Water Demand

This UWMP estimates water demands through the year 2045 based on current demands plus demands for the projected future planned developments through 2040 described in Section 3 and listed in Appendix C, consistent with the 2020 UWMP. Projected demands are based on currently planned development through 2045. Future planned developments, estimated climate change, and water conservation efforts combined with unit water demand factors from the 2020 WSMP form the basis for estimating future demands in Table 4-5.

Table 4-5. Use for Potable and Non-Potable Water – Projected (DWR Table 4-2)

Use Type	Additional Description	Projected Water Use, MG				
		2025	2030	2035	2040	2045
Single-family		2,760	2,817	2,873	2,929	2,986
Multi-family		416	424	432	439	447
CII	Includes commercial, industrial, and institutional/governmental	478	486	493	501	508
Landscape	Potable water- includes commercial and City irrigation meters	389	386	384	382	380
Losses	Non-revenue water	557	569	581	593	605
	Total	4,600	4,682	4,763	4,845	4,926

Projected water use from 2025-45 is shown in Table 4-5 and in Figure 4-5. Water demand projections for 2025-45 assume a normal water year type (see Section 7.2 for year-type definitions). Figure 4-5 also shows the expected increase in demand due to climate change and anticipated decrease in demand due active and passive savings.

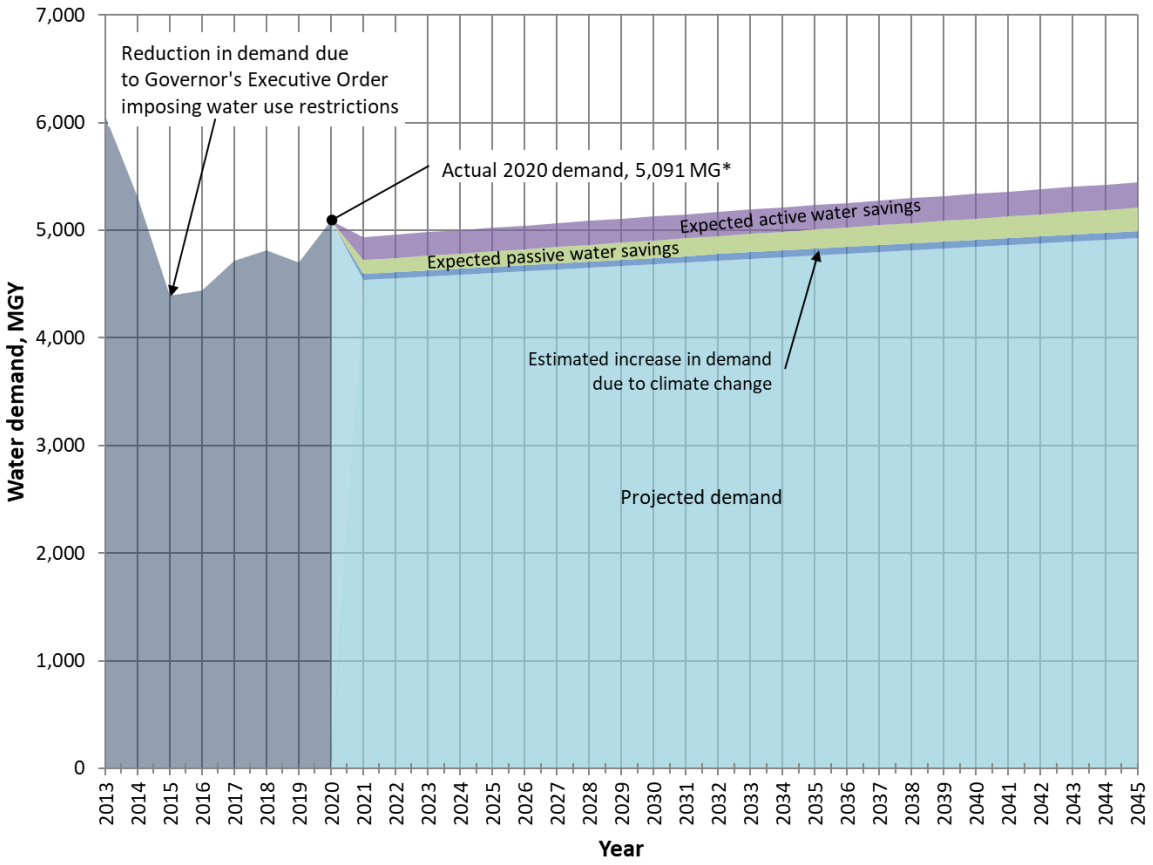

Figure 4-5. Historical and projected water demand

**Note: Demands shown in 2020 were unusually high due to the combination of a dry year and more residents at home due to COVID. 2021 demands were assumed to be at 2018 levels as a more typical base year since 2020 was an unusual circumstance.*

BC based total water demands in Table 4-6 on the sum of potable and recycled water demands.

Table 4-6. Total Gross Water Use (Potable and Non-Potable), MG (DWR Table 4-3)

	2020	2025	2030	2035	2040	2045
Potable, raw, other non-potable *from DWR Table 4-1 and 4-2*	5,091	4,600	4,682	4,763	4,845	4,926
Recycled water demand *from DWR Table 6-4*	74	78	82	86	90	94
Total water demand	5,165	4,678	4,763	4,849	4,935	5,021

4.7 Water Use for Lower Income Households

The Housing Element was used to estimate the projected water demands for low-income households (City of Antioch, 2015). Approximately 53.6 percent of households fall within or below the low-income category (19.4 percent are extremely low income, 14.5 percent are very-low income, and 19.7 percent are low income). The data shows he 2020 low-income household water demand of 2,729 MG.

Tables 4-6 and 4-7 show these projected low-income water demand projections. Table 4-7 shows verification that the demands by lower income households are included in the water use projections in this UWMP.

Table 4-7. Inclusion in Water Use Projections (DWR Table 4-5)

Are future water savings included in projections?	Yes
If "Yes" to above, state the section or page number where citations of the codes, ordinances, etc... utilized in demand projections are found.	Section 4.5 & 4.6
Are lower income residential demands included?	Yes

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Section 5

Baselines and Targets

This section describes the City's compliance with the 2020 SB x7-7 GPCD baseline and targets as determined from the analyses conducted as part of the 2010 and 2015 UWMPs.

5.1 Baseline Periods

In the 2015 UWMP, the City updated calculations (from the 2010 UWMP) for its baseline period and the selected 2020 GPCD method to calculate the target GPCD. The City re-calculated the target GPCD using Method 3. The City's 10-year baseline period covers 1999 to 2008. The City's 5-year baseline period is 2004-08. Appendix E shows a copy of the SB x7-7 Verification Form completed as part of the 2015 UWMP.

5.2 Service Area Population

Based on the Methodologies document (DWR, 2016b), the City is a category 2 water supplier. The DWR population tool was used to estimate the historical population and baseline water use. DWR developed this tool to assist water agencies to estimate their service area population using a consistent methodology based on the 1990, 2000, and 2010 Census data and historical residential connection data.

This 2020 UWMP bases the population estimate for 2020 DOF 2020 estimates for the City as described in Section 3.

5.3 Gross Water Use

Gross water use measures water that enters the City's distribution system over a 12-month period with certain allowable exclusions. These allowable exclusions are recycled water delivered within the service area, indirect recycled water, water placed into long-term storage, water conveyed to another urban supplier, water delivered for agricultural use, and process water. The City did not have water sources or uses (recycled water or process water) that would allow for using these exclusions. Appendix E presents the City's 2020 gross water use shown in the 2020 SB x7-7 Compliance Form.

5.4 Baseline Daily and 2020 Target Per Capita Water Use

The 2015 UWMP used the City's historical gross water and population estimates from the DWR population tool to calculate the baseline daily per capita use in GPCD presented in Appendix E. A summary presents the resulting 5-year and 10-year baseline per capita water. No changes were made to the baseline daily per capita use for this 2020 UWMP.

Consistent with the 2015 UWMP, Table 5-1 shows the confirmed 2020 GPCD target, as well as a summary of the City's baseline per capita demands and periods.

Table 5-1. Baselines and Targets Summary (DWR Table 5-1)				
Baseline Period	Start Year	End Year	Average Baseline GPCD	Confirmed 2020 Target
10-15 year	1999	2008	185	165
5 Year	2004	2008	184	

Notes: Units: All values are in gallons per capita day (GPCD)

5.5 2020 Compliance Daily Per Capita Water Use

The City's actual 2020 water use is compared to the 2020 target to determine if daily per capita water use met the 2020 target daily per capita water use. Actual water use for the 2020 calendar year and 2020 population, described in Section 3, is used to calculate the actual 2020 per capita water use. As discussed in Section 4, the 2020 GPCD is below the City's 2020 SBx7-7 goal (165 GPCD).

There are several allowable adjustments that can be made to the City's gross water use for 2020. No adjustments to 2020 GPCD were made as a result of extraordinary weather events, economic conditions, or weather conditions as shown in Table 5-2. The City's completed 2020 SB x7-7 Compliance Form is provided in Appendix E.

Table 5-2. (DWR Table 5-2) 2020 Compliance							
	Optional Adjustments to 2020 GPCD *Enter "0" if no adjustment is made from Methodology 8*						
Actual 2020 GPCD	Extraordinary Events	Economic Adjustment	Weather Normalization	Total Adjustments	Adjusted 2020 GPCD	2020 GPCD *(Adjusted if applicable)*	Did Supplier Achieve Targeted Reduction for 2020? Y/N
125	0	0	0	0	0	125	Yes

Note: Units: All values are in GPCD

5.6 Regional Alliance

The regional alliance includes CCWD's retail service area and wholesale municipal customers (City of Antioch, Pittsburg, Martinez, the Golden State Water Company, and DWD). As discussed in Section 2, although the City is a part of a regional alliance with CCWD, the City has chosen to comply with the requirements of SB X7-7 on an individual reporting basis.

Section 6

System Water Supplies

This section describes the sources, quantities, supply constraints, and quality of the City's various water supply sources, including recycled water. Additionally, this section describes current and projected water supplies and their reliability and vulnerability.

6.1 Surface Water

The City pumps surface water from the Delta, which it can store in the Municipal Reservoir before it is treated at the WTP. This section discusses the quantity of surface water available and associated water quality issues.

6.1.1 Sacramento/San Joaquin Rivers Delta

The City has diverted water from the San Joaquin River in the western Delta since at least the 1870s and as such has pre-1914 water rights. Water quality in the western Delta varies widely, influenced by precipitation, regional water management activities, tides, river outflows, agricultural drainage, and drought conditions. Generally, the City's intake experiences fresher conditions in the winter and early spring, and salinity increases in the late spring through fall as conditions become drier and Delta operations change. This seasonal pattern can vary substantially depending on hydrology. The intake also experiences tidal influence; salinity varies throughout the day during lower Delta outflows.

The City currently pumps from the Delta for varying periods from a few weeks up to about 300 days depending on water quality conditions. The City has a delivered water quality goal of 75 milligrams per liter (mg/L) chlorides. The City's existing intake has a capacity of 16 mgd. The Water Rights Division of SWRCB has identified no quantity limit on the City's diversions from the Delta provided the water is used beneficially. The City's ability to use river water to meet City demands is limited by the pump station capacity and the inability of the existing WTP to remove salinity.

With the construction of the Brackish Desalination facility, the City will be able to treat river water year-round to drinking water standards even when salinity is high. The City will use the desalination facility when salinity in the Delta is above the City's delivered water quality target. When operating, the desalination facility will divert up to 8 mgd of Delta water to produce 6 mgd of treated water. When salinity is low and the WTP operates conventionally (without desalination), the City can operate the intake to its full capacity of 16 mgd. The City will purchase water from CCWD to meet additional demand. Table 6-1 summarizes recent historical water pumped from the Delta.

Table 6-1. Historical Delta Pumped Water Volumes, MG

Water Supply/Constraint	2012	2013	2014	2015	2016	2017	2018	2019	2020
Delta	1,672	1,538	558	409	1,440	2,168	1,251	2,089	241

6.2 Purchased or Imported Water

The City is one of the twelve cities in the central and eastern Contra Costa County that are contract customers to CCWD for the wholesale purchase of water.

6.2.1 CCWD

CCWD supplies raw water to the City from diversions at Victoria Canal, Rock Slough and Old River in the Delta through the Canal, which is operated by CCWD for the United States Bureau of Reclamation (Bureau). In May 2005, CCWD and the Bureau renewed the long-term Central Valley Project (CVP) agreement for a term of 40 years. The contract allows CCWD a maximum annual allotment of 195,000 AF from the CVP. Reductions in the 195,000 ac-ft allotment depend on water shortages, including droughts and regulatory restrictions.

The Bureau created the Municipal and Industrial (M&I) Water Shortage Policy, which establishes CVP water supply levels that could sustain urban areas and provide adequate levels of health and safety during continuing or severe droughts. The M&I Water Shortage Policy also allows a minimum allotment of 75 percent of adjusted historical use until irrigation allocations are below 25 percent. The M&I Water Shortage Policy defines historical use as "the average quantity of CVP water put to beneficial use within the service area during the last three years of water deliveries, unconstrained by the availability of CVP water."

Per discussion with CCWD (Appendix F), the City's water supply from CCWD varies based on year type, but in normal years CCWD agrees to supply 100 percent of the City's demand. Unless constrained by drought conditions, CCWD will sell the City all the City's projected water needs through the year 2045. The City's previous annual agreement with CCWD limits supply to a peak demand of 25,000 gpm (36.0 mgd).

In the 1990s and 2000's, CCWD constructed Los Vaqueros Reservoir (LVR), Victoria Canal and Old River Pump Stations and connecting pipelines, to divert from better quality water sources. LVR also stores good quality water to blend with saltier water, to maintain raw water quality and reserve supply to draw upon during droughts. More recently CCWD has undertaken a program to replace the open canal from its Rock Slough Diversion with pipeline, to avoid infiltration of saline groundwater into its raw water diversion from Rock Slough.

Table 6-2 summarizes volume of water the City pumped from the Canal from 2012 through 2020.

Table 6-2. CCWD Surface Water Supply to the City, MG

Water Supply/Constraint	2012	2013	2014	2015	2016	2017	2018	2019	2020
CCWD (Canal)	3,914	4,520	4,866	3,970	3,114	2,586	3,863	2,446	4,877

6.3 Groundwater

The City has not historically pumped groundwater (as shown in Table 6-3) nor has any plans for using groundwater by the year 2045. However, the City lies within the northwest part of the East Contra Costa Subbasin (East Contra Costa Subbasin) within the larger San Joaquin Valley Groundwater Basin. The City participates in the East Contra Costa Subbasin Groundwater Sustainability Agency (GSA), and is involved with developing the Groundwater Sustainability Plan (GSP) for the group. The East Contra Costa Subbasin GSA includes the following eight local agencies: City of Antioch, City of Brentwood, Byron Bethany Irrigation District, Contra Costa County, CCWD, DWD, Town of Discovery Bay, and East Contra Costa Irrigation District. The GSP is currently in development with the draft available for public review in September 2021. The City plans to adopt the completed GSP in November 2021.

Table 6-3. Groundwater Volume Pumped, MG (DWR Table 6-1)						
✓	Supplier does not pump groundwater. The supplier will not complete the table below.					
Groundwater Type	Location or Basin Name	2016	2017	2018	2019	2020
Alluvial basin	San Joaquin Valley Groundwater Basin	0	0	0	0	0
Total		0	0	0	0	0

6.4 Stormwater

The four creeks that receive local runoff are the East Antioch Creek, Markley Creek, Sand Creek, and West Antioch Creek. Storm water from these local creeks flows untreated into the San Joaquin River. Currently the City does not implement stormwater recovery to offset potable use.

6.5 Wastewater and Recycled Water

This section provides information on recycled water and its current and potential as a resource for the City. The elements of this section include: (1) the quantity of wastewater generated in the service area, (2) description of the collection, treatment, and disposal/reuse of that wastewater, (3) current water recycling efforts, and (4) the potential for water recycling in the service area.

6.5.1 Recycled Water Coordination

DD manages the wastewater collection and treatment for the domestic and industrial wastewater flows generated within the City as well as Pittsburg and the unincorporated community of Bay Point in Contra Costa County. DD collected an estimated 14,500 AF (4,725 MG) of wastewater in 2020. DD recycles approximately 50 percent of that wastewater to supply various uses. It disposes the remaining wastewater effluent through an outfall into the Delta at New York Slough.

In 2001, DD began operating its recycled water system, primarily to provide recycled water for two Calpine power plants. In 2007 to 2008, DD expanded the system with the Pittsburg Recycled Water Project, serving recycled water to the Delta View Golf Course and several Pittsburg parks. Most recently in 2011, DD constructed the Antioch Recycled Water Project to provide water to the City. DD has coordinated all recycled water projects successfully with CCWD, the region's primary water supplier, and plans to coordinate all proposed projects with CCWD per the CCWD/DD General Recycled Water Agreement Letter of Mutual Understanding (DD, 2014).

6.5.2 Wastewater Collection, Treatment, and Disposal

The City owns and maintains a collection system that delivers raw sewage to DD pumping stations. The wastewater collection system in the City is a network of approximately 292 miles of gravity sewer mains. All sewer pump stations and force mains in the City's wastewater system have been decommissioned. Two of DD's pump stations (Bridgehead Pump Station and Antioch Pump Station) transport most sewage from the City's collection system to the DD Wastewater Treatment Plant (WWTP). Table 6-4 summarizes wastewater flows generated in the City's service area.

Table 6-4. Wastewater Collected within Service Area in 2020, MG (DWR Table 6-2)						
100	Percentage of 2020 service area covered by wastewater collection system (optional)					
100	Percentage of 2020 service area population covered by wastewater collection system (optional)					
Wastewater Collection			Recipient of Collected Wastewater			
Name of Wastewater Collection Agency	Wastewater Volume Metered or Estimated?	Volume of Wastewater Collected in 2020, MG[a]	Name of Wastewater Treatment Agency Receiving Collected Wastewater	Treatment Plant Name	Is WWTP Located Within UWMP Area?	Is WWTP Operation Contracted to a Third Party? (optional)
City of Antioch	Metered	2,136	Delta Diablo	DD WWTP	Yes	No
Total wastewater collected from service area in 2020:		2,136				

Note:
a. From DD email (2/18/2021)

Table 6-5 summarizes the amount of wastewater treated and discharged by the WWTP from within the City's service area.

Table 6-5. Wastewater Treatment and Discharge within Service Area in 2020 (DWR Table 6-3)

WWTP Name	Discharge Location Name or Identifier	Discharge Location Description	Method of Disposal	Does this Plant Treat Wastewater Generated Outside the Service Area?	Treatment Level	2020 Volumes[a], MG				
						Wastewater Treated	Discharged Treated Wastewater	Recycled within Service Area	Recycled Outside of Service Area	Instream Flow Permit Requirement
Delta Diablo	New York Slough	Sacramento-San Joaquin Rivers Delta	Bay or estuary outfall	Yes	Secondary	14,528	9,914	262	6,907	0
TOTAL						14,528	9,914	262	6,907	0

Note:

a. Data from DD email (2/18/2021)

6.5.3 Recycled Water System

As discussed in Section 6.5.1, DD constructed the Antioch Recycled Water Project to provide water to the City. Currently, the City uses recycled water from DD to irrigate four City parks and the Lone Tree Golf Course. Recycled water use currently offsets about 1 percent of the City's potable use.

6.5.4 Recycled Water Beneficial Uses

Current and potential uses of recycled water are landscape irrigation at medians, municipal parks, playing fields, the Lone Tree Golf Course, and other green spaces. The City intends to continue to pursue additional opportunities to expand recycled water use. Projections in the 2020 UWMP reflect latest information on customer needs and opportunities for expanding use as reflected in Table 6-6.

Table 6-6. Current and Projected Recycled Water Direct Beneficial Uses within Service Area, MG (DWR Table 6-4)

Recycled water is not used and is not planned for use within the service area of the supplier.
Quantities listed are for outside of the service area.

Name of Agency Producing (Treating) the Recycled Water:		Delta Diablo						
Name of Agency Operating the Recycled Water Distribution System:		City of Antioch						
Supplemental Water Added in 2020		0						
Source of 2020 Supplemental Water		0						
Beneficial Use Type	General Description of 2020 Uses	Level of Treatment Drop down list	2020	2025[a]	2030[a]	2035[a]	2040[a]	2045[a]
Agricultural irrigation								
Landscape irrigation (excludes golf courses)	City Parks	Tertiary	17	18	19	20	21	22
Golf course irrigation	Lone Tree Golf Course	Tertiary	57	60	63	66	69	73
Commercial use								
Industrial use								
Geothermal and other energy production								
Seawater intrusion barrier								
Recreational impoundment								
Wetlands or wildlife habitat								
Groundwater recharge Indirect Potable Use (IPR)								
Surface water augmentation (IPR)								
Direct potable reuse								
Other								
		TOTAL (within the service area)	74	78	82	86	90	94

Note:
IPR - Indirect Potable Reuse
Data from DD email (3/1/2021)
a. Projected recycled water use is estimated to be 1 percent annual increase from 2020 through 2045.

Table 6-7 shows actual recycled water use in 2020 compared to what was projected in the previous UWMP. Expansion of recycled water use in the City's service area has not proceeded as quickly as forecasted in 2015 in part due to changing needs of water users (i.e., golf course modified due to recent improvements). In the future the City intends to continue to pursue additional opportunities to expand recycled water use.

Table 6-7. 2015 UWMP Recycled Water Use Projection Compared to 2020 Actual, MG (DWR Table 6-5)

Recycled Water was not used in 2015 nor Projected for use in 2020. The Supplier will not Complete the Table Below.

Use Type	2015 Projection for 2020	2020 Actual Use
Agricultural irrigation		
Landscape irrigation (except golf courses)	183	17
Golf course irrigation	143	57
Commercial use		
Industrial use		
Geothermal and other energy production		
Seawater intrusion barrier		
Recreational impoundment		
Wetlands or wildlife habitat		
Groundwater recharge (IPR)		
Surface water augmentation (IPR)		
Direct potable reuse		
Other		
TOTAL	326	74

6.5.5 Actions to Encourage and Optimize Future Recycled Water Use

The City does not currently have plans to expand recycled water, as shown in Table 6-8, but the City plans to continue using recycled water and plans to expand recycled water use within the City service area through 2045.

Table 6-8. Methods to Expand Future Recycled Water Use, MG (DWR Table 6-6R)

☒	Supplier does not plan to expand recycled water use in the future. Supplier will not complete the table below but will provide narrative explanation.
	Provide page location of narrative in UWMP

Name of Action	Description	Planned Implementation Year	Expected Increase in Recycled Water Use
--	--	--	--
		Total	

6.6 Desalination

After many years of planning, permitting, and design, the City contracted for a desalination facility known as the Brackish Water Desalination Project (Project). Brackish water desalination as a component of the City's water supply portfolio has been evaluated in State-approved water planning documents including the City's 2015 Urban Water Management Plan and the East Contra Costa County Integrated Regional Water Management Plan 2015 Update.

The Project will improve the City's water supply reliability and provide operational flexibility while reducing costs, especially during droughts and with future proposed changes in Delta water management. The Project will allow the City to use water from its river intake year-round, even when the salinity is above levels normally treated at the existing conventional WTP.

The Project will replace the City's existing San Joaquin River intake and River Pump Station, construct a desalination facility located at the City's existing water treatment plant property, and construct pipelines for the conveyance of source water and byproduct from the desalination process. The new intake will be in the same location in the western Delta and include a state-of-the art fish screen. The Project will have the capacity to produce up to 6 mgd of desalinated water and will be used when salinity levels in the western Delta are above the City's delivered water quality goals. Overall, the Project will increase the availability of Delta water for direct diversion and provide 6 mgd of "drought-proof" supply improving the reliability and resiliency of the City's supply.

6.7 Exchanges or Transfers

The City does not exchange or transfer water and has no future or planned agreements for short- or long-term transfers. As needed or in emergency, the City also can purchase treated water from its neighboring agencies including DWD and City of Pittsburg (intertie is currently out of service).

6.8 Future Water Projects

As shown in Table 6-9, the City is constructing a Brackish Water Desalination facility to improve water supply reliability and operational flexibility. This Project is a critical investment in the City's water infrastructure and water supply that has been years in the making and will provide benefits for generations. The City currently does not have plans for other future supply projects through 2045. The CCWD UWMP includes information from the wholesaler's perspective on future water supply.

Table 6-9. Expected Future Water Supply Projects or Programs (DWR Table 6-7 R)						
	No expected future water supply projects or programs that provide a quantifiable increase to the agency's water supply. Supplier will not complete the table below.					
	Some or all of the supplier's future water supply projects or programs are not compatible with this table and are described in a narrative format.					
X	Future water supply projects are described in Section 6.7					
Name of Future Projects or Programs	Joint Project with Other Agencies?		Description (if needed)	Planned Implementation Year	Planned for Use in Year Type	Expected Increase in Water Supply to Agency, mgd
Brackish Water Desalination Facility	No	--	Delta intake, fish screen, pump station, 3,000-foot-long raw water pipeline, new 6-mgd desalination facility, brine disposal pipeline	2023	All year types	6[a]

Note:

a. *When the desalination facility is online, it will provide 6-mgd total supply to the City from the Delta. While the capacity of the desalination facility is 6 mgd, the overall increase in available annual supply to the City is less than 6 mgd and varies by year type since the City already pumps Delta water when water quality is good. The facility will result in the largest increase in available supply in drier years when the City will be able to continue pumping Delta water even as salinity increases.*

6.9 Summary of Existing and Planned Sources of Water

Table 6-10 summarizes water supplies for 2020; Table 6-11 presents projected potable and non-potable supplies for a normal water year.

Table 6-10. Water Supplies – Actual (DWR Table 6-8)				
		2020		
Water Supply	Additional Detail on Water Supply	Actual Volume, MG	Water Quality	Total Right or Safe Yield (optional)
Surface water	Delta	241	Drinking water	-
Purchased or imported water	CCWD (Delta)	4,877	Drinking water	-
Recycled water[a]	DD	74	Recycled water	-
	Total[b]	5,192		

Notes:

a. *Based on DD email dated 3/1/2021*

b. *There is a slight difference between water that is delivered to the distribution system (Table 4-6) and water pumped from supply sources in 2020*

Table 6-11. Water Supplies – Projected (DWR Table 6-9)						
		Projected Water Supply, MG				
		2025	2030	2035	2040	2045 (opt)
Water Supply	Additional Detail on Water Supply	Reasonably Available Volume	Reasonably Available Volume	Reasonably Available Volume	Reasonably Available Volume	Reasonably Available Volume
Surface water[a]	Delta	2,776	2,776	2,776	2,776	2,776
Purchased or imported water[b]	CCWD	5,303	5,303	5,303	5,303	5,303
Recycled water[c]	DD	78	82	86	90	94
	TOTAL	8,157	8,161	8,165	8,169	8,174

Notes:

a. *It is assumed that the Brackish Water Desalination Facility will be online in 2023. Projected supply from 2025 through 2045 during normal water years is based on historical water pumped from the Delta in 2012. However, for months where there was limited pumping in 2012 (July through November) due to water quality constraints; this UWMP assumes RO would be used in these conditions going forwards and supply was increased to 6 mgd.*

b. *100 percent of normal supply is estimated to be available to the City in normal years per discussions with CCWD (Base year = 2012, see Table 7-1)*

c. *Based on DD projections per email dated 3/1/2021*

6.10 Energy Intensity

The City's current energy uses in supplying water within the service area are comprised of pump stations and the WTP. This analysis does not include energy usage for supplies purchased by the City from CCWD. The associated electricity metering data provide energy usage for each facility within the distribution cycle and reported in kilowatt-hours (kWh). Table 6-12 presents energy intensity by process for all facilities during the 2020 calendar year.

Table 6-12. Energy Intensity – Water Supply Process Approach (DWR Table O-1C)						
Start Date for Reporting Period: 1/1/2020	Urban Water Supplier Operational Control					
End Date: 12/31/2020						
	Water Management Process				Non-Consequential Hydropower (if applicable)	
	Conveyance	Treatment	Distribution	Total Utility	Hydropower	Net Utility
Volume of water entering process (AF)	9,939	15,933	15,706	N/A	0	N/A
Retail potable deliveries (%)	--	100	100	--	--	--
Retail non-potable deliveries (%)	100	--	--	--	--	--
Total percentage	100	100	100	N/A	0	N/A
Energy consumed (kWh)	1,219,188	3,943,782	1,050,677	6,213,648	0	N/A
Energy intensity (kWh/AF)	123	248	67	438	0	N/A

Section 7

Water Supply Reliability Assessment and Drought Risk Assessment

This assessment of the water supply reliability is the fundamental purpose of this UWMP. This section considers the reliability of meeting customer water use by analyzing potential variability of the City's water supplies and comparing those projected water supplies to projected water demands. In addition, this section includes a DRA that evaluates the City's water supply risk under a severe drought period lasting for the next five consecutive years.

7.1 Water Service Reliability Assessment

This section describes the water service reliability determination, of the City's two water supply sources: surface water from the Delta and purchased water from CCWD. Water supply reliability is an important component of the water management planning process. Factors contributing to inconsistency in the City's water supplies include environmental and water quality constraints, and reductions in availability due to climatic factors. The implementation of the Brackish Water Desalination Project in 2023 will improve the City's overall water service reliability.

7.1.1 Constraints on Water Sources

The Delta is the source for all the City's water, whether pumped directly by the City or pumped by CCWD and delivered to the City via the Canal. Section 6.2 presented discussion on constraints for surface water supply from the City's western Delta intake. The City's available supply at its intake is currently limited primarily by its pumping capacity and water quality. Implementation of the Brackish Water Desalination Project in 2023 will enable the City to use its river intake for longer periods and increase its available river water supply during dry conditions. For planning purposes, the City has estimated that after 2023 with the desalination facility online, the City will be able to pump as much as 6 mgd in months where the City would not have been able to historically pump from the Delta due to water quality constraints.

The purchased water supplies available to the City are subject to significant reductions during dry years (seasonal and climatic shortages). This UWMP assumes that CCWD will reduce its raw water supply in dry years. The factors and constraints specific to the City's purchased water supplies are further described in Section 6.1.

7.1.2 Reliability by Type of Year

This section describes the reliability of the City's water supply sources and their vulnerability to seasonal or climatic shortage for three year-types:

- Normal Year: a single year that represents the average water supply available to the supplier (2012)
- Single Dry Year: a single dry year that represents the lowest water supply available to the supplier (2020, based on lowest river pumping from the Delta in the last 10 years)
- Five-Consecutive-Year Drought: the driest five-year historical sequence (2012-2016)

For each respective water supply source, Table 7-1, 7-2, and 7-3 present the basis of water year data for determining water reliability based. Table 7-2 shows estimated surface water supply adjusted to account for increased pumping from the Delta with the Brackish Water Desalination Plant online. The single-dry year for both sources is based on the lowest annual water supply available from the Delta (2020). Table 7-4 shows historical recycled water use for the City, but per discussions with DD supply is not impacted by year type. As noted in Table 7-1, 2016 was technically not a dry year, but is part of the driest five-year historical period.

Table 7-1. Basis of Water Year Data (Reliability Assessment) (DWR Table 7-1) – Surface Water (Delta)

			Quantification of available supplies in not compatible with this table and is provided elsewhere in the UWMP. Location_____
		X	Quantification of available supplies is provided in this table as either volume only, percent only, or both
Year Type	Base Year	Volume Available, MG	Percent of Average Supply
Normal year	2012	1,672	100
Single-dry year	2020	409	68
Consecutive dry years 1st year	2012	1,672	100
Consecutive dry years 2nd year	2013	1,538	256
Consecutive dry years 3rd year	2014	558	93
Consecutive dry years 4th year	2015	409	68
Consecutive dry years 5th year	2016	1,440	240

Note: Multiple versions of DWR Table 7-1 are being used. The particular water sources that is being reported in this table is surface water (Delta).

Table 7-2. Basis of Water Year Data (Reliability Assessment) (DWR Table 7-1) – Surface Water (Delta) adjusted after 2023

			Quantification of available supplies in not compatible with this table and is provided elsewhere in the UWMP. Location_____
		X	Quantification of available supplies is provided in this table as either volume only, percent only, or both
Year Type	Base Year (adjusted)	Volume Available, MG	Percent of Average Supply
Normal year	2012	2,866	100
Single-dry year	2020	2,213	77
Consecutive dry years 1st year	2012	2,866	100
Consecutive dry years 2nd year	2013	2,765	96
Consecutive dry years 3rd year	2014	2,297	80
Consecutive dry years 4th year	2015	2,216	77
Consecutive dry years 5th year	2016	2,680	93

Note: Multiple versions of DWR Table 7-1 are being used. The particular water sources that is reported in this table is surface water (Delta).

Table 7-3. Basis of Water Year Data (Reliability Assessment) (DWR Table 7-1) - Purchased or Imported Water (CCWD)			
			Quantification of available supplies in not compatible with this table and is provided elsewhere in the UWMP. Location_____
		X	Quantification of available supplies is provided in this table as either volume only, percent only, or both
Year Type	Base Year	Volume Available, MG	Percent of Average Supply
Normal year	2012	5,854	100
Single-dry year	2020	3,970	76
Consecutive dry years 1st year	2012	5,854	100
Consecutive dry years 2nd year	2013	4,520	86
Consecutive dry years 3rd year	2014	4,866	93
Consecutive dry years 4th year	2015	3,970	76
Consecutive dry years 5th year	2016	3,114	59

Note: Multiple versions of DWR Table 7-1 are being used. The particular water source that is being reported in this table is purchased or imported water (CCWD).

Table 7-4. Basis of Water Year Data (Reliability Assessment) (DWR Table 7-1) - Recycled Water (DD)			
			Quantification of available supplies in not compatible with this table and is provided elsewhere in the UWMP. Location_____
		X	Quantification of available supplies is provided in this table as either volume only, percent only, or both
Year Type	Base Year	Volume Available[a], MG	Percent of Average Supply
Normal year	-	74	100
Single-dry year	-	74	100
Consecutive dry years 1st year	-	74	100
Consecutive dry years 2nd year	-	74	100
Consecutive dry years 3rd year	-	74	100
Consecutive dry years 4th year	-	74	100
Consecutive dry years 5th year	-	74	100

Note: Multiple versions of DWR Table 7-1 are being used. The particular water source that is being reported in this table is recycled water (DD).
a. Recycled water supplies do not vary by year type and corresponds with 2020 water use.

7.1.3 Supply and Demand Assessment

This section provides a comparison of normal, single dry, and multiple dry water year supply and demand for the City. Section 4 addresses water demands and Section 6, water supplies. Table 7-5 data compare the normal water year current and projected water supplies to the current and projected demand for the City in.

The values in Tables 7-5, 7-6, and 7-7, vary from those in Tables 7-1 and 7-3, as supply from the Delta is anticipated to increase to in 2023 as shown in Table 7-2. Furthermore, per discussions with CCWD supply availability is not anticipated to be reduced by more than 15 percent in dry years. Lastly, historical water pumped from CCWD does not indicate supply availability; it corresponds with the amount of water the City needed to pump to meet demands beyond what supply from the Delta could meet (or when Delta supply was unavailable due to water quality constraints).

Table 7-5. Normal Year Supply and Demand Comparison, MG (DWR Table 7-2)

	2025	2030	2035	2040	2045
Supply[a]					
Surface water (Delta)	2,866	2,866	2,866	2,866	2,866
Purchased or imported water (CCWD)	3,914	3,914	3,914	3,914	3,914
Recycled water (DD)	78	82	86	90	94
Supply totals[a]	6,857	6,861	6,865	6,870	6,874
Demand totals[b]	4,679	4,765	4,850	4,936	5,022
Difference (supply minus demand)	2,178	2,097	2,015	1,933	1,852

Notes:
a. From Table 7-2 (DWR Table 7-1)
b. From Table 4-6 (DWR Table 4-3)

Table 7-6 presents the current and projected water supplies compared to the demands for a single dry year for the City. As shown in Table 7-6, the City would see no reduction in water supplies in single dry years; supplies are adequate to meet demands.

Table 7-6. Single Dry Year Water Supply and Demand Comparison, MG (DWR Table 7-3)

	2025	2030	2035	2040	2045
Supply[a]					
Surface water (Delta)	2,213	2,213	2,213	2,213	2,213
Purchased or imported water (CCWD)	3,914	3,914	3,914	3,914	3,914
Recycled water (DD)	78	82	86	90	94
Supply totals[a]	6,857	6,861	6,865	6,870	6,874
Demand totals[b]	4,679	4,765	4,850	4,936	5,022
Difference (supply minus demand)	2,178	2,097	2,015	1,933	1,852

Notes:
a. From Table 7-2 (DWR Table 7-1)
b. From Table 4-6 (DWR Table 4-3)

Demands in Table 7-7 are the same demands as those in a normal year (Table 7-5), but it is projected that in dry years water demand may increase in the summer due to decreased precipitation and increased ET rates. These demand projections do not assume mandated WSCP water shortage action measures.
Table 7-7 summarizes the total projected supplies compared to demands for multiple dry years. As shown in Table 7-7, supplies are adequate to meet demands in multiple dry years even with the supply reductions in the third, fourth, and fifth years.

Table 7-7. Multiple-Dry Years Supply and Demand Comparison, MG (DWR Table 7-4)

		2025	2030	2035	2040	2045
First year	Supply[a]					
	Surface water (Delta)	2,866	2,866	2,866	2,866	2,866
	Purchased or imported water (CCWD)	3,914	3,914	3,914	3,914	3,914
	Recycled water (DD)	78	82	86	90	94
	Supply totals[a]	6,857	6,861	6,865	6,870	6,874
	Demand totals[b]	4,679	4,765	4,850	4,936	5,022
	Difference (supply minus demand)	2,178	2,097	2,015	1,933	1,852
Second year	Supply[a]					
	Surface water (Delta)	2,765	2,765	2,765	2,765	2,765
	Purchased or imported water (CCWD)	3,914	3,914	3,914	3,914	3,914
	Recycled water (DD)	78	82	86	90	94
	Supply totals[a]	6,756	6,760	6,764	6,768	6,773
	Demand totals[b]	4,679	4,765	4,850	4,936	5,022
	Difference (supply minus demand)	2,077	1,995	1,914	1,832	1,751
Third year	Supply[a]					
	Surface water (Delta)	2,297	2,297	2,297	2,297	2,297
	Purchased or imported water (CCWD)	3,914	3,914	3,914	3,914	3,914
	Recycled water (DD)	78	82	86	90	94
	Supply totals[a]	6,288	6,292	6,296	6,300	6,305
	Demand totals[b]	4,679	4,765	4,850	4,936	5,022
	Difference (supply minus demand)	1,609	1,527	1,446	1,364	1,282
Fourth year	Supply[a]					
	Surface water (Delta)	2,216	2,216	2,216	2,216	2,216
	Purchased or imported water (CCWD)	3,522	3,522	3,522	3,522	3,522
	Recycled water (DD)	78	82	86	90	94
	Supply totals[a]	5,816	5,820	5,824	5,828	5,833
	Demand totals[b]	4,679	4,765	4,850	4,936	5,022
	Difference (supply minus demand)	1,137	1,055	974	892	810
Fifth year	Supply[a]					
	Surface water (Delta)	2,680	2,680	2,680	2,680	2,680
	Purchased or imported water (CCWD)	3,326	3,326	3,326	3,326	3,326
	Recycled water (DD)	78	82	86	90	94
	Supply totals[a]	6,084	6,088	6,092	6,096	6,101
	Demand totals[b]	4,679	4,765	4,850	4,936	5,022
	Difference (supply minus demand)	1,405	1,323	1,242	1,160	1,078

Notes:

a. From Table 7-2 (DWR Table 7-1), except in 3rd, 4th, and 5th years where supply from CCWD is estimated to be reduced to 95, 90, and 85 percent of normal supply, respectively. See Appendix F for correspondence with CCWD.

b. From Table 4-6 (DWR Table 4-3)

The water demands for multiple dry years are based on normal years, but the City should expect that peak demands may be higher due to decreased precipitation and increased ET rates. These demand projections do not assume mandated water shortage action measures.

As shown on Figure 7-1 projections for this UWMP show no water supply shortages. During multiple dry years, the City's purchased water supplies would decrease in the 3rd dry year. However, the City would have sufficient supply to meet projected demands.

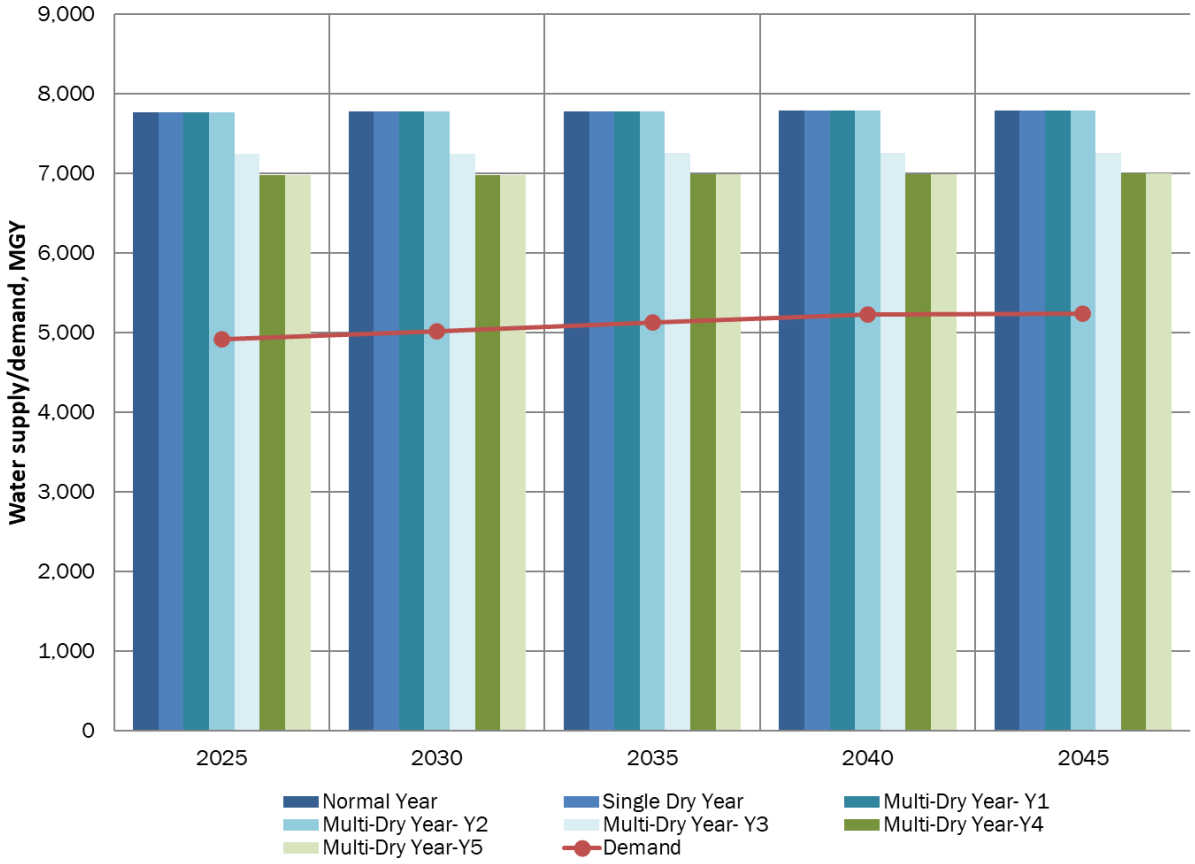

Figure 7-1. Water supply reliability

7.2 Drought Risk Assessment

This DRA includes a description of the data and methods used, basis for the supply shortage conditions, determination of the reliability of each source, and comparison of the total water supplies and uses during a drought.

7.2.1 Data and Methods Used

BC based data for the DRA on historical use from Tables 7-1, 7-3, and 7-4 for purchased water (CCWD, surface water (Delta), and recycled water (DD) respectively. The one exception is that Scenario 2 uses a data from Table 7-2 for surface water (Delta) as the City's supply should increase beginning in 2023 when the desalination facility is online.

7.2.2 Basis for Water Shortage Condition

BC based the shortage conditions considered in this DRA on the key issues to a potential shortage condition discussed in Section 8.2.2 of the WSCP section of this UWMP. Below is a list of drought related scenarios considered in this DRA. Section 7.5.2 describes the reliability assumptions for each of the City's supply sources under these drought related shortage condition scenarios.

1. Regional drought circumstances without Brackish Water Desalination Plant
2. Regional drought circumstances with Brackish Water Desalination Plant
3. Reduced availability of CCWD water supplies
4. Delays in the Brackish Water Desalination Project

7.2.3 DRA Water Source Reliability

Table 7-8 summarizes the reliability of each supply source under the drought related shortage condition scenarios for a variety of shortage conditions listed in Section 7.2. The scenario with the lowest source reliability is Scenario 4.

Table 7-8. DRA Water Source Reliability

Supply Source: DRA Scenario	Purchased or Imported Water (CCWD)		Surface Water (Delta)		Recycled Water (DD)		Total		Assumptions
	Volume Available, MG	Percent of Average/ Normal Year Supply	Volume Available, MG	Percent of Average/ Normal Year Supply	Volume Available, MG	Percent of Average/ Normal Year Supply	Volume Available, MG	Percent of Average/ Normal Year Supply	
1. Regional drought circumstances without Brackish Water Desalination Plant	4,877	125%	409	24%	74	100	5,360	95%	Assume single dry year without increased Delta supply from desalination project.
2. Regional drought circumstances with Brackish Water Desalination Plant (in 2023)	4,877	125%	2,213	77%	74	100%	7,164	127%	Assume single dry year . Includes increased Delta supply from desalination project.
3. Reduced availability of CCWD water supplies	2,680	80%	2,680	93%	74	100%	5,434	96%	Assume fifth year of five consecutive dry years for CCWD water supply availability. Includes increased Delta supply from desalination project.
4. Delays in the Brackish Water Desalination Project	3,114	80%	1,440	86	74	100%	4,628	82%	Assume fifth year of five consecutive dry years for CCWD water supply availability. No increased Delta supply from desalination project.

7.2.4 Total Water Supply and Use Comparison

Table 7-9 presents the DRA total water supply and use comparison. The analysis is based on the scenario that the next five years are five-consecutive-year drought years. It calculates the potential supply shortages (or surplus) and allows the City to include shortfall mitigation from the WSCP demand reduction measures and supply augmentation as necessary. The basis of the key inputs in the DRA water supply and use comparison are:

- **Gross water use** – The City's projected water use from 2021 through 2025. The gross water use does not include water use reduction resulting from implementation of any necessary demand reduction actions by WSCP stage described in Section 8.
- **Total supplies** – Supplies assumed to be available in worst case (lowest available total supplies) in DRA scenario identified in Table 7-9. Scenario 4 is the worst-case scenario.
- **Surplus/shortfall without WSCP Action** – Total supplies minus gross water use prior to any demand reduction or supply augmentation actions from the WSCP
- **WSCP–supply augmentation benefit** – Sum of estimated supply augmentation benefit in the required WSCP stage
- **WSCP–use reduction savings benefit** – Sum of estimated water savings from demand reduction actions in the required WSCP stage
- **Revised surplus/(shortfall)** – Total supplies including supply augmentation benefit minus total demands including demand reductions from relevant WSCP stage.
- **Resulting percent use reduction from WSCP action** – WSCP–use reduction savings benefit divided by gross water use

Table 7-9. 5-Year DRA (DWR Table 7-5), MG

2021	Total	Notes
Gross Water Use	4,536	
Total Supplies	4,628	Scenario 4- Assume fifth year of five consecutive dry years for CCWD water supply availability. No increased Delta supply from desalination project.
Surplus/shortfall without WSCP action	92	Surplus
Planned WSCP actions (use reduction and supply augmentation)		
WSCP - supply augmentation benefit	-	
WSCP - use reduction savings benefit	-	
Revised surplus/(shortfall)	-	
Resulting percent use reduction from WSCP action	-	
2022	**Total**	**Notes**
Gross water use [use worksheet]	4,553	
Total supplies [supply worksheet]	4,628	Scenario 4- Assume fifth year of five consecutive dry years for CCWD water supply availability. No increased Delta supply from desalination project.
Surplus/shortfall without WSCP action	76	Surplus
Planned WSCP Actions (use reduction and supply augmentation)		
WSCP - supply augmentation benefit	-	
WSCP - use reduction savings benefit	-	
Revised surplus/(shortfall)	-	
Resulting precent use reduction from WSCP action	-	

Table 7-9. 5-Year DRA (DWR Table 7-5), MG		
2023	**Total**	**Notes**
Gross water use [use worksheet]	4,569	
Total supplies [supply worksheet]	4,628	Scenario 4- Assume fifth year of five consecutive dry years for CCWD water supply availability. No increased Delta supply from desalination project.
Surplus/shortfall without WSCP action	59	Surplus
Planned WSCP actions (use reduction and supply augmentation)		
WSCP - supply augmentation benefit	-	
WSCP - use reduction savings benefit	-	
Revised surplus/(shortfall)	-	
Resulting percent Use Reduction from WSCP action	-	
2024	**Total**	**Notes**
Gross water use [use worksheet]	4,585	
Total supplies [supply worksheet]	4,628	Scenario 4- Assume fifth year of five consecutive dry years for CCWD water supply availability. No increased Delta supply from desalination project.
Surplus/shortfall without WSCP action	43	Surplus
Planned WSCP actions (use reduction and supply augmentation)		
WSCP - supply augmentation benefit	-	
WSCP - use reduction savings benefit	-	
Revised surplus/(shortfall)	-	
Resulting percent use reduction from WSCP action	-	
2025	**Total**	**Notes**
Gross water use [use worksheet]	4,602	
Total supplies [supply worksheet]	4,628	Scenario 4- Assume fifth year of five consecutive dry years for CCWD water supply availability. No increased Delta supply from desalination project.
Surplus/shortfall without WSCP action	27	Surplus
Planned WSCP actions (use reduction and supply augmentation)		
WSCP - supply augmentation benefit	-	
WSCP - use reduction savings benefit	-	
Revised surplus/(shortfall)	-	
Resulting percent use reduction from WSCP action	-	

Section 8

Water Shortage Contingency Plan

The WSCP defines how the City will respond in the case of an actual water shortage. A water shortage means that the water supply available is insufficient to meet the normally expected customer water use at a given point in time. The WSCP provides guidance for managing and mitigating a potential shortage of water supply.

8.1 Introduction

The WSCP is an element of the City's UWMP s incorporated into any actual City emergency response activity affecting the water supply. The WSCP consists of the following elements consistent with provisions in the state regulations pertaining to water planning in Water Code Section 10632 and 10635:

- Water Supply Reliability Analysis
- Annual Water Supply and Demand Assessment Procedures
- Six Standard Water Shortage Stages
- Shortage Response Actions
- Special Water Feature Distinction
- Communication Protocols
- Compliance and Enforcement
- Legal Authorities
- Financial Consequences of WSCP
- Monitoring and Reporting
- WSCP Refinement Procedures
- Plan Adoption, Submittal, and Availability

8.2 Water Supply Reliability Analysis

This section summarizes the water supply reliability analysis of the City's supplies and describes the key issues that may create a shortage conditions relative to the City's water supply portfolio.

8.2.1 Water System Reliability

Section 7 in the DRA describes the water system reliability analysis to meet demands in normal, single dry, and multiple dry years over a 5-year drought period.

8.2.2 Key Issues to Potential Shortage Condition

Because the City has two sources of supply and has plans to have its desalination facility online in 2023, the reliability of the City's water supply is relatively high. Some scenarios could result in the City declaring a water shortage stage condition. Below is a list of the key issues that could potentially result in a shortage condition for the City.

- Regional drought circumstances
- Reduced availability of CCWD water supplies
- Delays in the Antioch Brackish Water Desalination Project

8.3 Annual Water Supply and Demand Assessment Procedures

The City must conduct an annual water supply and demand assessment (Annual Assessment) annually on or before July 1 of each year, beginning with the first annual water supply and demand assessment due by July 1, 2022. The Annual Assessment report is submitted to DWR with information for anticipated shortage, triggered shortage response actions, compliance and enforcement actions, and communication actions consistent with this WSCP. The City will conduct an Annual Assessment that follows the steps illustrated in Figure 8-1 and described below. Once DWR finalizes the guidelines, DWR may modify this process.

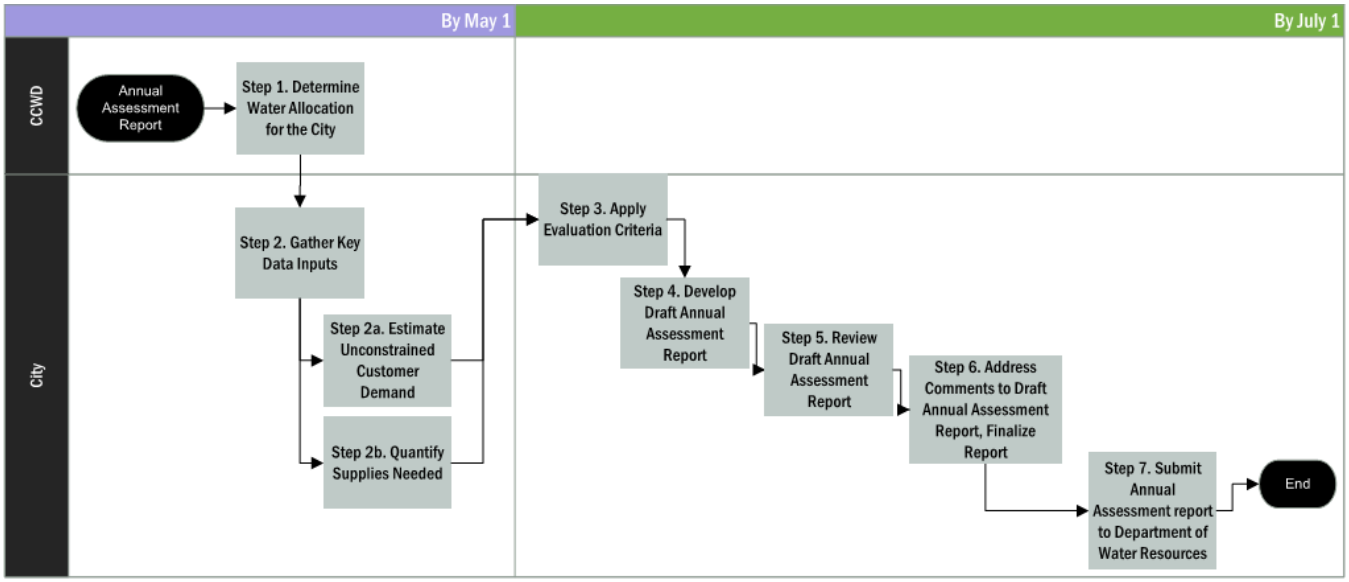

Figure 8-1. Annual Assessment Procedure and Decision-Making Process

The Annual Assessment Procedure and Decision-Making Process includes several steps:

- **Step 1.** Determine Water Allocation for the City - The type of water year for the Delta and CCWD water supply
- **Step 2.** Gather Key Data Inputs - The City collects key data inputs for the Annual Assessment including water supply and unconstrained customer demand as described below.
  - **Step 2a.** Estimate Unconstrained Customer Demand – The City estimates current year unconstrained demand considering weather, growth, and other influencing factors such as policies to manage current supplies to meet demand objectives in future years, as applicable. Unconstrained customer demand does not include demand reductions that may occur as a result of the City implementing any necessary special shortage response actions.
  - **Step 2b.** Quantify Supplies Needed – The City estimates the available water supply by source for the current year and one subsequent dry year.
    - Quantify each source of water supply and provide descriptive text of each source
    - Quantify current year available supply by source, considering hydrological and regulatory conditions in the current year
    - Quantify available supply by source for one subsequent dry year.

  - Estimate water supply availability estimates by source:
    - The existing infrastructure capabilities and plausible constraints as they impact the City's ability to deliver supplies to meet expected customer water use needs in the coming year should be considered.
    - Hydrological and regulatory conditions in the current year
    - Specific locally applicable factors that can influence or disrupt each supply source
- **Step 3.** Apply Evaluation Criteria – Evaluation criteria are determined by the supply source conditions and factors that impact the condition of each supply source. The Annual Assessment is based on evaluating the key data inputs to determine the water supply reliability. Although an actual shortage may occur at any time during the year, the City usually can forecast a shortage on or about May 1 of each year. The City monitors water production monthly. The evaluation applies the criteria defined by supply source condition in Table 8-1.

Table 8-1. Evaluation Criteria

Supply Source Condition	Criteria
Purchased water	
CCWD	CCWD water supply allocation
Surface water	
Delta	Water quality, until 2023 when desalination facility is online
Recycled water	
DD	N/A

- **Step 4.** Develop Draft Annual Assessment Report – The City compiles the draft Annual Assessment report based on the format to be determined by DWR using the key data inputs and evaluation criteria.
- **Step 5.** Review Draft Annual Assessment Report – The City will review and provide comment on the draft Annual Assessment report.
- **Step 6.** Address Comments to the Draft Annual Assessment Report, Finalize Report – The City will address internal comments to the draft Annual Assessment report and will finalize the report.
- **Step 7.** Submit Annual Assessment Report to DWR – The City will submit the Annual Assessment report to DWR.

8.4 Six Standard Water Shortage Stages

The City has developed a six-stage WSCP, as shown in Table 8-2, to invoke during declared water shortages. The City's WSCP stages have changed from four-stages to six-stages to provide a consistent regional and statewide approach to conveying the relative severity of water supply shortage conditions. The six standard water shortage levels correspond to progressively increasing estimated shortage conditions and align with the response action the City would implement to meet the severity of the impending shortages.

Table 8-2. WSCP Levels (DWR Table 8-1)		
Shortage Level	Percent Shortage Range[a] *Numerical value as a percent*	Water Shortage Condition (*Narrative description*)
Add additional rows as needed		
1	Up to 10	Water supply conditions are sufficient to meet between 90 to 100 percent of projected unconstrained demand for the next two years.
2	Up to 20	Water supply conditions are sufficient to meet between 80 to 90 percent of projected unconstrained demand for the next two years.
3	Up to 30	Water supply conditions are sufficient to meet between 70 to 80 percent of projected unconstrained demand for the next two years.
4	Up to 40	Water supply conditions are sufficient to meet between 60 to 70 percent of projected unconstrained demand for the next two years.
5	Up to 50	Water supply conditions are sufficient to meet between 50 to 60 percent of projected unconstrained demand for the next two years.
6	>50	Water supply conditions are sufficient to meet less than 50 percent of projected unconstrained demand for the next two years.

Note:
a. One stage in the WSCP must address a water shortage of 50 percent.

8.5 Shortage Response Actions

Shortage response actions align with the defined shortage levels by stage in Table 8-2. BC used existing demands based on 2018 use, consistent with the basis of demand projections used in the 2020 WSMP. Shortage response actions include supply augmentation actions, demand reduction actions, operational changes, locally appropriate mandatory prohibitions against specific water use practices, and state mandated prohibitions. Table 8-2 shows the extent to which the gap between supplies and demand will be reduced by each shortage response action for each activity. As the water purveyor, the City always must provide the community's minimum health and safety water needs. Table 8-3 provides the summary of the demand reduction and supply augmentation estimated results for each stage. The objective is to design the WSCP so that the demand reduction and supply augmentation activities in each stage reduce the shortage by the percent shortage range for each stage defined in Table 8-2. Sections 8.5.1 and 8.5.2 provide detailed information as to the activities and the estimated savings for each activity.

Table 8-3. Summary of Demand Reduction, Supply Augmentation, and other Actions in WSCP by Shortage Level						
	Shortage Level (percent shortage range)					
	1 (0 to 10)	2 (10 to 20)	3 (20 to 30)	4 (30 to 40)	5 (40 to 50)	6 (>50)
Total demand reduction and other activities (MG) (from Table 8-5 and 8-6))	39	146	875	1,152	1,423	1,968
Total supply augmentation (MG) (from Table 8-6)	-	526	526	526	526	526
Total demand reduction and supply augmentation (MG)	39	671	1,401	1,678	1,949	2,493
Total existing (2018) demand (MG)	4,816	4,816	4,816	4,816	4,816	4,816
Percent of demand	1	14	29	35	40	52

8.5.1 Demand Reduction Actions

Table 8-4 lists locally appropriate demand reduction actions to adequately respond to shortages. The City Council may declare a water shortage and implement drought management measures in accordance with state laws, regulations of CCWD, and this UWMP as needed. The annual volume of water that the demand reduction action will reduce the shortage gap is estimated. The assumptions and references for the estimated volume by demand reduction action item is provided in Appendix G. It is also noted if there is a penalty, charge, or other enforcement for each demand reduction action item.

As included in Section 6-10.04 of the City's Municipal Code, the following actions are considered nonessential use of water and are prohibited at all times.

§ 6-10.04 NONESSENTIAL USE OF WATER PROHIBITED.

A. At all times, no person shall use any water provided by the city for a nonessential purpose.
B. For the purposes of this chapter, each of the following is declared a nonessential use of water:
    a. Permitting water to flow onto a sidewalk, driveway or street, or escape down a gutter, ditch or other service drain
    b. Outside watering that results in excessive flooding or runoff into a gutter, drain, walkway or street
    c. Using city-furnished water for non-recirculating decorative fountains or filling of decorative lakes or ponds
    d. Washing of paved or other hard surface areas, including sidewalks, walkways, driveways, patios and parking areas with city-furnished water
    e. Failing to repair a controllable leak of water
    f. Using a hose without an automatic shutoff nozzle

(Ord. 2026-C-S, passed 5-26-09; Am. Ord. 2102-C-S, passed 5-12-15)

Table 8-4. Demand Reduction Actions (DWR Table 8-2)				
Shortage Level	Demand Reduction Actions	How much is this going to reduce the shortage gap? *Include volume units used.*	Additional Explanation or Reference *(optional)*	Penalty, Charge, or Other Enforcement?
1	Landscape - limit landscape irrigation to specific times	331 MGY	Limit 9am to 5pm	Yes
2 (was 3)	CII - restaurants may only serve water upon request	4 MGY		No
2	Other - prohibit vehicle washing except at facilities using recycled or recirculating water	5 MGY		Yes
2	Water Features - restrict water use for decorative water features, such as fountains	13 MGY		Yes
2	CII - commercial kitchens required to use pre-rinse spray valves	9 MGY		Yes
2	CII - lodging establishment must offer opt out of linen service	4 MGY		Yes
2	Pools - allow filling of swimming pools only when an appropriate cover is in place.	9 MGY		Yes
3	Landscape - prohibit certain types of landscape irrigation	331 MGY	Prohibit sprinklers during and 2 days after rain	Yes
3	Landscape - limit landscape irrigation to specific days	397 MGY	Limit more than 3 days per week	Yes
3	Other - prohibit use of potable water for construction and dust control	4 MGY		No
4	Landscape - other landscape restriction or prohibition	993 MGY	Irrigation of any landscaping except trees or drought tolerant plantings is prohibited.	Yes
4	Other water feature or swimming pool restriction	9 MGY	Existing pools shall not be emptied and refilled using potable water unless required for public health and safety purposes.	Yes
5	Landscape - prohibit all landscape irrigation	1,257 MGY	All landscape irrigation prohibited	Yes
5	Other water feature or swimming pool restriction	7 MGY	No new permits for pools will be issued.	Yes
6	Other	1,842 MGY	Water use only for public health and safety purposes	Yes

8.5.2 Supply Augmentation and Other Actions

Table 8-5 lists locally appropriate supply augmentation actions and operational changes.

Table 8-5. Supply Augmentation and Other Actions (DWR Table 8-3)			
Shortage Level	Supply Augmentation Methods and Other Actions by Water Supplier	How much is this going to reduce the shortage gap? *Include volume units used.*	Additional Explanation or Reference *(optional)*
1	Expand public information campaign	39 MGY	Offer workshops, increased use of bill inserts, social media
2	Offer water use surveys	19 MGY	Consumption checks at meter and assist customers via phone to review water usage for their property are always in place. For Stage 4, 5, and 6 City would increase the number of water use surveys and potentially offer in person surveys.
2	Decrease line flushing	25 MGY	Operational changes – No routine system flushing
2	Increase water waste patrols	14 MGY	Implement excess use penalties and flow restrictions
2	Transfers	526 MGY	Emergency intertie with DWD and/or City of Pittsburg (assume 1,000 gpm average daily flow rate)

8.5.3 Special Water Feature Distinction

The guidelines consider and define water features that are not pools or spas separately from pools and spas in the WSCP. Non-pool or non-spa water features including ponds, lakes, waterfalls, and fountains that do not require the use of potable water for health and safety considerations are defined as decorative water features and recreational water features and are included as such in the response actions and are enforced and monitored as part of the WSCP process.

Under all conditions and stages the WSCP prohibits using potable water in an ornamental fountain or other decorative water feature, except where the water is part of a recirculating system. At Stage 3 all decorative water features will have restricted water use.

8.6 Emergency Response Plan

The City has prepared and maintains an Emergency Response Plan (ERP) to address responding to catastrophic supply interruptions as well as other emergencies. Appendix H only includes the ERP Table of Contents due to security reasons. The City most recently updated its ERP in September 2020 in compliance in with America's Water Infrastructure Act (AWIA) of 2018 Public Law 115-270, S. 3021. Section 8.7 includes more details on AWIA.

The City's ERP includes information on key facilities, emergency response roles, communication methods, public notification information, response actions and procedures, mitigation actions, and detection strategies. The ERP has incident action checklists for the possible water supply catastrophes included in Table 8-6. Table 8-7 lists potential actions and responses.

Table 8-6. Possible Catastrophes	
• Cybersecurity • Drought • Earthquake • Extreme cold and winter storms • Extreme Heat	• Flooding • Harmful algal blooms • Pandemic • Power outage • Wildfire

Table 8-7. Potential Actions in Response to Catastrophes	
• Stretch existing water storage • Obtain additional water supplies • Develop alternative water supplies • Determine where the funding will come from • Contact and coordinate with other agencies • Create an emergency response team/coordinator	• Implement the ERP • Put employees/contractors on-call • Develop methods to communicate with the public • Develop methods to prepare for water quality interruptions

Table 8-3 also lists shortage response actions to respond to catastrophic water shortages. When a shortage declaration appears imminent, the WTP Superintendent (also the Emergency Response Lead) leads managing related activities. The WTP Superintendent coordinates efforts with the Public Information Officer and other agencies or resources as needed. The Public Information Officer coordinates with the Police Department and media outlets for public information, if necessary. The City will coordinate with Contra Costa County for the possible proclamation of a local emergency. The City's ERP has a complete list of emergency response roles and contacts.

8.7 Seismic Risk Assessment and Mitigation Plan

This section includes a seismic risk assessment and mitigation plan to assess the vulnerability of each of the water system's facilities and methods to mitigate those vulnerabilities. Water suppliers also may comply with 2020 UWMP requirements by submitting a copy of the most recent adopted local hazard mitigation plan or multi-hazard mitigation plan under the federal Disaster Mitigation Act of 2000 (Public Law 106-390) if the local hazard mitigation plan or multi-hazard mitigation plan addresses seismic risk.

The City has prepared a seismic risk assessment as part of its confidential Risk and Resilience Assessment (RRA) in compliance with AWIA of 2018 Public Law 115-270, S. 3021. This section discusses a summary of the risk of earthquake to the City's facilities. Furthermore, the table of contents of the RRA included as Appendix I to this UWMP due to security concerns. The Contra Costa County Hazard Mitigation Plan (HMP) is also available showing compliance with 2020 UWMP requirements. Due to the large size of the HMP document Appendix J presents only the cover and table of contents pages. The reader can access the full document at https://www.contracosta.ca.gov/6415/Local-Hazard-Mitigation-Plan, the plan for the entire County. The City's portion of the HMP document, which appears in Volume 2 of the HMP, includes all the relevant City information.

The AWIA law requires a community water system (CWS) serving more than 3,300 people to develop an RRA and an ERP. In compliance with AWIA, as a CWS serving a population of 50,000 or more, the City prepared and submitted the required RRA to the U.S. Environmental Protection Agency by December 31, 2020. Similarly, the City prepared and submitted its ERP according to the required schedule. As part of the RRA and ERP, the City evaluated seismic risk to its facilities and mitigation measures to reduce the impacts of the earthquake threat.

In 2018, Contra Costa County developed a HMP to guide hazard mitigation planning from identified threats. The steering committee conducted a risk assessment that identified and profiled hazards that pose a risk to the Contra Costa County planning area, assessed the vulnerability of the planning area to these hazards, and examined the existing capabilities to mitigate them (Contra Costa County, 2018). Earthquake, landslide, severe weather, wildfire, dam and levee failure, flood, sea-level rise, tsunami, and drought are among the hazards that can have an impact on the Contra Costa County planning area.

Earthquake damage can include structural, injury, loss of life, and infrastructure damage, and can vary in degrees based on factors such as magnitude, focal depth, distance from the fault, and topography. Types of hazards related to earthquakes include the ground shaking, seismic structural safety, liquefaction, settlement, and faults.

Areas of Contra Costa County most susceptible to earthquake include those near active fault zones. Contra Costa County lies over or is near numerous known faults, the most significant are the Hayward, Calaveras North, Concord-Green Valley, Mount Diablo, and Greenville faults (Contra Costa County, 2018). The Hayward and Rodgers Creek Faults have high potential for experiencing major to great seismic events. There is a 72 percent likelihood that at least one earthquake with a magnitude of 6.7 or greater will occur in the San Francisco Bay area before 2043 causing widespread damage. USGS ground motion maps indicate the peak ground acceleration, that has a 10 percent probability of being exceeded in a 50-year period, is 0.4g. The entire County planning area is at risk to direct and indirect impacts from earthquakes according to the HMP. Past work has identified 52 critical facilities in the City exposed to the earthquake hazard per the HMP.

The City's RRA went a little deeper by identifying specific assets and risks associated with seismic activity. Per the RRA earthquake is the City's costliest threat. The cost is not as significant on an asset basis, but when added together, earthquakes have the potential to impact several assets simultaneously. The RRA determined that many of the City's facilities are at risk to earthquake threat:

- CCWD Canal Pumping Stations
- San Joaquin River Pumping Station
- Raw Water Interties
- WTPs A and B
- Antioch Municipal Reservoir

8.8 Communication Protocols

Timely and effective communication is a key element of WSCP implementation. The City has structured its communication protocols and procedures in the event of a water shortage to activate through authorization by the WTP Superintendent. Under a water shortage condition, the WTP superintendent, working with other City staff, would assess the actual water supply and demand information and conditions to determine whether the City should activate the WSCP. If so, City staff would recommend activation of the appropriate stage alert, and request City Council authorization to initiate the measures necessary to achieve the appropriate demand reduction target. The City would encourage the public to understand and participate in the decision-making process and provide feedback to the City Council on such an action. The WSCP is flexible and can be implemented to best match actual conditions of a particular water shortage event.

Specific communication protocols to inform customers, the public, interested parties, and local, regional, state governments of any current or projected shortage as determined by the annual water supply and demand assessment described in Section 8.3 and any shortage response actions as a result of the annual assessment are listed below:

- Expanded public information and awareness program by implementing workshops, distributing park signs, adding bill inserts, and increasing the number of educational programs at schools. Use of social media and e-mail blasts to customers. Further explanation of these tools are described in Section 9.
- Customer billing frequency increased from bi-monthly to monthly to provide a better estimate of water losses and quicker detection of a leak or water loss.

Critical communication information is included in the City's ERP as discussed in Section 8.6.

8.9 Compliance and Enforcement

This section of the WSCP describes the means the City uses to ensure compliance and enforcement. Table 8-5 identifies the shortage actions with penalties. Section 6-10.06 and 6-10.07 of the City's Municipal Code address rules and variances and enforcement measures.

§ 6-10.06 RULES AND VARIANCES.

A. Pursuant to a resolution of the City Council declaring a water shortage and/or the need for drought management efforts, the City Manager and/or his designee are hereby authorized to promulgate further rules and regulations further implementing the policies in this chapter and the resolution. The City Manager and/or his designee is also authorized to settle disputes regarding definitions of terms, applicability and other disputes or questions that may arise regarding the implementation of this chapter. Requests for dispute resolution shall be made in writing to the City Manager and/or his designee.
B. The City Manager and or his designee are also authorized to provide procedures for, and to consider, grant, or deny requests for variances or exceptions to the provisions of this chapter. For example, provisions shall be made for exceptions of this water reduction goal based upon medical needs.
C. Any appeals shall be made through the appeals process set by Chapter 4 of Title 1 of the Antioch Municipal Code.

(Ord. 2026-C-S, passed 5-26-09; Am. Ord. 2102-C-S, passed 5-12-15)

§ 6-10.07 ENFORCEMENT.

A violation of any provision of this chapter or any resolution or rule adopted pursuant to this chapter is deemed to be an infraction and subject to the fines set forth in Chapter 5 of Title 1 of the Municipal Code, as well as any remedies set forth in Chapter 2 of Title 1. In addition, a violation of any provision of this chapter or any resolution or rule adopted pursuant to this chapter is deemed a public nuisance pursuant to Chapter 1 of Title 5 of the Antioch Municipal Code and subject to the any remedies available to address a public nuisance. (Ord. 2102-C-S, passed 5-12-15)

8.10 Legal Authorities

As required by Water Code Section 10632 (a)(7), this section includes a description of the legal authorities that empower the City to implement and enforce its shortage response actions and the required statements for a WSCP.

The relevant statutory authorities, local ordinances, and resolutions and water supply contract provisions to which the City is subject to are listed below:

- The City's most recent WSCP was adopted as part of the 2015 UWMP on May 24, 2016. The City updates its WSCP in each five-year UWMP. The City Council may, by resolution and after a noticed public hearing, determine that water shortage conditions exist within the City. Based on this determination, the City Council may determine that water shortage measures become operative within the City and remain in effect until the City Council, by resolution, determines that the water shortage condition no longer exists.
- CCWD water supply contract provisions
- City Municipal Code

Required statements:

- *The City shall declare a water shortage emergency condition in accordance with Water Code Chapter 3 (commencing with Section 350) of Division 1,* as stated below:

  Declaration of water shortage emergency condition. The governing body of a distributor of a public water supply, whether publicly or privately owned and including a mutual water company, shall declare a water shortage emergency condition to prevail within the area served by such distributor whenever it finds and determines that the ordinary demands and requirements of water consumers cannot be satisfied without depleting the water supply of the distributor to the extent that there would be insufficient water for human consumption, sanitation, and fire protection.
- The City *shall coordinate with any city or county within which it provides water supply services for the possible proclamation of a local emergency* under California Government Code, California Emergency Services Act (Article 2, Section 8558). As part of the City's ERP the county for which the City provides services, is contacted and the City follows the developed coordination protocols that can facilitate compliance with the Water Code in the event of a local emergency as defined in subpart (c) of Government Code Section 8558.

8.11 Financial Consequence of WSCP

The financial consequence of implementing the WSCP include potential revenue reductions and expense increases. The City has developed mitigation actions to reduce these impacts and the cost of compliance.

8.11.1 Potential Revenue Reductions and Expense Increases

The City understands the projected ranges of water sales by shortage stage and what the impact would be on projected revenues and expenditures by each shortage stage. Revenues would decrease as consumption is decreased. Expenditures would increase as response actions are implemented.

8.11.2 Mitigation Actions

In Stage 1 and 2 conditions, the City would attempt to avoid rate adjustments. However, if the water shortage conditions persisted and/or became more severe thereby further reducing demands, rate changes would be imperative.

- Use of Financial Reserves - The City has financial reserves to address decreased water sales during a water shortage.
- Other Measures - The City does not have additional measures formalized such as drought rate surcharges, postponement of capital improvements, or reduction of agency staff.

8.11.3 Cost of Compliance

Although not quantified at this time, the City likely would have extra costs to implement the actions in Table 8-4 and 8-5.

The City did not implement a drought rate structure or surcharges in 2020 and maintains its current water rates through June 2022 (Antioch on the Move, 2020). To comply with and address excessive water use, the City's efforts include 24-hour standby staff to respond to emergency calls, staff focused on high consumption monitoring, additional water waste patrols as required as part of the City's WSCP.

8.12 Monitoring and Reporting

The City will monitor and report implementation of the WSCP by collecting, tracking, and analyzing appropriate data to monitor customer compliance and to meet state reporting requirements. Under normal water supply conditions, City staff record potable water production figures daily. The City reports daily production totals monthly. The City operates its water system on a computerized supervisory control and data acquisition system (SCADA), which allows instantaneous viewing of water system conditions.

During Stage 2 of a water shortage, the WTP Superintendent evaluates production figures to determine if City water users meet demand reduction targets. The WTP Superintendent reviews the monthly production reports and determines if further action is required to meet demand reduction goals. If City water users do not meet reduction goals, the WTP Superintendent will notify the City Council so that corrective action is considered and/or taken.

As a water shortage progresses to Stage 4, the City would follow the procedure described above, with the addition of a weekly production report to the WTP Superintendent.

During emergency shortages (Stage 6), the WTP Superintendent reviews production figures and reports to the City Manager.

8.13 WSCP Refinement, Adoption, Submittal, and Availability

The City routinely reevaluates the WSCP to improve functionality to ensure the shortage risk tolerance is adequate and implements the appropriate water shortage mitigation strategies as needed. The City has adopted the WSCP and has submitted and made it available per the Water Code requirements.

8.13.1 Refinement Procedures

The City may update the WSCP independently of the Urban Water Management Plan. At a minimum of every five years in parallel with the update of the UWMP, the City shall complete this review and update process.

8.13.2 Adoption, Submittal, and Availability

During each WSCP review and update process WTP Superintendent will review the revised WSCP prior to adoption by City Council. The City typically reviews the WSCP and adopted any changes as part of the UWMP review and adoption process. In either instance the City follows the public review period and adoption process in accordance with Government Code 6066.

The City makes available the updated WSCP to City residents and Contra Costa County no later than 30 days after it adopts the updated WSCP. The WSCP is available at the City's website and as part of the UWMP document; interested parties can locate it on the City's website, the California State Library, and local public libraries within the City.

Section 9

Demand Management Measures

The City conducts an ongoing water conservation program. The City has committed to implementing water conservation measures for all customer sectors. This section provides narrative descriptions addressing the nature and extent of each DMM implemented over the past five years, from 2016 through 2020, as well as the City's planned implementation of each conservation measure (see narratives of the DMMs below). Table 9-1 presents a summary of water conservation measures over the past five years.

Table 9-1. DMMs 2016-20 Calendar Years

DMM	2016	2017	2018	2019	2020
Water Waste Prevention Ordinance	Yes	Yes	Yes	Yes	Yes
Metering	Fully metered	Fully metered	Fully metered	Fully metered	Fully metered
Conservation Pricing	Tiered rate schedule	Tiered rate schedule	Tiered rate schedule	Tiered rate schedule	Tiered rate schedule
Public Education and Outreach					
Utility bill inserts	Yes	Yes	Yes	Yes	Yes
Website postings	Yes	Yes	Yes	Yes	Yes
Brochures	Yes	Yes	Yes	Yes	Yes
Participation in media events	Yes	Yes	Yes	Yes	No[a]
WTP tours	Yes	Yes	Yes	Yes	No[a]
Speaker's bureau	Yes	Yes	Yes	Yes	No[a]
Assess and manage distribution system real loss	Yes	Yes	Yes	Yes	Yes
Water conservation coordinator	Yes	Yes	Yes	Yes	Yes

Note:

a. No public events in 2020 due to COVID

9.1 Water Waste Prevention Ordinances

The City has adopted a water waste prohibition ordinance included in its Municipal Code (City of Antioch, 2021). The ordinance is Section 6-5.10 of the City's Municipal Code. The water waste ordinance is:

§ 6-5.10 WASTE OF WATER.

No person shall misuse or waste water. Any person misusing or wasting water shall be guilty of an infraction. The term MISUSE or WASTE shall mean the use of water which, to a reasonable person, is clearly in excess of the need or intended purpose. MISUSE or WASTE may also mean the use of water in excess of quantity standards imposed during any water shortage emergency declared by the City Council. In the event of any misuse or waste of water, in addition to criminal prosecution, the Finance Department may install flow restrictors at the premises where misuse or waste has occurred, following procedures established for such installation, which shall include at least one warning notice to the consumer prior to such installation. ('66 Code, § 6-5.10) (Ord. 76-A, passed 12-17-23; Am. Ord. 817-C-S, passed 7-11-91)

In addition, Section 6-10.05 of the City's Municipal Code defines excessive use of water:

§ 6-10.05 EXCESSIVE USE OF WATER.

By resolution, the City Council may determine whether certain consumption amounts are excessive and beyond an established allocation and thus impose a penalty for such consumption as a violation of the law. (Ord. 2026-C-S, passed 5-26-09; Am. Ord. 2102-C-S, passed 5-12-15)

Most of the City's cases of water wasting involve irrigation. The City requires all violators to take advantage of CCWD's water conservation programs and assistance (Section 9.5). The City's Code Enforcement and Public Works staff carry out enforcement through courtesy notices, abatement letters, and citations for water waste violations. From 2016 through 2020, the City issued no citations for violating water wasting violations.

The implementation of the DMM is ongoing. Any violation of the Ordinance may result in water being turned off and remaining off until the party in violation can comply with the provisions. A customer will pay a fee with each shut-off. The City expects that implementation will achieve help it achieve its water use targets by minimizing the nonessential uses of water so that water is available for human consumption, sanitation, and fire protection.

9.2 Metering

The City is fully metered. The City requires meters for all new connections and bills customers by volume-of-use. The City has no unmetered accounts and meters for its internal uses such as parks and landscape median irrigation. The City has not conducted a feasibility study to assess the merits of a program to provide incentives for switching mixed-use accounts to dedicated landscape meters. The City has not tracked the number of CII accounts with mixed-use meters and the number of CII accounts with mixed-use meters retrofitted with irrigation meters are unavailable.

9.3 Conservation Pricing

Effective July 1, 2015, the City adopted a residential water rate tier structure based on two components:

- Monthly meter service charge (varies by meter size)
- Quantity rate for actual metered residential water usage in each of four elevation zones (rates increase for higher elevation zone due to additional electricity costs of pumping to higher elevations)

The City recently voted to keep water rates the same through June 2022. The City expects that implementation of this DMM will help the City achieve its water use targets through effective conservation pricing.

9.4 Public Education and Outreach

Public information is an ongoing component of the City's water conservation program. Activities incorporated in this program include:

- Bill inserts
- City website postings
- Brochures
- Participation in media events
- Speaker's bureau

The City also participates in the Contra Costa County Green Business Program. The Green Business Program is a partnership of environmental agencies, professional associations, waste management agencies, and utilities, working together to recognize and assist businesses and government agencies that operate in an environmentally friendly manner.

The City offers tours of the WTP to Antioch schools for educational field trips. Tours are primarily attended by 3rd grade classes. The City has offered such tours since 2001, with the exception of during construction activities, at times of water quality concerns, and in portions of 2020 and 2021 due to COVID-19 restrictions. However, the City has not tracked participation in this program over the years.

The City provides public information and school educational programs on water conservation and other water issues on an ongoing, year-round basis. As with most public education and outreach programs, the direct effectiveness of these programs is difficult to quantify.

9.4.1 Programs to Assess and Manage Distribution System Real Loss

As discussed in Section 4.4, NRW is the difference between water production and billed consumption. NRW consists of water losses (apparent and real losses) and unbilled authorized consumption. The City prepares its AWWA water loss audit annually.

Because the City's system losses percentage is so low, the City has no ongoing program for leak detection. The City repairs system leaks on an "as-necessary" basis. The City reviews records to track unaccounted-for water losses.

In addition, the City has an ongoing water main replacement program. On a yearly basis the City budgets for removing and replacing older mains and valves. This activity helps substantially to reduce leakage potential. From 2015 through 2020, the City spent about $2.96 million on water main replacement projects. The 2020-2025 Capital Improvement budget includes $9.45 million per year for similar work. Implementation of this DMM should help the City achieve its water use targets by proactively replacing aging facilities and quickly repairing pipeline leaks. Currently the City is preparing its 2020 WSMP, which includes a pipeline risk assessment to evaluate areas of concern within the City's distribution system pipelines.

9.4.2 Water Conservation Program Coordination and Staffing Support

The City has an Environmental Resources Coordinator focused on water conservation. The Environmental Resources Coordinator is an ongoing component of the City's water conservation program. The Environmental Resources Coordinator is responsible for implementing and monitoring the City's water conservation activities. Since July 2000 the City has maintained this position. The Environmental Resources Coordinator is a full-time staff position who devotes approximately one third of available time to water conservation. Regional conservation work is done through a partnership with CCWD. The City assigns no additional staff to conservation efforts; however, meter readers and other field workers do some leak checking and initial outreach and customer service representatives often provide conservation and leak detection advice to customers.

The implementation of this DMM should help the City achieve its water use targets by making water conservation and implementation of the City's water conservation program a priority. The City cannot quantify water savings from this DMM directly. The City evaluates effectiveness of this DMM through the success of the City's water conservation program.

9.5 Other Demand Management Measures

In addition to the six DMMs described above, City water customers can take advantage of conservation programs offered by CCWD including, but not limited to (CCWD, 2021):

- Residential:
  - Water Wise House Calls- free in-person visit from a Water Conservation Technician
  - Free Water Conservation Devices
  - Lawn to Garden Rebate- Rebates of up to $1,000 to replace front lawn with a waterwise landscape
  - Smart Irrigation Controller Rebate- rebates toward the purchase of qualifying smart irrigation controllers
  - Laundry to Landscape Greywater Rebate- rebates of $50 toward the purchase of qualifying equipment and installation of a laundry to landscape greywater system
  - Rain Water Harvesting and Rain Gardens
  - Pool Cover Rebate- rebates of $50 toward the purchase of a qualifying pool cover
  - Landscape Mulch Coupons
  - Get Car Wash Coupons
  - Multi-Family Water Use Evaluation- free professional water use evaluations to identify potential water saving opportunities
  - Multi-Family and Commercial Clothes Washer Rebate- rebates of up to $450 to help CCWD service area customers purchase or lease qualified Energy Star Certified commercial clothes washers
- Commercial:
  - Commercial Water Use Evaluation- free professional water use evaluations to identify potential water saving opportunities.
  - Conservation Resources for Businesses- free table tents for restaurants, decals for the mirrors of restaurants and businesses, and dye tablets for tank-type toilets
  - Multi-Family and Commercial Clothes Washer Rebates
  - Lawn to Garden Rebate
  - Irrigation Equipment Rebate- The Large Landscape Rebate Program is designed to encourage customers with a cash incentive to upgrade selected irrigation equipment with new irrigation equipment.
  - Commercial Flushometer Toilet and Urinal Rebate

Section 10

UWMP Adoption, Submittal, and Implementation

This section describes actions taken by the City to address the California Water Code requirements for a public hearing, UWMP adoption, submittal of an adopted UWMP, public availability, and the process for amending an adopted UWMP.

10.1 Inclusion of all 2020 Data

This UWMP includes water use and production for the entire 2020 calendar year.

10.2 Public Participation and UWMP Adoption

The Act requires the encouragement of public participation and a public hearing as part of the UWMP development and approval process. As required by the Act, prior to adopting this UWMP, the City made the UWMP available for public inspection and held a public hearing.

The City notified the county within the service area 60 days before the public hearing as shown in Table 10-1. Appendix B provides documentation that the Area within which the City provides water supplies received notified at least 60 days prior to the UWMP public hearing. This hearing provided an opportunity for the City's customers, including social, cultural, and economic community groups, to learn about the water supply situation and the plans for providing a reliable, safe, high-quality water supply for the future. The hearing was an opportunity for people to ask questions regarding the current situation and the viability of future supplies and water shortage contingency planning.

Table 10-1. Notification to Cities and Counties (DWR Table 10-1)

City Name	60-day Notice	Notice of Public Hearing
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County Name	**60-day Notice**	**Notice of Public Hearing**
Contra Costa County	✓	✓

10.3 Notice of Public Hearing

As required by the Act, the City made the UWMP available for public inspection and held a public hearing on May 24, 2021, prior to adopting this UWMP.

Per the requirements of Government Code Section 6066, a Notice of Public Hearing was published twice in East Bay Times, once a week for two successive weeks, to notify all customers and local governments of the public hearing. Appendix K contains a copy of the published Notice of Public Hearing.

In addition, the City made available copies of the draft UWMP for public inspection on the City's website, www.antiochca.gov. Appendix K includes a copy of the published Notice of Public Hearing.

10.4 Public Hearing and Adoption

The City Council adopted this UWMP and WSCP, included within the UWMP Section 8, after the public hearing. Appendix L has a copy of the adopted resolution for each document.

10.5 UWMP Submittal

Before July 1, 2021, the City submitted the 2020 UWMP electronically to DWR using the WUE data, online submittal tool.

10.6 Public Availability

The adopted UWMP is available for public review within 30 days of adoption on the City's website at https://www.antiochca.gov/finance-department/water/more-info/.

Section 11

References

Antioch on the Move. City of Antioch Votes Not to Increase Water Rates, January 2020. https://antiochonthemove.com/water_rates/. Accessed February 2021.

California Irrigation Management Information System. https://cimis.water.ca.gov/UserControls/Reports/MonthlyReportViewer.aspx

California Legislative Information. California Law, California Water Code. https://leginfo.legislature.ca.gov/faces/codesTOCSelected.xhtml?tocCode=WAT&tocTitle=+Water+Code+-+WAT.

California's Fourth Climate Change Assessment. San Francisco Bay Area Region Report, 2018. https://www.energy.ca.gov/sites/default/files/2019-11/Reg_Report-SUM-CCCA4-2018-005_SanFranciscoBayArea_ADA.pdf

City of Antioch. 2010 Urban Water Management Plan, June 2011.

City of Antioch. 2015 Urban Water Management Plan, May 2016.

City of Antioch. 2015–2023 Housing Element (Housing Element), April 2015.

City of Antioch. 2020 Water System Master Plan.

City of Antioch. About Antioch. https://www.antiochca.gov/about-antioch/. Accessed January 2021.

City of Antioch. California Code of Ordinances, Ordinance 2020-S-35 – 2186-C-S. https://codelibrary.amlegal.com/codes/antioch/latest/antioch_ca/0-0-0-18579/. Accessed February 2021.

City of Antioch. Climate Action Initiatives. https://www.antiochca.gov/environmental-resources/climate-change/. Accessed February 2021.

Contra Costa County. Contra Costa County Hazard Mitigation Plan, January 2018.

Contra Costa Water District. 2020 Urban Water Management Plan.

Contra Costa Water District. Conservation. https://www.ccwater.com/148/Conservation. Accessed March 2021.

Delta Diablo. Contra Costa Water District and Delta Diablo General Recycled Water Agreement Letter of Mutual Understanding, 2014.

Delta Stewardship Council. Chapter 2: The Delta Plan, January 2019.

Delta Stewardship Council. Delta Plan Cover Letter, August 2012.

Department of Water Resources. California Irrigation Management Information System (CIMIS). https://cimis.water.ca.gov/. Accessed January 2021.

Department of Water Resources. California's Groundwater Bulletin 118-Update 2003 Sacramento Valley Groundwater Basin, North American Subbasin, February 2004.

Department of Water Resources. Groundwater Information System. https://water.ca.gov/Programs/Groundwater-Management/Data-and-Tools Accessed 2016c.

Department of Water Resources. Methodology for Calculating Baseline and Compliance Urban Per Capita Water Use, Final Draft 2016b.

Department of Water Resources. Urban Water Management Plan Guidebook 2020.

East County Water Management Association. East Contra Costa County Integrated Regional Water Management Plan Update, March 2019.

State of California, Department of Finance, E-1 Population Estimates for Cities, Counties and the State with Annual Percent Change — January 1, 2019 and 2020. Sacramento, California, May 2019. https://www.dof.ca.gov/forecasting/demographics/estimates/e-1/. Accessed January 2021.

State Water Resources Control Board. Water Conservation Portal- Conservation Reporting. http://www.waterboards.ca.gov/water_issues/programs/conservation_portal/conservation_reporting.shtml. Accessed March 2016.

United States, Census Bureau (US Census). 2019 Median Household Income in California. https://data.census.gov/cedsci/all?q=median%20household%20income%20california. Accessed January 2021.

United States, Census Bureau. 2021 Quick Facts – Antioch city, California. https://www.census.gov/quickfacts/antiochcitycalifornia. Accessed January 2021.

Appendix A: DWR UWMP Checklist

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Appendix A: UWMP Checklist						
Retail	Wholesale	2020 Guidebook Location	Water Code Section	Summary as Applies to UWMP	Subject	2020 UWMP Location (Optional Column for Agency Review Use)
x	x	Chapter 1	10615	A plan shall describe and evaluate sources of supply, reasonable and practical efficient uses, reclamation and demand management activities.	Introduction and Overview	Section 1.3
x	x	Chapter 1	10630.5	Each plan shall include a simple description of the supplier's plan including water availability, future requirements, a strategy for meeting needs, and other pertinent information. Additionally, a supplier may also choose to include a simple description at the beginning of each chapter.	Summary	Section 1.3
x	x	Section 2.2	10620(b)	Every person that becomes an urban water supplier shall adopt an urban water management plan within one year after it has become an urban water supplier.	Plan Preparation	Section 2.1
x	x	Section 2.6	10620(d)(2)	Coordinate the preparation of its plan with other appropriate agencies in the area, including other water suppliers that share a common source, water management agencies, and relevant public agencies, to the extent practicable.	Plan Preparation	Section 2.2, Table 2-5, Appendix B
x	x	Section 2.6.2	10642	Provide supporting documentation that the water supplier has encouraged active involvement of diverse social, cultural, and economic elements of the population within the service area prior to and during the preparation of the plan and contingency plan.	Plan Preparation	Section 2.2, Table 2-5, Appendix B
x		Section 2.6, Section 6.1	10631(h)	Retail suppliers will include documentation that they have provided their wholesale supplier(s) - if any - with water use projections from that source.	System Supplies	Section 2.2.1
	x	Section 2.6	10631(h)	Wholesale suppliers will include documentation that they have provided their urban water suppliers with identification and quantification of the existing and planned sources of water available from the wholesale to the urban supplier during various water year types.	System Supplies	N/A
x	x	Section 3.1	10631(a)	Describe the water supplier service area.	System Description	Section 3.1
x	x	Section 3.3	10631(a)	Describe the climate of the service area of the supplier.	System Description	Section 3.2, Table 3-1
x	x	Section 3.4	10631(a)	Provide population projections for 2025, 2030, 2035, 2040 and optionally 2045.	System Description	Section 3.4.1, Table 3-2
x	x	Section 3.4.2	10631(a)	Describe other social, economic, and demographic factors affecting the supplier's water management planning.	System Description	Section 3.4.2
x	x	Sections 3.4 and 5.4	10631(a)	Indicate the current population of the service area.	System Description and Baselines and Targets	Section 3.4.1, Table 3-2
x	x	Section 3.5	10631(a)	Describe the land uses within the service area.	System Description	Section 3.5
x	x	Section 4.2	10631(d)(1)	Quantify past, current, and projected water use, identifying the uses among water use sectors.	System Water Use	Section 4.1 (Table 4-1), Section 4.2, Section 4.6 (Table 4-6, Table 4-6)

Appendix A: UWMP Checklist						
Retail	Wholesale	2020 Guidebook Location	Water Code Section	Summary as Applies to UWMP	Subject	2020 UWMP Location (Optional Column for Agency Review Use)
x	x	Section 4.2.4	10631(d)(3)(C)	Retail suppliers shall provide data to show the distribution loss standards were met.	System Water Use	Section 4.4.1, Section 4.4.2
x	x	Section 4.2.6	10631(d)(4)(A)	In projected water use, include estimates of water savings from adopted codes, plans, and other policies or laws.	System Water Use	Section 4.5, Table 4-4
x	x	Section 4.2.6	10631(d)(4)(B)	Provide citations of codes, standards, ordinances, or plans used to make water use projections.	System Water Use	Section 4.5.2
x	optional	Section 4.3.2.4	10631(d)(3)(A)	Report the distribution system water loss for each of the 5 years preceding the plan update.	System Water Use	Section 4.4.1,Table 4-2
x	optional	Section 4.4	10631.1(a)	Include projected water use needed for lower income housing projected in the service area of the supplier.	System Water Use	Section 4.7
x	x	Section 4.5	10635(b)	Demands under climate change considerations must be included as part of the drought risk assessment.	System Water Use	Section 7.2
x		Chapter 5	10608.20(e)	Retail suppliers shall provide baseline daily per capita water use, urban water use target, interim urban water use target, and compliance daily per capita water use, along with the bases for determining those estimates, including references to supporting data.	Baselines and Targets	Section 5.4, Section 5.5
x		Chapter 5	10608.24(a)	Retail suppliers shall meet their water use target by December 31, 2020.	Baselines and Targets	Section 5.4, Table 5-1
	x	Section 5.1	10608.36	Wholesale suppliers shall include an assessment of present and proposed future measures, programs, and policies to help their retail water suppliers achieve targeted water use reductions.	Baselines and Targets	N/A
x		Section 5.2	10608.24(d)(2)	If the retail supplier adjusts its compliance GPCD using weather normalization, economic adjustment, or extraordinary events, it shall provide the basis for, and data supporting the adjustment.	Baselines and Targets	Section 5.4
x		Section 5.5	10608.22	Retail suppliers' per capita daily water use reduction shall be no less than 5 percent of base daily per capita water use of the 5-year baseline. This does not apply if the suppliers base GPCD is at or below 100.	Baselines and Targets	Section 5.4, Table 5-1
x		Section 5.5 and Appendix E	10608.4	Retail suppliers shall report on their compliance in meeting their water use targets. The data shall be reported using a standardized form in the SBX7-7 2020 Compliance Form.	Baselines and Targets	Table 5-2 and Appendix E
x	x	Sections 6.1 and 6.2	10631(b)(1)	Provide a discussion of anticipated supply availability under a normal, single dry year, and a drought lasting five years, as well as more frequent and severe periods of drought.	System Supplies	Section 7.2
x	x	Sections 6.1	10631(b)(1)	Provide a discussion of anticipated supply availability under a normal, single dry year, and a drought lasting five years, as well as more frequent and severe periods of drought, including changes in supply due to climate change.	System Supplies	Section 4.6 and Section 7.2

Appendix A: UWMP Checklist						
Retail	Wholesale	2020 Guidebook Location	Water Code Section	Summary as Applies to UWMP	Subject	2020 UWMP Location (Optional Column for Agency Review Use)
x	x	Section 6.1	10631(b)(2)	When multiple sources of water supply are identified, describe the management of each supply in relationship to other identified supplies.	System Supplies	Section 7.2
x	x	Section 6.1.1	10631(b)(3)	Describe measures taken to acquire and develop planned sources of water.	System Supplies	Section 6.8
x	x	Section 6.2.8	10631(b)	Identify and quantify the existing and planned sources of water available for 2020, 2025, 2030, 2035, 2040 and optionally 2045.	System Supplies	Section 6.9
x	x	Section 6.2	10631(b)	Indicate whether groundwater is an existing or planned source of water available to the supplier.	System Supplies	Section 6.3
x	x	Section 6.2.2	10631(b)(4)(A)	Indicate whether a groundwater sustainability plan or groundwater management plan has been adopted by the water supplier or if there is any other specific authorization for groundwater management. Include a copy of the plan or authorization.	System Supplies	Section 6.3
x	x	Section 6.2.2	10631(b)(4)(B)	Describe the groundwater basin.	System Supplies	Section 6.3
x	x	Section 6.2.2	10631(b)(4)(B)	Indicate if the basin has been adjudicated and include a copy of the court order or decree and a description of the amount of water the supplier has the legal right to pump.	System Supplies	Section 6.3
x	x	Section 6.2.2.1	10631(b)(4)(B)	For unadjudicated basins, indicate whether or not the department has identified the basin as a high or medium priority. Describe efforts by the supplier to coordinate with sustainability or groundwater agencies to achieve sustainable groundwater conditions.	System Supplies	Section 6.3
x	x	Section 6.2.2.4	10631(b)(4)(C)	Provide a detailed description and analysis of the location, amount, and sufficiency of groundwater pumped by the urban water supplier for the past five years	System Supplies	Section 6.3
x	x	Section 6.2.2	10631(b)(4)(D)	Provide a detailed description and analysis of the amount and location of groundwater that is projected to be pumped.	System Supplies	Section 6.3
x	x	Section 6.2.7	10631(c)	Describe the opportunities for exchanges or transfers of water on a short-term or long- term basis.	System Supplies	Section 6.7
x	x	Section 6.2.5	10633(b)	Describe the quantity of treated wastewater that meets recycled water standards, is being discharged, and is otherwise available for use in a recycled water project.	System Supplies (Recycled Water)	Section 6.5.2

Appendix A: UWMP Checklist						
Retail	Wholesale	2020 Guidebook Location	Water Code Section	Summary as Applies to UWMP	Subject	2020 UWMP Location (Optional Column for Agency Review Use)
x	x	Section 6.2.5	10633(c)	Describe the recycled water currently being used in the supplier's service area.	System Supplies (Recycled Water)	Section 6.5.3
x	x	Section 6.2.5	10633(d)	Describe and quantify the potential uses of recycled water and provide a determination of the technical and economic feasibility of those uses.	System Supplies (Recycled Water)	Section 6.5.4
x	x	Section 6.2.5	10633(e)	Describe the projected use of recycled water within the supplier's service area at the end of 5, 10, 15, and 20 years, and a description of the actual use of recycled water in comparison to uses previously projected.	System Supplies (Recycled Water)	Section 6.5.4, Table 6-6, Table 6-7
x	x	Section 6.2.5	10633(f)	Describe the actions which may be taken to encourage the use of recycled water and the projected results of these actions in terms of acre-feet of recycled water used per year.	System Supplies (Recycled Water)	Section 6.5.5
x	x	Section 6.2.5	10633(g)	Provide a plan for optimizing the use of recycled water in the supplier's service area.	System Supplies (Recycled Water)	Section 6.5.5
x	x	Section 6.2.6	10631(g)	Describe desalinated water project opportunities for long-term supply.	System Supplies	Section 6.6
x	x	Section 6.2.5	10633(a)	Describe the wastewater collection and treatment systems in the supplier's service area with quantified amount of collection and treatment and the disposal methods.	System Supplies (Recycled Water)	Section 6.5.2
x	x	Section 6.2.8, Section 6.3.7	10631(f)	Describe the expected future water supply projects and programs that may be undertaken by the water supplier to address water supply reliability in average, single-dry, and for a period of drought lasting 5 consecutive water years.	System Supplies	Section 6.8
x	x	Section 6.4 and Appendix O	10631.2(a)	The UWMP must include energy information, as stated in the code, that a supplier can readily obtain.	System Suppliers, Energy Intensity	Section 6.10
x	x	Section 7.2	10634	Provide information on the quality of existing sources of water available to the supplier and the manner in which water quality affects water management strategies and supply reliability	Water Supply Reliability Assessment	Section 7.1
x	x	Section 7.2.4	10620(f)	Describe water management tools and options to maximize resources and minimize the need to import water from other regions.	Water Supply Reliability Assessment	Section 8.5.1

Appendix A: UWMP Checklist						
Retail	Wholesale	2020 Guidebook Location	Water Code Section	Summary as Applies to UWMP	Subject	2020 UWMP Location (Optional Column for Agency Review Use)
x	x	Section 7.3	10635(a)	Service Reliability Assessment: Assess the water supply reliability during normal, dry, and a drought lasting five consecutive water years by comparing the total water supply sources available to the water supplier with the total projected water use over the next 20 years.	Water Supply Reliability Assessment	Section 7.1
x	x	Section 7.3	10635(b)	Provide a drought risk assessment as part of information considered in developing the demand management measures and water supply projects.	Water Supply Reliability Assessment	Section 7.2
x	x	Section 7.3	10635(b)(1)	Include a description of the data, methodology, and basis for one or more supply shortage conditions that are necessary to conduct a drought risk assessment for a drought period that lasts 5 consecutive years.	Water Supply Reliability Assessment	Section 7.2.1, Section 7.2.2
x	x	Section 7.3	10635(b)(2)	Include a determination of the reliability of each source of supply under a variety of water shortage conditions.	Water Supply Reliability Assessment	Section 7.2.3
x	x	Section 7.3	10635(b)(3)	Include a comparison of the total water supply sources available to the water supplier with the total projected water use for the drought period.	Water Supply Reliability Assessment	Section 7.2.4
x	x	Section 7.3	10635(b)(4)	Include considerations of the historical drought hydrology, plausible changes on projected supplies and demands under climate change conditions, anticipated regulatory changes, and other locally applicable criteria.	Water Supply Reliability Assessment	Section 7.2.4
x	x	Chapter 8	10632(a)	Provide a water shortage contingency plan (WSCP) with specified elements below.	Water Shortage Contingency Planning	Section 8
x	x	Chapter 8	10632(a)(1)	Provide the analysis of water supply reliability (from Chapter 7 of Guidebook) in the WSCP	Water Shortage Contingency Planning	Section 8.2
x	x	Section 8.10	10632(a)(10)	Describe reevaluation and improvement procedures for monitoring and evaluation the water shortage contingency plan to ensure risk tolerance is adequate and appropriate water shortage mitigation strategies are implemented.	Water Shortage Contingency Planning	Section 8.13
x	x	Section 8.2	10632(a)(2)(A)	Provide the written decision- making process and other methods that the supplier will use each year to determine its water reliability.	Water Shortage Contingency Planning	Section 8.3
x	x	Section 8.2	10632(a)(2)(B)	Provide data and methodology to evaluate the supplier's water reliability for the current year and one dry year pursuant to factors in the code.	Water Shortage Contingency Planning	Section 8.3

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Retail	Wholesale	2020 Guidebook Location	Water Code Section	Summary as Applies to UWMP	Subject	2020 UWMP Location (Optional Column for Agency Review Use)
x	x	Section 8.3	10632(a)(3)(A)	Define six standard water shortage levels of 10, 20, 30, 40, 50 percent shortage and greater than 50 percent shortage. These levels shall be based on supply conditions, including percent reductions in supply, changes in groundwater levels, changes in surface elevation, or other conditions. The shortage levels shall also apply to a catastrophic interruption of supply.	Water Shortage Contingency Planning	Section 8.4
x	x	Section 8.3	10632(a)(3)(B)	Suppliers with an existing water shortage contingency plan that uses different water shortage levels must cross reference their categories with the six standard categories.	Water Shortage Contingency Planning	Section 8.4
x	x	Section 8.4	10632(a)(4)(A)	Suppliers with water shortage contingency plans that align with the defined shortage levels must specify locally appropriate supply augmentation actions.	Water Shortage Contingency Planning	Section 8.5.2
x	x	Section 8.4	10632(a)(4)(B)	Specify locally appropriate demand reduction actions to adequately respond to shortages.	Water Shortage Contingency Planning	Section 8.5.1
x	x	Section 8.4	10632(a)(4)(C)	Specify locally appropriate operational changes.	Water Shortage Contingency Planning	Table 8-6
x	x	Section 8.4	10632(a)(4)(D)	Specify additional mandatory prohibitions against specific water use practices that are in addition to state-mandated prohibitions are appropriate to local conditions.	Water Shortage Contingency Planning	Section 8.5.1
x	x	Section 8.4	10632(a)(4)(E)	Estimate the extent to which the gap between supplies and demand will be reduced by implementation of the action.	Water Shortage Contingency Plan	Section 8.5.1, Table 8.5
x	x	Section 8.4.6	10632.5	The plan shall include a seismic risk assessment and mitigation plan.	Water Shortage Contingency Plan	Section 8.7
x	x	Section 8.5	10632(a)(5)(A)	Suppliers must describe that they will inform customers, the public and others regarding any current or predicted water shortages.	Water Shortage Contingency Planning	Section 8.8

Appendix A: UWMP Checklist						
Retail	Wholesale	2020 Guidebook Location	Water Code Section	Summary as Applies to UWMP	Subject	2020 UWMP Location (Optional Column for Agency Review Use)
x	x	Section 8.5 and 8.6	10632(a)(5)(B) 10632(a)(5)(C)	Suppliers must describe that they will inform customers, the public and others regarding any shortage response actions triggered or anticipated to be triggered and other relevant communications.	Water Shortage Contingency Planning	Section 8.8
x		Section 8.6	10632(a)(6)	Retail supplier must describe how it will ensure compliance with and enforce provisions of the WSCP.	Water Shortage Contingency Planning	Section 8.10, Section 8.12
x	x	Section 8.7	10632(a)(7)(A)	Describe the legal authority that empowers the supplier to enforce shortage response actions.	Water Shortage Contingency Planning	Section 8.10
x	x	Section 8.7	10632(a)(7)(B)	Provide a statement that the supplier will declare a water shortage emergency Water Code Chapter 3.	Water Shortage Contingency Planning	Section 8.10
x	x	Section 8.7	10632(a)(7)(C)	Provide a statement that the supplier will coordinate with any city or county within which it provides water for the possible proclamation of a local emergency.	Water Shortage Contingency Planning	Section 8.8, Section 8.10
x	x	Section 8.8	10632(a)(8)(A)	Describe the potential revenue reductions and expense increases associated with activated shortage response actions.	Water Shortage Contingency Planning	Section 8.11.2
x	x	Section 8.8	10632(a)(8)(B)	Provide a description of mitigation actions needed to address revenue reductions and expense increases associated with activated shortage response actions.	Water Shortage Contingency Planning	Section 8.11.2
x		Section 8.8	10632(a)(8)(C)	Retail suppliers must describe the cost of compliance with Water Code Chapter 3.3: Excessive Residential Water Use During Drought	Water Shortage Contingency Planning	Section 8.11
x		Section 8.9	10632(a)(9)	Retail suppliers must describe the monitoring and reporting requirements and procedures that ensure appropriate data is collected, tracked, and analyzed for purposes of monitoring customer compliance.	Water Shortage Contingency Planning	Section 8.12

Appendix A: UWMP Checklist						
Retail	Wholesale	2020 Guidebook Location	Water Code Section	Summary as Applies to UWMP	Subject	2020 UWMP Location (Optional Column for Agency Review Use)
x		Section 8.11	10632(b)	Analyze and define water features that are artificially supplied with water, including ponds, lakes, waterfalls, and fountains, separately from swimming pools and spas.	Water Shortage Contingency Planning	Section 8.5.3
x	x	Sections 8.12 and 10.4	10635(c)	Provide supporting documentation that Water Shortage Contingency Plan has been, or will be, provided to any city or county within which it provides water, no later than 30 days after the submission of the plan to DWR.	Plan Adoption, Submittal, and Implementation	Section 8.13.2
x	x	Section 8.14	10632(c)	Make available the Water Shortage Contingency Plan to customers and any city or county where it provides water within 30 after adopted the plan.	Water Shortage Contingency Planning	Section 8.13.2
	x	Sections 9.1 and 9.3	10631(e)(2)	Wholesale suppliers shall describe specific demand management measures listed in code, their distribution system asset management program, and supplier assistance program.	Demand Management Measures	Section 9.5
x		Sections 9.2 and 9.3	10631(e)(1)	Retail suppliers shall provide a description of the nature and extent of each demand management measure implemented over the past five years. The description will address specific measures listed in code.	Demand Management Measures	Section 9, Table 9-1
x		Chapter 10	10608.26(a)	Retail suppliers shall conduct a public hearing to discuss adoption, implementation, and economic impact of water use targets (recommended to discuss compliance).	Plan Adoption, Submittal, and Implementation	Section 10.3
x	x	Section 10.2.1	10621(b)	Notify, at least 60 days prior to the public hearing, any city or county within which the supplier provides water that the urban water supplier will be reviewing the plan and considering amendments or changes to the plan. Reported in Table 10-1.	Plan Adoption, Submittal, and Implementation	Section 10.3
x	x	Section 10.4	10621(f)	Each urban water supplier shall update and submit its 2020 plan to the department by July 1, 2021.	Plan Adoption, Submittal, and Implementation	Section 10.5
x	x	Sections 10.2.2, 10.3, and 10.5	10642	Provide supporting documentation that the urban water supplier made the plan and contingency plan available for public inspection, published notice of the public hearing, and held a public hearing about the plan and contingency plan.	Plan Adoption, Submittal, and Implementation	Section 10.6
x	x	Section 10.2.2	10642	The water supplier is to provide the time and place of the hearing to any city or county within which the supplier provides water.	Plan Adoption, Submittal, and Implementation	Section 10.3
x	x	Section 10.3.2	10642	Provide supporting documentation that the plan and contingency plan has been adopted as prepared or modified.	Plan Adoption, Submittal, and Implementation	Section 10.4

Appendix A: UWMP Checklist						
Retail	Wholesale	2020 Guidebook Location	Water Code Section	Summary as Applies to UWMP	Subject	2020 UWMP Location (Optional Column for Agency Review Use)
x	x	Section 10.4	10644(a)	Provide supporting documentation that the urban water supplier has submitted this UWMP to the California State Library.	Plan Adoption, Submittal, and Implementation	Section 10.5
x	x	Section 10.4	10644(a)(1)	Provide supporting documentation that the urban water supplier has submitted this UWMP to any city or county within which the supplier provides water no later than 30 days after adoption.	Plan Adoption, Submittal, and Implementation	Section 10.6
x	x	Sections 10.4.1 and 10.4.2	10644(a)(2)	The plan, or amendments to the plan, submitted to the department shall be submitted electronically.	Plan Adoption, Submittal, and Implementation	Section 10.5
x	x	Section 10.5	10645(a)	Provide supporting documentation that, not later than 30 days after filing a copy of its plan with the department, the supplier has or will make the plan available for public review during normal business hours.	Plan Adoption, Submittal, and Implementation	Section 10.6
x	x	Section 10.5	10645(b)	Provide supporting documentation that, not later than 30 days after filing a copy of its water shortage contingency plan with the department, the supplier has or will make the plan available for public review during normal business hours.	Plan Adoption, Submittal, and Implementation	Section 10.6
x	x	Section 10.6	10621(c)	If supplier is regulated by the Public Utilities Commission, include its plan and contingency plan as part of its general rate case filings.	Plan Adoption, Submittal, and Implementation	N/A
x	x	Section 10.7.2	10644(b)	If revised, submit a copy of the water shortage contingency plan to DWR within 30 days of adoption.	Plan Adoption, Submittal, and Implementation	Section 10.5

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Appendix B: UWMP Notification and Outreach

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ANTIOCH
CALIFORNIA

March 26, 2021

Steve Welsh, General Manager
Contra Costa Water District
1331 Concord Avenue
Concord, CA 94520

Subject: Notification of Preparation of Antioch's Urban Water Management Plan – 2020 Update

Dear Mr. Welsh:

The City of Antioch is currently in the process of updating its Urban Water Management Plan (UWMP) that was last prepared in 2015 and adopted on May 24, 2016. The Urban Water Management Planning Act requires the City to notify any city or county within which we provide water supplies that we are reviewing and considering changes to the UWMP. The requirement is to provide this notification at least 60 days prior to the public hearing. The public hearing of the UWMP update is anticipated to take place at an Antioch City Council meeting on May 25, 2021. The City's 2020 UWMP is anticipated to be available for public review in April 2021 or at least two weeks prior to the public hearing.

The City's 2020 UWMP is anticipated to be posted on the City's website, https://www.antiochca.gov/ in April 2021. Please provide comments and/or direct any questions to Scott Buenting, Project Manager, at (925) 779-6129 or at sbuenting@antiochca.gov.

Sincerely,

Scott Buenting
Project Manager

Phone: (925) 779-7050
Fax: (925) 779-7062
Antiochca.gov

CAPITAL IMPROVEMENTS DIVISION

200 H Street
Antioch, CA. 94509
AntiochIsOpportunity.com

ANTIOCH
CALIFORNIA

March 26, 2021

Ron Bernal, City Manager
City of Antioch
200 H Street
Antioch, CA 94509

Subject: Notification of Preparation of Antioch's Urban Water Management Plan – 2020 Update

Dear Mr. Bernal:

The City of Antioch is currently in the process of updating its Urban Water Management Plan (UWMP) that was last prepared in 2015 and adopted on May 24, 2016. The Urban Water Management Planning Act requires the City to notify any city or county within which we provide water supplies that we are reviewing and considering changes to the UWMP. The requirement is to provide this notification at least 60 days prior to the public hearing. The public hearing of the UWMP update is anticipated to take place at an Antioch City Council meeting on May 25, 2021. The City's 2020 UWMP is anticipated to be available for public review in April 2021 or at least two weeks prior to the public hearing.

The City's 2020 UWMP is anticipated to be posted on the City's website, https://www.antiochca.gov/ in April 2021. Please provide comments and/or direct any questions to Scott Buenting, Project Manager, at (925) 779-6129 or at sbuenting@antiochca.gov.

Sincerely,

Scott Buenting
Project Manager

Phone: (925) 779-7050
Fax: (925) 779-7062
Antiochca.gov

CAPITAL IMPROVEMENTS DIVISION

200 H Street
Antioch, CA. 94509
AntiochIsOpportunity.com

ANTIOCH
CALIFORNIA

March 26, 2021

Monica Nino, County Administrator
Contra Costa County
1025 Escobar St, 4th floor
Martinez, CA 94553

Subject: Notification of Preparation of Antioch's Urban Water Management Plan – 2020 Update

Dear Ms. Nino:

The City of Antioch is currently in the process of updating its Urban Water Management Plan (UWMP) that was last prepared in 2015 and adopted on May 24, 2016. The Urban Water Management Planning Act requires the City to notify any city or county within which we provide water supplies that we are reviewing and considering changes to the UWMP. The requirement is to provide this notification at least 60 days prior to the public hearing. The public hearing of the UWMP update is anticipated to take place at an Antioch City Council meeting on May 25, 2021. The City's 2020 UWMP is anticipated to be available for public review in April 2021 or at least two weeks prior to the public hearing.

The City's 2020 UWMP is anticipated to be posted on the City's website, https://www.antiochca.gov/ in April 2021. Please provide comments and/or direct any questions to Scott Buenting, Project Manager, at (925) 779-6129 or at sbuenting@antiochca.gov.

Sincerely,

Scott Buenting
Project Manager

Phone: (925) 779-7050
Fax: (925) 779-7062
Antiochca.gov

CAPITAL IMPROVEMENTS DIVISION

200 H Street
Antioch, CA. 94509
AntiochIsOpportunity.com

ANTIOCH
CALIFORNIA

March 26, 2021

Vince De Lange, General Manager
Delta Diablo
2500 Pittsburg-Antioch Highway
Antioch, CA 94509

Subject: Notification of Preparation of Antioch's Urban Water Management Plan – 2020 Update

Dear Mr. De Lange:

The City of Antioch is currently in the process of updating its Urban Water Management Plan (UWMP) that was last prepared in 2015 and adopted on May 24, 2016. The Urban Water Management Planning Act requires the City to notify any city or county within which we provide water supplies that we are reviewing and considering changes to the UWMP. The requirement is to provide this notification at least 60 days prior to the public hearing. The public hearing of the UWMP update is anticipated to take place at an Antioch City Council meeting on May 25, 2021. The City's 2020 UWMP is anticipated to be available for public review in April 2021 or at least two weeks prior to the public hearing.

The City's 2020 UWMP is anticipated to be posted on the City's website, https://www.antiochca.gov/ in April 2021. Please provide comments and/or direct any questions to Scott Buenting, Project Manager, at (925) 779-6129 or at sbuenting@antiochca.gov.

Sincerely,

Scott Buenting
Project Manager

Phone: (925) 779-7050
Fax: (925) 779-7062
Antiochca.gov

CAPITAL IMPROVEMENTS DIVISION

200 H Street
Antioch, CA. 94509
AntiochIsOpportunity.com

Appendix C: Future Development Projects

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Table C-1. Projected Land Use Quantities by Proposed Developments										
Development/Land Use	Pressure Zone	Single-family, DU	Multi-family, DU	Storage, acre	Business Park, acre	Commercial, acre	School/ Church, acre	Cannabis, acre	Public/ Institutional, acre	Oil/Gas Drilling, acre
Element 7	I							1.13		
Acorn Business Park	II			5.44	10.52	13.79				
Vineyard Self Storage	II			6.68						
One Plant	II							2.78		
Alluvium, Inc.	II							1.15		
Delta Fair Village Commercial Building	II		210							
Buchanan Crossings Shops Building E	II					13.50				
Baby Yale Academy (School/church)	II					-1.75	1.75			
Almond Knolls	II		58							
USA Trucking Yard	II					6.23				
Wildflower Station	II	22	98			10.45				
Contra Costa Farms, LLC	II							8.97		
Oakley Knolls	II	28								
AMCAL Apartments (affordable apartments)	II		394							
Golden Bow Estates	II	12								
Windsor at Shaddick	II	3								
Delta Courtyard Apartments	II C		126							
Deer Valley Business Park (office buildings)	III East				1.06					
Nelson Ranch	III East	244								
Laurel Ranch	III East	180								
Park Ridge	III East	525								
Ducky's Car Wash	III East					1.30				
Albers Ranch	III East	301								
Creekside Vineyards at Sand Creek		220								

Table C-1. Projected Land Use Quantities by Proposed Developments										
Development/Land Use	Pressure Zone	Single-family, DU	Multi-family, DU	Storage, acre	Business Park, acre	Commercial, acre	School/ Church, acre	Cannabis, acre	Public/ Institutional, acre	Oil/Gas Drilling, acre
Quail Cove	III East	30								
Heidorn Village	III East	117								
Vineyards at Sand Creek	III East	640								
Ginochio Oil and Gas Drilling [a]	III East									158
Aviano Farms	III East	533								
K. Hovnanian Homes	III East	100								
The Ranch	IV East	1,100				1.24			3.5	
Black Diamond Ranch	IV West	9								
Total (DU or acre)		4,064	886	12	12	45	2	4	14	158

a. *Per the County Department of Conservation and Development, County Zoning Administrator for Ginochio 3 Oil and Gas Wells, the proposed wells have no potential for increasing the water demand at the site.*

DU = dwelling unit

Table C-2. Projected New Growth Water Demands	
Development/Land Use	Estimated Growth[a], gpd
Element 7	5,400
Acorn Business Park	29,400
Vineyard Self Storage	1,600
One Plant	13,300
Alluvium Inc	5,500
Delta Fair Village Commercial Building	30,500
Buchanan Crossings Shops Building E	12,800
Baby Yale Academy	700
Almond Knolls	8,400
USA Trucking Yard	5,900
Wildflower Station	29,400
Contra Costa Farms LLC	43,100
Oakley Knolls	6,700
AMCAL Apartments (affordable apartments)	57,100
Golden Bow Estates	2,900
Windsor at Shaddick	700
Delta Courtyard Apartments	18,300
Deer Valley Business Park (office buildings)	1,500
Nelson Ranch	58,600
Laurel Ranch	43,200
Park Ridge	126,000
Ducky's Car Wash	1,200
Albers Ranch	72,200
Creekside Vineyards at Sand Creek	52,800
Quail Cove	7,200
Heidorn Village	28,100
Vineyards at Sand Creek	153,600
Ginochio Oil and Gas Drilling[b]	0
Aviano Farms	127,900
K. Hovnanian Homes	24,000
The Ranch	270,200
Black Diamond Ranch	2,200
Total	1,240,400 (1.24 mgd)

a. *Rounded to the nearest hundred*

b. *Per the County Department of Conservation and Development, County Zoning Administrator for Ginochio #3 Oil and Gas Wells, the proposed wells have no potential for increasing the water demand at the site.*

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Appendix D: AWWA Water Loss Audits

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AWWA Free Water Audit Software:
Reporting Worksheet

WAS v5.0

? Click to access definition
+ Click to add a comment

Water Audit Report for: City of Antioch (CA0710001)
Reporting Year: 2015-16 7/2015 - 6/2016

Please enter data in the white cells below. Where available, metered values should be used; if metered values are unavailable please estimate a value. Indicate your confidence in the accuracy of the input data by grading each component (n/a or 1-10) using the drop-down list to the left of the input cell. Hover the mouse over the cell to obtain a description of the grades

All volumes to be entered as: MILLION GALLONS (US) PER YEAR

To select the correct data grading for each input, determine the highest grade where the utility meets or exceeds all criteria for that grade and all grades below it.

<---------- Enter grading in column 'E' and 'J' ---------->

Master Meter and Supply Error Adjustments

WATER SUPPLIED

				Pcnt:	Value:	
Volume from own sources:	3	4,790.675	MG/Yr	-3.00%		MG/Yr
Water imported:			MG/Yr			MG/Yr
Water exported:			MG/Yr			MG/Yr
WATER SUPPLIED:		**4,938.840**	MG/Yr			

Enter negative % or value for under-registration
Enter positive % or value for over-registration

AUTHORIZED CONSUMPTION

Click here: ? for help using option buttons below

				Pcnt:	Value:	
Billed metered:	7	4,367.563	MG/Yr			
Billed unmetered:	1	1.000	MG/Yr			
Unbilled metered:	7	383.945	MG/Yr			
Unbilled unmetered:		61.736	MG/Yr	1.25%		MG/Yr
AUTHORIZED CONSUMPTION:		**4,814.244**	MG/Yr			

Default option selected for Unbilled unmetered - a grading of 5 is applied but not displayed

Use buttons to select percentage of water supplied **OR** value

WATER LOSSES (Water Supplied - Authorized Consumption) **124.597** MG/Yr

Apparent Losses

				Pcnt:	Value:	
Unauthorized consumption:		12.347	MG/Yr	0.25%		MG/Yr
Customer metering inaccuracies:	4	96.970	MG/Yr	2.00%		MG/Yr
Systematic data handling errors:		10.919	MG/Yr	0.25%		MG/Yr
Apparent Losses:		**120.236**	MG/Yr			

Default option selected for unauthorized consumption - a grading of 5 is applied but not displayed

Default option selected for Systematic data handling errors - a grading of 5 is applied but not displayed

Real Losses (Current Annual Real Losses or CARL)

Real Losses = Water Losses - Apparent Losses: **4.361** MG/Yr

WATER LOSSES: **124.597** MG/Yr

NON-REVENUE WATER

NON-REVENUE WATER: **570.277** MG/Yr

= Water Losses + Unbilled Metered + Unbilled Unmetered

SYSTEM DATA

Length of mains:	7	339.0	miles
Number of active AND inactive service connections:	8	31,965	
Service connection density:		94	conn./mile main

Are customer meters typically located at the curbstop or property line? Yes

Average length of customer service line:

(length of service line, beyond the property boundary, that is the responsibility of the utility)

Average length of customer service line has been set to zero and a data grading score of 10 has been applied

Average operating pressure:	7	75.0	psi

COST DATA

Total annual cost of operating water system:	10	$31,045,000	$/Year	
Customer retail unit cost (applied to Apparent Losses):	10	$2.61	$/100 cubic feet (ccf)	
Variable production cost (applied to Real Losses):	9	$3,489.30	$/Million gallons	☑ Use Customer Retail Unit Cost to value real losses

Retail costs are less than (or equal to) production costs; please review and correct if necessary

WATER AUDIT DATA VALIDITY SCORE:

***** YOUR SCORE IS: 54 out of 100 *****

A weighted scale for the components of consumption and water loss is included in the calculation of the Water Audit Data Validity Score

PRIORITY AREAS FOR ATTENTION:

Based on the information provided, audit accuracy can be improved by addressing the following components:

1: Volume from own sources
2: Billed unmetered
3: Customer metering inaccuracies

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AWWA Free Water Audit Software: Reporting Worksheet

WAS v5.0

American Water Works Association

Click to access definition Water Audit Report for: City of Antioch (CA0710001)

Click to add a comment Reporting Year: 2020 7/2019 - 6/2020

Please enter data in the white cells below. Where available, metered values should be used; if metered values are unavailable please estimate a value. Indicate your confidence in the accuracy of the

All volumes to be entered as: MILLION GALLONS (US) PER YEAR

To select the correct data grading for each input, determine the highest grade where the utility meets or exceeds all criteria for <---------- Enter grading in column 'E' and 'J' ----------> Master Meter and Supply Error Adjustments

WATER SUPPLIED

					Pcnt:	Value:	
Volume from own sources:	3	4,981.359	MG/Yr	5		1.974	MG/Yr
Water imported:	8	1.720	MG/Yr				MG/Yr
Water exported:	n/a		MG/Yr				MG/Yr

Enter negative % or value for under-registration
Enter positive % or value for over-registration

WATER SUPPLIED: 4,981.105 MG/Yr

AUTHORIZED CONSUMPTION

Click here: for help using option buttons

				Pcnt:	Value:	
Billed metered:	7	4,404.258	MG/Yr			
Billed unmetered:	10	2.550	MG/Yr			
Unbilled metered:	9	474.208	MG/Yr			
Unbilled unmetered:	9	13.120	MG/Yr		13.120	MG/Yr

Use buttons to select percentage of water supplied OR value

AUTHORIZED CONSUMPTION: 4,894.136 MG/Yr

WATER LOSSES (Water Supplied - Authorized Consumption) 86.969 MG/Yr

Apparent Losses

				Pcnt:	Value:	
Unauthorized consumption:		12.453	MG/Yr	0.25%		MG/Yr

Default option selected for unauthorized consumption - a grading of 5 is applied but not displayed

Customer metering inaccuracies:	7	33.895	MG/Yr	0.69%		MG/Yr
Systematic data handling errors:	5	11.011	MG/Yr	0.25%		MG/Yr

Default option selected for Systematic data handling errors - a grading of 5 is applied but not displayed

Apparent Losses: 57.359 MG/Yr

Real Losses (Current Annual Real Losses or CARL)

Real Losses = Water Losses - Apparent Losses: 29.610 MG/Yr

WATER LOSSES: 86.969 MG/Yr

NON-REVENUE WATER

NON-REVENUE WATER: 574.297 MG/Yr

= Water Losses + Unbilled Metered + Unbilled Unmetered

SYSTEM DATA

Length of mains:	9	395.8	miles
Number of active AND inactive service connections:	9	32,647	
Service connection density:		82	conn./mile main

Are customer meters typically located at the curbstop or property line? Yes

Average length of customer service line:

(length of service line, beyond the property boundary, that is the responsibility of the utility)

Average length of customer service line has been set to zero and a data grading score of 10 has been applied

Average operating pressure:	5	73.7	psi

COST DATA

Total annual cost of operating water system:	10	$36,670,369	$/Year	
Customer retail unit cost (applied to Apparent Losses):	9	$4.66	$/100 cubic feet (ccf)	
Variable production cost (applied to Real Losses):	5	$1,977.98	$/Million gallons	Use Customer Retail Unit Cost to value real

WATER AUDIT DATA VALIDITY SCORE:

***** YOUR SCORE IS: 60 out of 100 *****

A weighted scale for the components of consumption and water loss is included in the calculation of the Water Audit Data Validity Score

PRIORITY AREAS FOR ATTENTION:

Based on the information provided, audit accuracy can be improved by addressing the following components:

1: Volume from own sources

2: Variable production cost (applied to Real Losses)

3: Billed metered

AWWA Free Water Audit Software: Reporting Worksheet

WAS v5.0

American Water Works Association

Click to access definition / Click to add a comment

Water Audit Report for: City of Antioch (CA071001)

Reporting Year: 2019 | 7/2018 - 6/2019

Please enter data in the white cells below. Where available, metered values should be used; if metered values are unavailable please estimate a value. Indicate your confidence in the accuracy of the

All volumes to be entered as: MILLION GALLONS (US) PER YEAR

To select the correct data grading for each input, determine the highest grade where the utility meets or exceeds all criteria for <---------- Enter grading in column 'E' and 'J' ----------> Master Meter and Supply Error Adjustments

WATER SUPPLIED

					Pcnt:	Value:	
Volume from own sources:	3	4,707.223	MG/Yr	5		-1.177	MG/Yr
Water imported:	n/a		MG/Yr				MG/Yr
Water exported:	n/a		MG/Yr				MG/Yr

Enter negative % or value for under-registration

Enter positive % or value for over-registration

WATER SUPPLIED: 4,708.400 MG/Yr

AUTHORIZED CONSUMPTION

Click here: for help using option buttons

				Pcnt:	Value:	
Billed metered:	7	4,174.901	MG/Yr			
Billed unmetered:	10	2.301	MG/Yr			
Unbilled metered:	9	451.305	MG/Yr			
Unbilled unmetered:	9	16.677	MG/Yr		16.677	MG/Yr

Use buttons to select percentage of water supplied OR value

AUTHORIZED CONSUMPTION: 4,645.184 MG/Yr

WATER LOSSES (Water Supplied - Authorized Consumption) 63.216 MG/Yr

Apparent Losses

				Pcnt:	Value:	
Unauthorized consumption:		11.771	MG/Yr	0.25%		MG/Yr

Default option selected for unauthorized consumption - a grading of 5 is applied but not displayed

Customer metering inaccuracies:	7	24.182	MG/Yr	0.52%		MG/Yr
Systematic data handling errors:	5	10.437	MG/Yr	0.25%		MG/Yr

Default option selected for Systematic data handling errors - a grading of 5 is applied but not displayed

Apparent Losses: 46.390 MG/Yr

Real Losses (Current Annual Real Losses or CARL)

Real Losses = Water Losses - Apparent Losses: 16.826 MG/Yr

WATER LOSSES: 63.216 MG/Yr

NON-REVENUE WATER

NON-REVENUE WATER: 531.198 MG/Yr

= Water Losses + Unbilled Metered + Unbilled Unmetered

SYSTEM DATA

Length of mains:	9	365.8	miles
Number of active AND inactive service connections:	9	32,500	
Service connection density:		89	conn./mile main

Are customer meters typically located at the curbstop or property line? Yes

Average length of customer service line: (length of service line, beyond the property boundary, that is the responsibility of the utility)

Average length of customer service line has been set to zero and a data grading score of 10 has been applied

Average operating pressure:	5	67.5	psi

COST DATA

Total annual cost of operating water system:	10	$31,865,163	$/Year	
Customer retail unit cost (applied to Apparent Losses):	9	$4.25	$/100 cubic feet (ccf)	
Variable production cost (applied to Real Losses):	5	$2,368.88	$/Million gallons	☐ Use Customer Retail Unit Cost to value real

WATER AUDIT DATA VALIDITY SCORE:

***** YOUR SCORE IS: 60 out of 100 *****

A weighted scale for the components of consumption and water loss is included in the calculation of the Water Audit Data Validity Score

PRIORITY AREAS FOR ATTENTION:

Based on the information provided, audit accuracy can be improved by addressing the following components:

1: Volume from own sources

2: Variable production cost (applied to Real Losses)

3: Billed metered

AWWA Free Water Audit Software: Reporting Worksheet

WAS v5.0

? Click to access definition
+ Click to add a comment

Water Audit Report for: City of Antioch (CA071001)
Reporting Year: 2018 7/2017 - 6/2018

Please enter data in the white cells below. Where available, metered values should be used; if metered values are unavailable please estimate a value. Indicate your confidence in the accuracy of the input data by grading each component (n/a or 1-10) using the drop-down list to the left of the input cell. Hover the mouse over the cell to obtain a description of the grades

All volumes to be entered as: MILLION GALLONS (US) PER YEAR

To select the correct data grading for each input, determine the highest grade where the utility meets or exceeds all criteria for that grade and all grades below it.

WATER SUPPLIED

				Master Meter and Supply Error Adjustments		
				Pcnt:	Value:	
Volume from own sources:	3	4,776.242	MG/Yr	3		MG/Yr
Water imported:	n/a	0.000	MG/Yr			MG/Yr
Water exported:	n/a	0.000	MG/Yr			MG/Yr

Enter negative % or value for under-registration
Enter positive % or value for over-registration

WATER SUPPLIED: 4,776.242 MG/Yr

AUTHORIZED CONSUMPTION

Click here: ? for help using option buttons below

			Pcnt:	Value:	
Billed metered:	7	4,171.263	MG/Yr			
Billed unmetered:	10	2.995	MG/Yr			
Unbilled metered:	9	431.370	MG/Yr			
Unbilled unmetered:	7	11.941	MG/Yr		11.941	MG/Yr

Use buttons to select percentage of water supplied OR value

AUTHORIZED CONSUMPTION: 4,617.569 MG/Yr

WATER LOSSES (Water Supplied - Authorized Consumption) 158.673 MG/Yr

Apparent Losses

			Pcnt:	Value:	
Unauthorized consumption:		11.941	MG/Yr	0.25%		MG/Yr

Default option selected for unauthorized consumption - a grading of 5 is applied but not displayed

Customer metering inaccuracies:	7	36.183	MG/Yr	0.78%	MG/Yr
Systematic data handling errors:		10.428	MG/Yr	0.25%	MG/Yr

Default option selected for Systematic data handling errors - a grading of 5 is applied but not displayed

Apparent Losses: 58.552 MG/Yr

Real Losses (Current Annual Real Losses or CARL)

Real Losses = Water Losses - Apparent Losses: 100.121 MG/Yr

WATER LOSSES: 158.673 MG/Yr

NON-REVENUE WATER

NON-REVENUE WATER: 601.984 MG/Yr

= Water Losses + Unbilled Metered + Unbilled Unmetered

SYSTEM DATA

Length of mains:	9	367.5	miles	
Number of active AND inactive service connections:	9	32,412		
Service connection density:		88	conn./mile main	
Are customer meters typically located at the curbstop or property line?		Yes		(length of service line, beyond the property boundary, that is the responsibility of the utility)
Average length of customer service line				

Average length of customer service line has been set to zero and a data grading score of 10 has been applied

Average operating pressure:	5	69.0	psi	

COST DATA

Total annual cost of operating water system:	10	$28,401,512	$/Year	
Customer retail unit cost (applied to Apparent Losses):	9	$3.90	$/100 cubic feet (ccf)	
Variable production cost (applied to Real Losses):	5	$2,932.89	$/Million gallons	☐ Use Customer Retail Unit Cost to value real losses

WATER AUDIT DATA VALIDITY SCORE:

***** YOUR SCORE IS: 60 out of 100 *****

A weighted scale for the components of consumption and water loss is included in the calculation of the Water Audit Data Validity Score

PRIORITY AREAS FOR ATTENTION:

Based on the information provided, audit accuracy can be improved by addressing the following components:

1: Volume from own sources
2: Variable production cost (applied to Real Losses)
3: Billed metered

AWWA Free Water Audit Software: Reporting Worksheet

WAS v5.0

Click to access definition
Click to add a comment

Water Audit Report for: City of Antioch (CA071001)
Reporting Year: 2017 7/2016 - 6/2017

Please enter data in the white cells below. Where available, metered values should be used; if metered values are unavailable please estimate a value. Indicate your confidence in the accuracy of the input data by grading each component (n/a or 1-10) using the drop-down list to the left of the input cell. Hover the mouse over the cell to obtain a description of the grades

All volumes to be entered as: MILLION GALLONS (US) PER YEAR

To select the correct data grading for each input, determine the highest grade where the utility meets or exceeds all criteria for that grade and all grades below it.

<---------- Enter grading in column 'E' and 'J' ---------->

WATER SUPPLIED

				Master Meter and Supply Error Adjustments		
				Pcnt:	Value:	
Volume from own sources:	3	4,587.672	MG/Yr	3		MG/Yr
Water imported:	n/a	0.000	MG/Yr			MG/Yr
Water exported:	n/a	0.000	MG/Yr			MG/Yr
WATER SUPPLIED:		**4,587.672**	MG/Yr	Enter negative % or value for under-registration Enter positive % or value for over-registration		

AUTHORIZED CONSUMPTION

Click here: for help using option buttons below

				Pcnt:	Value:	
Billed metered:	7	3,847.589	MG/Yr			
Billed unmetered:	10	1.552	MG/Yr			
Unbilled metered:	9	336.135	MG/Yr			
Unbilled unmetered:	5	11.469	MG/Yr		11.469	MG/Yr
AUTHORIZED CONSUMPTION:		**4,196.745**	MG/Yr			

Use buttons to select percentage of water supplied OR value

WATER LOSSES (Water Supplied - Authorized Consumption) **390.927** MG/Yr

Apparent Losses

			Pcnt:	Value:	
Unauthorized consumption:		11.469 MG/Yr	0.25%		MG/Yr

Default option selected for unauthorized consumption - a grading of 5 is applied but not displayed

Customer metering inaccuracies:	6	65.006	MG/Yr	1.53%	MG/Yr
Systematic data handling errors:		9.619	MG/Yr	0.25%	MG/Yr

Default option selected for Systematic data handling errors - a grading of 5 is applied but not displayed

Apparent Losses: **86.094** MG/Yr

Real Losses (Current Annual Real Losses or CARL)

Real Losses = Water Losses - Apparent Losses: **304.833** MG/Yr

WATER LOSSES: **390.927** MG/Yr

NON-REVENUE WATER

NON-REVENUE WATER: **738.531** MG/Yr

= Water Losses + Unbilled Metered + Unbilled Unmetered

SYSTEM DATA

Length of mains:	9	378.8	miles
Number of active AND inactive service connections:	9	32,291	
Service connection density:		85	conn./mile main
Are customer meters typically located at the curbstop or property line?		Yes	
Average length of customer service line			(length of service line, beyond the property boundary, that is the responsibility of the utility)

Average length of customer service line has been set to zero and a data grading score of 10 has been applied

Average operating pressure:	5	68.0	psi

COST DATA

Total annual cost of operating water system:	10	$23,459,652	$/Year	
Customer retail unit cost (applied to Apparent Losses):	9	$3.32	$/100 cubic feet (ccf)	
Variable production cost (applied to Real Losses):	5	$1,906.22	$/Million gallons	☑ Use Customer Retail Unit Cost to value real losses

WATER AUDIT DATA VALIDITY SCORE:

***** YOUR SCORE IS: 59 out of 100 *****

A weighted scale for the components of consumption and water loss is included in the calculation of the Water Audit Data Validity Score

PRIORITY AREAS FOR ATTENTION:

Based on the information provided, audit accuracy can be improved by addressing the following components:

1: Volume from own sources
2: Variable production cost (applied to Real Losses)
3: Billed metered

Appendix E: SB X7-7 GPCD Worksheets

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SB X7-7 Table 0: Units of Measure Used in UWMP* *(select one from the drop down list)*
Million Gallons
**The unit of measure must be consistent with Table 2-3*
NOTES:

SB X7-7 Table-1: Baseline Period Ranges			
Baseline	**Parameter**	**Value**	**Units**
10- to 15-year baseline period	2008 total water deliveries	6612	Million Gallons
	2008 total volume of delivered recycled water	0	Million Gallons
	2008 recycled water as a percent of total deliveries	0.00%	Percent
	Number of years in baseline period[1, 2]	10	Years
	Year beginning baseline period range	1999	
	Year ending baseline period range[3]	2008	
5-year baseline period	Number of years in baseline period	5	Years
	Year beginning baseline period range	2004	
	Year ending baseline period range[4]	2008	

[1] If the 2008 recycled water percent is less than 10 percent, then the first baseline period is a continuous 10-year period. If the amount of recycled water delivered in 2008 is 10 percent or greater, the first baseline period is a continuous 10- to 15-year period. *[2] The Water Code requires that the baseline period is between 10 and 15 years. However, DWR recognizes that some water suppliers may not have the minimum 10 years of baseline data.*

[3] The ending year must be between December 31, 2004 and December 31, 2010.

[4] The ending year must be between December 31, 2007 and December 31, 2010.

NOTES:

SB X7-7 Table 2: Method for Population Estimates	
Method Used to Determine Population (may check more than one)	
☑	**1. Department of Finance** (DOF) DOF Table E-8 (1990 - 2000) and (2000-2010) and DOF Table E-5 (2011 - 2015) when available
☐	**2. Persons-per-Connection Method**
☐	**3. DWR Population Tool**
☐	**4. Other** DWR recommends pre-review
NOTES:	

SB X7-7 Table 3: Service Area Population		
Year		**Population**
10 to 15 Year Baseline Population		
Year 1	1999	86,408
Year 2	2000	90,091
Year 3	2001	92,942
Year 4	2002	96,343
Year 5	2003	98,467
Year 6	2004	100,042
Year 7	2005	99,713
Year 8	2006	98,995
Year 9	2007	99,098
Year 10	2008	99,854
Year 11		
Year 12		
Year 13		
Year 14		
Year 15		
5 Year Baseline Population		
Year 1	2004	100,042
Year 2	2005	99,713
Year 3	2006	98,995
Year 4	2007	99,098
Year 5	2008	99,854
2015 Compliance Year Population		
2015		108,298
NOTES:		

SB X7-7 Table 4: Annual Gross Water Use *								
Baseline Year *Fm SB X7-7 Table 3*		**Volume Into Distribution System** *This column will remain blank until SB X7-7 Table 4-A is completed.*	**Deductions**					**Annual Gross Water Use**
			Exported Water	**Change in Dist. System Storage (+/-)**	**Indirect Recycled Water** *This column will remain blank until SB X7-7 Table 4-B is completed.*	**Water Delivered for Agricultural Use**	**Process Water** *This column will remain blank until SB X7-7 Table 4-D is completed.*	
10 to 15 Year Baseline - Gross Water Use								
Year 1	1999	5,899			-		-	5,899
Year 2	2000	6,020			-		-	6,020
Year 3	2001	6,483			-		-	6,483
Year 4	2002	6,639			-		-	6,639
Year 5	2003	6,396			-		-	6,396
Year 6	2004	6,774			-		-	6,774
Year 7	2005	6,660			-		-	6,660
Year 8	2006	6,388			-		-	6,388
Year 9	2007	6,965			-		-	6,965
Year 10	2008	6,612			-		-	6,612
Year 11	0	-			-		-	-
Year 12	0	-			-		-	-
Year 13	0	-			-		-	-
Year 14	0	-			-		-	-
Year 15	0	-			-		-	-
10 - 15 year baseline average gross water use								**6,484**
5 Year Baseline - Gross Water Use								
Year 1	2004	6,774			-		-	6,774
Year 2	2005	6,660			-		-	6,660
Year 3	2006	6,388			-		-	6,388
Year 4	2007	6,965			-		-	6,965
Year 5	2008	6,612			-		-	6,612
5 year baseline average gross water use								**6,680**
2015 Compliance Year - Gross Water Use								
2015		4,521			-		-	**4,521**

* NOTE that the units of measure must remain consistent throughout the UWMP, as reported in Table 2-3

NOTES:

SB X7-7 Table 4-A: Volume Entering the Distribution System(s)

Complete one table for each source.

Name of Source	Water Treatment Plan
This water source is:	
☑	The supplier's own water source
☐	A purchased or imported source

Baseline Year *Fm SB X7-7 Table 3*		Volume Entering Distribution System	Meter Error Adjustment* *Optional (+/-)*	Corrected Volume Entering Distribution System
10 to 15 Year Baseline - Water into Distribution System				
Year 1	1999	5,899		5,899
Year 2	2000	6,020		6,020
Year 3	2001	6,483		6,483
Year 4	2002	6,639		6,639
Year 5	2003	6,396		6,396
Year 6	2004	6,774		6,774
Year 7	2005	6,660		6,660
Year 8	2006	6,388		6,388
Year 9	2007	6,965		6,965
Year 10	2008	6,612		6,612
Year 11	0			-
Year 12	0			-
Year 13	0			-
Year 14	0			-
Year 15	0			-
5 Year Baseline - Water into Distribution System				
Year 1	2004	6,774		6,774
Year 2	2005	6,660		6,660
Year 3	2006	6,388		6,388
Year 4	2007	6,965		6,965
Year 5	2008	6,612		6,612
2015 Compliance Year - Water into Distribution System				
2015		4,521		4,521

** Meter Error Adjustment - See guidance in Methodology 1, Step 3 of Methodologies Document*

NOTES:

SB X7-7 Table 4-A: Volume Entering the Distribution

Name of Source	
This water source is:	
☐	The supplier's own water source
☐	A purchased or imported source

Baseline Year *Fm SB X7-7 Table 3*		Volume Entering Distribution System	Meter Error Adjustment* *Optional (+/-)*	Corrected Volume Entering Distribution System
10 to 15 Year Baseline - Water into Distribution System				
Year 1	1,999			0
Year 2	2,000			0
Year 3	2,001			0
Year 4	2,002			0
Year 5	2,003			0
Year 6	2,004			0
Year 7	2,005			0
Year 8	2,006			0
Year 9	2,007			0
Year 10	2,008			0
Year 11	-			0
Year 12	-			0
Year 13	-			0
Year 14	-			0
Year 15	-			0
5 Year Baseline - Water into Distribution System				
Year 1	2,004			0
Year 2	2,005			0
Year 3	2,006			0
Year 4	2,007			0
Year 5	2,008			0
2015 Compliance Year - Water into Distribution System				
2015				0

** Meter Error Adjustment - See guidance in Methodology 1, Step 3 of Methodologies Document*

NOTES:

SB X7-7 Table 4-B: Indirect Recycled Water Use Deduction *(For use only by agencies that are deducting indirect recycled water)*

Baseline Year *Fm SB X7-7 Table 3*		**Surface Reservoir Augmentation**					**Groundwater Recharge**			**Total Deductible Volume of Indirect Recycled Water Entering the Distribution System**
		Volume Discharged from Reservoir for Distribution System Delivery	Percent Recycled Water	Recycled Water Delivered to Treatment Plant	Transmission/ Treatment Loss	Recycled Volume Entering Distribution System from Surface Reservoir Augmentation	Recycled Water Pumped by Utility*	Transmission/ Treatment Losses	Recycled Volume Entering Distribution System from Groundwater Recharge	
10-15 Year Baseline - Indirect Recycled Water Use										
Year 1	1999			-		-			-	-
Year 2	2000			-		-			-	-
Year 3	2001			-		-			-	-
Year 4	2002			-		-			-	-
Year 5	2003			-		-			-	-
Year 6	2004			-		-			-	-
Year 7	2005			-		-			-	-
Year 8	2006			-		-			-	-
Year 9	2007			-		-			-	-
Year 10	2008			-		-			-	-
Year 11	0			-		-			-	-
Year 12	0			-		-			-	-
Year 13	0			-		-			-	-
Year 14	0			-		-			-	-
Year 15	0			-		-			-	-
5 Year Baseline - Indirect Recycled Water Use										
Year 1	2004			-		-			-	-
Year 2	2005			-		-			-	-
Year 3	2006			-		-			-	-
Year 4	2007			-		-			-	-
Year 5	2008			-		-			-	-
2015 Compliance - Indirect Recycled Water Use										
2015				-		-			-	-

**Suppliers will provide supplemental sheets to document the calculation for their input into "Recycled Water Pumped by Utility". The volume reported in this cell must be less than total groundwater pumped - See Methodology 1, Step 8, section 2.c.*

NOTES:

SB X7-7 Table 5: Gallons Per Capita Per Day (GPCD)				
Baseline Year *Fm SB X7-7 Table 3*		Service Area Population *Fm SB X7-7 Table 3*	Annual Gross Water Use *Fm SB X7-7 Table 4*	Daily Per Capita Water Use (GPCD)
10 to 15 Year Baseline GPCD				
Year 1	1999	86,408	5,899	187
Year 2	2000	90,091	6,020	183
Year 3	2001	92,942	6,483	191
Year 4	2002	96,343	6,639	189
Year 5	2003	98,467	6,396	178
Year 6	2004	100,042	6,774	186
Year 7	2005	99,713	6,660	183
Year 8	2006	98,995	6,388	177
Year 9	2007	99,098	6,965	193
Year 10	2008	99,854	6,612	181
Year 11	0	-	-	
Year 12	0	-	-	
Year 13	0	-	-	
Year 14	0	-	-	
Year 15	0	-	-	
10-15 Year Average Baseline GPCD				**185**
5 Year Baseline GPCD				
Baseline Year *Fm SB X7-7 Table 3*		Service Area Population *Fm SB X7-7 Table 3*	Gross Water Use *Fm SB X7-7 Table 4*	Daily Per Capita Water Use
Year 1	2004	100,042	6,774	186
Year 2	2005	99,713	6,660	183
Year 3	2006	98,995	6,388	177
Year 4	2007	99,098	6,965	193
Year 5	2008	99,854	6,612	181
5 Year Average Baseline GPCD				**184**
2015 Compliance Year GPCD				
2015		108,298	4,521	**114**
NOTES:				

SB X7-7 Table 6: Gallons per Capita per Day *Summary From Table SB X7-7 Table 5*	
10-15 Year Baseline GPCD	185
5 Year Baseline GPCD	184
2015 Compliance Year GPCD	114
NOTES:	

SB X7-7 Table 7: 2020 Target Method *Select Only One*		
Target Method		Supporting Documentation
☐	Method 1	SB X7-7 Table 7A
☐	Method 2	SB X7-7 Tables 7B, 7C, and 7D *Contact DWR for these tables*
☑	Method 3	SB X7-7 Table 7-E
☐	Method 4	Method 4 Calculator
NOTES:		

SB X7-7 Table 7-A: Target Method 1 20% Reduction	
10-15 Year Baseline GPCD	**2020 Target GPCD**
185	**148**
NOTES:	

SB X7-7 Table 7-E: Target Method 3				
Agency May Select More Than One as Applicable	Percentage of Service Area in This Hydrological Region	Hydrologic Region	"2020 Plan" Regional Targets	Method 3 Regional Targets (95%)
☐		North Coast	137	130
☐		North Lahontan	173	164
☐		Sacramento River	176	167
☐		San Francisco Bay	131	124
☑	100%	San Joaquin River	174	165
☐		Central Coast	123	117
☐		Tulare Lake	188	179
☐		South Lahontan	170	162
☐		South Coast	149	142
☐		Colorado River	211	200
Target *(If more than one region is selected, this value is calculated.)*				**165**
NOTES:				

SB X7-7 Table 7-F: Confirm Minimum Reduction for 2020 Target			
5 Year Baseline GPCD *From SB X7-7 Table 5*	Maximum 2020 Target[1]	Calculated 2020 Target[2]	**Confirmed 2020 Target**
184	175	165	**165**

[1] Maximum 2020 Target is 95% of the 5 Year Baseline GPCD *[2] 2020 Target is calculated based on the selected Target Method, see SB X7-7 Table 7 and corresponding tables for agency's calculated target.*

NOTES:

SB X7-7 Table 8: 2015 Interim Target GPCD		
Confirmed 2020 Target *Fm SB X7-7 Table 7-F*	10-15 year Baseline GPCD *Fm SB X7-7 Table 5*	**2015 Interim Target GPCD**
165	185	**175**
NOTES:		

SB X7-7 Table 9: 2015 Compliance								
Actual 2015 GPCD	2015 Interim Target GPCD	Optional Adjustments *(in GPCD)* Enter "0" if Adjustment Not Used: Extraordinary Events	Weather Normalization	Economic Adjustment	TOTAL Adjustments	Adjusted 2015 GPCD	2015 GPCD *(Adjusted if applicable)*	**Did Supplier Achieve Targeted Reduction for 2015?**
114	175	-	-	-	-	114	114	**YES**

NOTES:

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SB X7-7 Table 0: Units of Measure Used in 2020 UWMP* *(select one from the drop down list)*
Million Gallons
**The unit of measure must be consistent throughout the UWMP, as reported in Submittal Table 2-3.*
NOTES:

SB X7-7 Table 2: Method for 2020 Population Estimate	
Method Used to Determine 2020 Population (may check more than one)	
☑	**1. Department of Finance** (DOF) or **American Community Survey** (ACS)
☐	**2. Persons-per-Connection Method**
☐	**3. DWR Population Tool**
☐	**4. Other** DWR recommends pre-review
NOTES:	

SB X7-7 Table 3: 2020 Service Area Population	
2020 Compliance Year Population	
2020	112,250
NOTES:	

SB X7-7 Table 4: 2020 Gross Water Use							
Compliance Year 2020	**2020 Volume Into Distribution System** *This column will remain blank until SB X7-7 Table 4-A is completed.*	**2020 Deductions**					**2020 Gross Water Use**
		Exported Water *	**Change in Dist. System Storage*** (+/-)	**Indirect Recycled Water** *This column will remain blank until SB X7-7 Table 4-B is completed.*	**Water Delivered for Agricultural Use***	**Process Water** *This column will remain blank until SB X7-7 Table 4-D is completed.*	
	5,118			-		-	**5,118**

*** Units of measure (AF, MG , or CCF)** must remain consistent throughout the UWMP, as reported in SB X7-7 Table 0 and Submittal Table 2-3.

NOTES:

SB X7-7 Table 4-A: 2020 Volume Entering the Distribution System(s), Meter Error Adjustment

Complete one table for each source.

Name of Source	San Joaquin River (Delta)
This water source is *(check one)* **:**	
☑	The supplier's own water source
☐	A purchased or imported source

Compliance Year 2020	Volume Entering Distribution System [1]	Meter Error Adjustment [2] *Optional (+/-)*	Corrected Volume Entering Distribution System
	241	-	241

[1] ***Units of measure (AF, MG , or CCF)*** *must remain consistent throughout the UWMP, as reported in SB X7-7 Table 0 and Submittal Table 2-3.*

[2] ***Meter Error Adjustment*** *- See guidance in Methodology 1, Step 3 of Methodologies Document*

NOTES

SB X7-7 Table 4-A: 2020 Volume Entering the Distribution System(s) Meter Error Adjustment

Complete one table for each source.

Name of Source	Contra Costa Water District (Canal)
This water source is *(check one)* **:**	
☐	The supplier's own water source
☑	A purchased or imported source

Compliance Year 2020	Volume Entering Distribution System [1]	Meter Error Adjustment [2] *Optional (+/-)*	Corrected Volume Entering Distribution System
	4,877		4,877

[1] ***Units of measure (AF, MG , or CCF)*** *must remain consistent throughout the UWMP, as reported in SB X7-7 Table 0 and Submittal Table 2-3.*

[2] ***Meter Error Adjustment*** *- See guidance in Methodology 1, Step 3 of Methodologies Document*

NOTES:

SB X7-7 Table 4-A: 2020 Volume Entering the Distribution System(s), Meter Error Adjustment

Complete one table for each source.

Name of Source	Enter Name of Source 3
This water source is *(check one)* **:**	
☐	The supplier's own water source
☐	A purchased or imported source

Compliance Year 2020	Volume Entering Distribution System [1]	Meter Error Adjustment [2] *Optional (+/-)*	Corrected Volume Entering Distribution System
			0

[1] ***Units of measure (AF, MG , or CCF)*** *must remain consistent throughout the UWMP, as reported in SB X7-7 Table 0 and Submittal Table 2-3.*

[2] ***Meter Error Adjustment*** *- See guidance in Methodology 1, Step 3 of Methodologies Document*

NOTES:

SB X7-7 Table 4-A: 2020 Volume Entering the Distribution System(s), Meter Error Adjustment

Complete one table for each source.

Name of Source	Enter Name of Source 4
This water source is *(check one)* **:**	
☐	The supplier's own water source
☐	A purchased or imported source

Compliance Year 2020	Volume Entering Distribution System [1]	Meter Error Adjustment [2] *Optional (+/-)*	Corrected Volume Entering Distribution System
			0

[1] ***Units of measure (AF, MG , or CCF)*** *must remain consistent throughout the UWMP, as reported in SB X7-7 Table 0 and Submittal Table 2-3.*

[2] ***Meter Error Adjustment*** *- See guidance in Methodology 1, Step 3 of Methodologies Document*

NOTES:

SB X7-7 Table 4-A: 2020 Volume Entering the Distribution System(s), Meter Error Adjustment

Complete one table for each source.

Name of Source	Enter Name of Source 5
This water source is *(check one)* **:**	
☐	The supplier's own water source
☐	A purchased or imported source

Compliance Year 2020	Volume Entering Distribution System [1]	Meter Error Adjustment [2] *Optional (+/-)*	Corrected Volume Entering Distribution System
			0

[1] ***Units of measure (AF, MG , or CCF)*** *must remain consistent throughout the UWMP, as reported in SB X7-7 Table 0 and Submittal Table 2-3.*

[2] ***Meter Error Adjustment*** *- See guidance in Methodology 1, Step 3 of Methodologies Document*

NOTES:

SB X7-7 Table 4-A: 2020 Volume Entering the Distribution System(s), Meter Error Adjustment

Complete one table for each source.

Name of Source	Enter Name of Source 6
This water source is *(check one)* **:**	
☐	The supplier's own water source
☐	A purchased or imported source

Compliance Year 2020	Volume Entering Distribution System [1]	Meter Error Adjustment [2] *Optional (+/-)*	Corrected Volume Entering Distribution System
			0

[1] ***Units of measure (AF, MG , or CCF)*** *must remain consistent throughout the UWMP, as reported in SB X7-7 Table 0 and Submittal Table 2-3.*

[2] ***Meter Error Adjustment*** *- See guidance in Methodology 1, Step 3 of Methodologies Document*

NOTES:

SB X7-7 Table 4-A: 2020 Volume Entering the Distribution System(s), Meter Error Adjustment

Complete one table for each source.

Name of Source	Enter Name of Source 7
This water source is *(check one)* **:**	
☐	The supplier's own water source
☐	A purchased or imported source

Compliance Year 2020	Volume Entering Distribution System [1]	Meter Error Adjustment [2] *Optional (+/-)*	Corrected Volume Entering Distribution System
			0

[1] ***Units of measure (AF, MG , or CCF)*** *must remain consistent throughout the UWMP, as reported in SB X7-7 Table 0 and Submittal Table 2-3.*

[2] ***Meter Error Adjustment*** *- See guidance in Methodology 1, Step 3 of Methodologies Document*

NOTES:

SB X7-7 Table 4-A: 2020 Volume Entering the Distribution System(s), Meter Error Adjustment

Complete one table for each source.

Name of Source	Enter Name of Source 8
This water source is *(check one)* **:**	
☐	The supplier's own water source
☐	A purchased or imported source

Compliance Year 2020	Volume Entering Distribution System [1]	Meter Error Adjustment [2] *Optional (+/-)*	Corrected Volume Entering Distribution System
			0

[1] ***Units of measure (AF, MG , or CCF)*** *must remain consistent throughout the UWMP, as reported in SB X7-7 Table 0 and Submittal Table 2-3.*

[2] ***Meter Error Adjustment*** *- See guidance in Methodology 1, Step 3 of Methodologies Document*

NOTES:

SB X7-7 Table 4-A: 2020 Volume Entering the Distribution System(s), Meter Error Adjustment

Complete one table for each source.

Name of Source	Enter Name of Source 9
This water source is *(check one)* **:**	
☐	The supplier's own water source
☐	A purchased or imported source

Compliance Year 2020	Volume Entering Distribution System [1]	Meter Error Adjustment [2] *Optional (+/-)*	Corrected Volume Entering Distribution System
			0

[1] ***Units of measure (AF, MG , or CCF)*** *must remain consistent throughout the UWMP, as reported in SB X7-7 Table 0 and Submittal Table 2-3.*

[2] ***Meter Error Adjustment*** *- See guidance in Methodology 1, Step 3 of Methodologies Document*

NOTES:

SB X7-7 Table 4-A: 2020 Volume Entering the Distribution System(s), Meter Error Adjustment

Complete one table for each source.

Name of Source	Enter Name of Source 10
This water source is *(check one)* **:**	
☐	The supplier's own water source
☐	A purchased or imported source

Compliance Year 2020	Volume Entering Distribution System [1]	Meter Error Adjustment [2] *Optional (+/-)*	Corrected Volume Entering Distribution System
			0

[1] ***Units of measure (AF, MG , or CCF)*** *must remain consistent throughout the UWMP, as reported in SB X7-7 Table 0 and Submittal Table 2-3.*

[2] ***Meter Error Adjustment*** *- See guidance in Methodology 1, Step 3 of Methodologies Document*

NOTES:

SB X7-7 Table 4-A: 2020 Volume Entering the Distribution System(s), Meter Error Adjustment

Complete one table for each source.

Name of Source	Enter Name of Source 11
This water source is *(check one)* **:**	
☐	The supplier's own water source
☐	A purchased or imported source

Compliance Year 2020	Volume Entering Distribution System [1]	Meter Error Adjustment [2] *Optional (+/-)*	Corrected Volume Entering Distribution System
			0

[1] ***Units of measure (AF, MG , or CCF)*** *must remain consistent throughout the UWMP, as reported in SB X7-7 Table 0 and Submittal Table 2-3.*

[2] ***Meter Error Adjustment*** *- See guidance in Methodology 1, Step 3 of Methodologies Document*

NOTES:

SB X7-7 Table 4-A: 2020 Volume Entering the Distribution System(s), Meter Error Adjustment

Complete one table for each source.

Name of Source	Enter Name of Source 12
This water source is *(check one)* **:**	
☐	The supplier's own water source
☐	A purchased or imported source

Compliance Year 2020	Volume Entering Distribution System [1]	Meter Error Adjustment [2] *Optional (+/-)*	Corrected Volume Entering Distribution System
			0

[1] ***Units of measure (AF, MG , or CCF)*** *must remain consistent throughout the UWMP, as reported in SB X7-7 Table 0 and Submittal Table 2-3.*

[2] ***Meter Error Adjustment*** *- See guidance in Methodology 1, Step 3 of Methodologies Document*

NOTES:

SB X7-7 Table 4-A: 2020 Volume Entering the Distribution System(s), Meter Error Adjustment

Complete one table for each source.

Name of Source	Enter Name of Source 13
This water source is *(check one)* **:**	
☐	The supplier's own water source
☐	A purchased or imported source

Compliance Year 2020	Volume Entering Distribution System [1]	Meter Error Adjustment [2] *Optional (+/-)*	Corrected Volume Entering Distribution System
			0

[1] ***Units of measure (AF, MG , or CCF)*** *must remain consistent throughout the UWMP, as reported in SB X7-7 Table 0 and Submittal Table 2-3.*

[2] ***Meter Error Adjustment*** *- See guidance in Methodology 1, Step 3 of Methodologies Document*

NOTES:

SB X7-7 Table 4-A: 2020 Volume Entering the Distribution System(s), Meter Error Adjustment

Complete one table for each source.

Name of Source	Enter Name of Source 14
This water source is *(check one)* **:**	
☐	The supplier's own water source
☐	A purchased or imported source

Compliance Year 2020	Volume Entering Distribution System [1]	Meter Error Adjustment [2] *Optional (+/-)*	Corrected Volume Entering Distribution System
			0

[1] ***Units of measure (AF, MG , or CCF)*** *must remain consistent throughout the UWMP, as reported in SB X7-7 Table 0 and Submittal Table 2-3.*

[2] ***Meter Error Adjustment*** *- See guidance in Methodology 1, Step 3 of Methodologies Document*

NOTES:

SB X7-7 Table 4-A: 2020 Volume Entering the Distribution System(s), Meter Error Adjustment

Complete one table for each source.

Name of Source	Enter Name of Source 15
This water source is *(check one)* **:**	
☐	The supplier's own water source
☐	A purchased or imported source

Compliance Year 2020	Volume Entering Distribution System [1]	Meter Error Adjustment [2] *Optional (+/-)*	Corrected Volume Entering Distribution System
			0

[1] ***Units of measure (AF, MG , or CCF)*** *must remain consistent throughout the UWMP, as reported in SB X7-7 Table 0 and Submittal Table 2-3.*

[2] ***Meter Error Adjustment*** *- See guidance in Methodology 1, Step 3 of Methodologies Document*

NOTES:

SB X7-7 Table 5: 2020 Gallons Per Capita Per Day (GPCD)		
2020 Gross Water *Fm SB X7-7 Table 4*	**2020 Population** *Fm SB X7-7 Table 3*	**2020 GPCD**
5,118	112,250	**125**
NOTES:		

SB X7-7 Table 9: 2020 Compliance							
Actual 2020 GPCD[1]	Optional Adjustments to 2020 GPCD Enter "0" if Adjustment Not Used			TOTAL Adjustments[1]	Adjusted 2020 GPCD [1] *(Adjusted if applicable)*	2020 Confirmed Target GPCD [1, 2]	**Did Supplier Achieve Targeted Reduction for 2020?**
	Extraordinary Events[1]	Weather Normalization[1]	Economic Adjustment[1]				
125	-	-	-	-	125	148	**YES**

[1] *All values are reported in GPCD*

[2] ***2020 Confirmed Target GPCD*** *is taken from the Supplier's SB X7-7 Verification Form Table SB X7-7, 7-F.*

NOTES:

Appendix F: Coordination with Wholesale Supplier and Water Alliance

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Micaela Nino

From: Jill Mosley <jmosley@ccwater.com>
Sent: Monday, March 8, 2021 1:29 PM
To: Marissa Tsuruda
Cc: Buenting, Scott; Micaela Nino; Chris Dundon
Subject: RE: City of Antioch - Water Supply Data

Follow Up Flag: Follow up
Flag Status: Flagged

Hello Marissa,
Below is a summary of CCWD total water supply in a normal year for our entire service area included in the draft 2020 UWMP. This is inclusive of all water sources utilized within our service area; therefore, includes supplies customers have (e.g. Antioch and industrial river diversions).

Year	**2020**	**2025**	**2030**	**2035**	**2040**	**2045**
Normal Year - Total	**204,200**	**281,600**	**291,400**	**303,700**	**243,800**	**244,600**

Normal and single dry years are based on the availability of supplies from the CalSIM model for these year types used to determine the amount of CVP water supply. In average years we looked at the supply availability in wet, above normal and below normal year types whereas single dry year we looked at supply availability in dry and critical. The multiple year is based on the period between 1929 to 1933. Below is a table that summarizes these with the assumed CVP supply percentage based on historical use.

Yr Type	Yr Type	% CVP Availability based on Historical Use
Calsim Ave W,AN,BN (1922-2020)	Normal Yr	95%
Calsim Ave D, C (1922-2020)	Dry Yr	70%
1932 (driest 5 yrs - Calsim)	1st	75%
1930 (driest 5 yrs - Calsim)	2nd	70%
1931 (driest 5 yrs - Calsim)	3rd	60%
1933 (driest 5 yrs - Calsim)	4th	55%
1929 (driest 5 yrs - Calsim)	5th	50%

It should be noted that CCWD has other supplies as well that are part of the portfolio which help to meet the overall supply reliability. The table below shows the total supply reliability as a percent of demand, which was included in a letter to Antioch in January. The District's goal to meet 100 percent of demand in normal years and at least 85 percent of demand during drought conditions. The remaining 15 percent would be met by a combination of short-term water purchases and a short-term conservation program.

Year Type	**2025**	**2030**	**2035**	**2040**	**2045**
Normal Year	100%	100%	100%	100%	100%
Single-Dry Year	100%	100%	100%	100%	100%

Multi-Year Drought, Year 1	100%	100%	100%	100%	100%
Multi-Year Drought, Year 2	100%	100%	100%	100%	100%
Multi-Year Drought, Year 3	95%	95%	95%	90%	90%
Multi-Year Drought, Year 4	90%	90%	90%	85%	85%
Multi-Year Drought, Year 5	85%	85%	85%	85%	85%

Lastly, it would be helpful to get the assumed demands, even in draft form, from Antioch to compare. Ideally, draft Table 4-3 from the guidebook if this is being followed, but I will take any information you can share.

If there are any questions with regards to CCWD's UWMP please let me know.

Jill

From: Chris Dundon <cdundon@ccwater.com>
Sent: Wednesday, March 3, 2021 4:51 PM
To: Jill Mosley <jmosley@ccwater.com>
Subject: RE: City of Antioch - Water Supply Data

Jill,

Can you help out Marissa at B&C?

I would like to respond to here, so can you let me know who can help her out?

Thanks much

Chris

From: Marissa Tsuruda <MTsuruda@BrwnCald.com>
Sent: Wednesday, March 3, 2021 4:16 PM
To: Chris Dundon <cdundon@ccwater.com>
Cc: Buenting, Scott <sbuenting@antiochca.gov>; Micaela Nino <Mnino@BrwnCald.com>
Subject: City of Antioch - Water Supply Data

Hi Chris,

I'm helping the City of Antioch prepare their UWMP and I was given your name as a point of contact to help get some supply numbers. Would you be able to provide us with the following info:

1) Current and future water supply projections:

Water supply	Additional detail on water supply	Current and Projected Water Supply, MGD			
		2020	2025	2030	2035
Purchased or imported water[1]	CCWD	xx	xx	xx	xx

2) Basis of water year data for 5-year drought hydrologic conditions

Please let me know if you have any questions.

Thanks,
Marissa

Marissa Tsuruda, P.E.*
Brown and Caldwell | Walnut Creek, CA
MTsuruda@brwncald.com
T 925.210.2492 | **C** 808.554.9104

*Professional Registration in California

From: Steiner, Nick <nicks@deltadiablo.org>
Sent: Monday, March 01, 2021 4:11 PM
To: Marissa Tsuruda
Cc: Buenting, Scott; Rachel Philipson; Micaela Nino
Subject: RE: 2020 Antioch UWMP- Wastewater and Recycled Water Use

Follow Up Flag: Follow up
Flag Status: Completed

Hi Marissa,

Our master plan has a number of potential sites listed for expansion in the City of Antioch however it is doubtful that any of those sites will materialize unless the direction comes from the City or there is interest from the individual site owners, which we have not seen to date. Here are the numbers we recently used for Region 5 (Antioch) expansion and some more information from the master plan on potential Antioch sites as well. I did look into the instream flow permit requirements and that does not apply to us and would be zero.

General Description of 2020 Uses	Level of Treatment *Drop down list*	2020	2025	2030	2035	2040	2045 (opt)
Region 5 (parks)	Tertiary	59	64	69	74	79	84
Region 5 (golf)	Tertiary	203	211	211	211	211	211

DRAFT

Table ES-4 – Potential Recycled Water Demands – Landscape Irrigation

User	Average Annual Demand (AFY)	Peak Day Demand (mgd)	Peak Hour Demand (gpm)
Babe Ruth Fields	14.7	0.03	71.9
Antioch Little League	11.4	0.03	55.7
Memorial Park (Park Middle School)	18.7	0.04	91.4
Sutter Elementary School	23.8	0.13	267
Antioch Fairgrounds	37.6	0.09	184
Prosserville Park (On 6th St between M&O)	2.3	0.01	16.7
Caltrans (Hwy 4 at RW pipeline crossing)	16.0	0.04	78.2
Antioch Historical Society	2.7	0.01	17.2
DOW Wetlands	1.0	0.00	1.4
Pittsburg High School	18.5	0.02	44.6
Parkside Elementary School	13.9	0.02	34.6
Rancho Medanos Junior High School	1.8	0.00	8.6
Los Medanos College (point demand)[1]	227	0.53	1,110
Total	401	1.0	1,981

Note:
1. "Point demands" are defined in Chapter 4 – Alternatives Analysis. The Los Medanos College point demand includes 555 gpm peak hour demand for Los Medanos College irrigation and 555 gpm peak hour demand for other irrigation users in the vicinity.

Let me know if there is anything else you need,

Nick Steiner
Delta Diablo - Recycled Water Program Coordinator
nicks@deltadiablo.org

From: Marissa Tsuruda <MTsuruda@BrwnCald.com>
Sent: Monday, March 1, 2021 3:45 PM
To: Steiner, Nick <nicks@deltadiablo.org>
Cc: Buenting, Scott <sbuenting@antiochca.gov>; Rachel Philipson <rphilipson@brwncald.com>; Micaela Nino <Mnino@BrwnCald.com>
Subject: RE: 2020 Antioch UWMP- Wastewater and Recycled Water Use

Hi Nick – Thanks for the water projections by sector/location. Do you have any recycled water projections through 2045? Also, any new info on "Instream Flow Permit Requirements"?

Thanks,
Marissa

Marissa Tsuruda, P.E.*
Brown and Caldwell | Walnut Creek, CA
MTsuruda@brwncald.com
T 925.210.2492 | **C** 808.554.9104

*Professional Registration in California

From: Steiner, Nick <nicks@deltadiablo.org>
Sent: Thursday, February 18, 2021 4:25 PM
To: Micaela Nino <Mnino@BrwnCald.com>
Cc: Buenting, Scott <sbuenting@antiochca.gov>; Rachel Philipson <RPhilipson@BrwnCald.com>; Marissa Tsuruda <MTsuruda@BrwnCald.com>
Subject: RE: 2020 Antioch UWMP- Wastewater and Recycled Water Use

Micaela,

I will do a little digging on the "Instream Flow Permit Requirement" but I am currently at a loss.

The total 2020 wastewater volume is the 14,528 AF and the latest number I have for population served is 214,324 people.

Here is the breakdown for 2020 recycled water use in 1,000 gallons by sector/location.

Antioch		2020
Lone Tree Golf Course	#1	66,260
Fairview Park	#2	2,657
City Park Baseball Fields	#3	4,765
Mountaire Park	#4	5,561
Chichibu Park	#5	4,818
Antioch Total		**84,061**

Have a good afternoon,

Nick Steiner
Delta Diablo - Recycled Water Program Coordinator
nicks@deltadiablo.org

From: Micaela Nino <Mnino@BrwnCald.com>
Sent: Thursday, February 18, 2021 2:01 PM
To: Steiner, Nick <nicks@deltadiablo.org>
Cc: Buenting, Scott <sbuenting@antiochca.gov>; Rachel Philipson <rphilipson@brwncald.com>; Marissa Tsuruda <MTsuruda@BrwnCald.com>
Subject: RE: 2020 Antioch UWMP- Wastewater and Recycled Water Use

Thanks Nick!

Looks like the DWR table for "Instream Flow Permit Requirement " is looking for a volume. Is there a permitted discharge volume, maybe in the NPDES?

Would it be quicker to provide us with the **total 2020 wastewater volume** collected by Delta Diablo and the approximate **population** served? Then we can determine average gpcd and to estimate wastewater use for Antioch.

Also, are you able to provide Antioch's **2020 recycled water use by sector/location** (e.g. golf course vs. parks)? and do you have any recycled water projections through 2045? Is the 2013 recycled water master plan the most up to date? I think you provided that a while back.

Thanks,

Micaela Nino, PE*
Brown and Caldwell | Sacramento, CA
MNino@brwncald.com
T 916.853.5332

*Professional Registration in California

From: Steiner, Nick <nicks@deltadiablo.org>
Sent: Thursday, February 18, 2021 11:48 AM
To: Micaela Nino <Mnino@BrwnCald.com>
Cc: Buenting, Scott <sbuenting@antiochca.gov>; Rachel Philipson <RPhilipson@BrwnCald.com>; Marissa Tsuruda <MTsuruda@BrwnCald.com>
Subject: RE: 2020 Antioch UWMP- Wastewater and Recycled Water Use

Hi Micaela,

Here is the data you asked for. I did have a question on what you were looking for with the "instream Flow Permit" column? The only thing I don't have is the wastewater collected from Antioch in 2020, I would need a little more time if you need this because this is not something we typically quantify. Also, I would make a note that the wastewater discharged to the New York Slough through our NPDES is only treated to secondary standards. The recycled water distributed throughout our service area is the only water treated to tertiary standards.

Table 1. Wastewater Treatment and Discharge Within Service Area In 2020 (DWR Table 6-3)

Wastewater treatment plant name	Discharge location name or identifier	Discharge location description	Wastewater discharge ID number (opt)	Method of Disposal	Does this plant treat wastewater generated outside the service area?	Treatment level	Wastewater treated	D w
Delta Diablo	New York Slough	Sacramento-San Joaquin Rivers Delta	2071013001	Bay or estuary outfall	Yes	Tertiary	14,528	
						TOTAL	XXX	

Have a good day,

Nick Steiner
Delta Diablo - Recycled Water Program Coordinator
nicks@deltadiablo.org

From: Micaela Nino <Mnino@BrwnCald.com>
Sent: Thursday, February 11, 2021 7:31 AM
To: Steiner, Nick <nicks@deltadiablo.org>
Cc: Buenting, Scott <sbuenting@antiochca.gov>; Rachel Philipson <rphilipson@brwncald.com>; Marissa Tsuruda <MTsuruda@BrwnCald.com>
Subject: RE: 2020 Antioch UWMP- Wastewater and Recycled Water Use

Thanks Nick! Sounds great.

Micaela Nino, PE*
Brown and Caldwell | Sacramento, CA
MNino@brwncald.com
T 916.853.5332

*Professional Registration in California

From: Steiner, Nick <nicks@deltadiablo.org>
Sent: Wednesday, February 10, 2021 4:38 PM
To: Micaela Nino <Mnino@BrwnCald.com>
Cc: Buenting, Scott <sbuenting@antiochca.gov>; Rachel Philipson <RPhilipson@BrwnCald.com>; Marissa Tsuruda <MTsuruda@BrwnCald.com>
Subject: RE: 2020 Antioch UWMP- Wastewater and Recycled Water Use

Hi Micaela,

Thank you for reaching out to me. I will take a look at the information that you need and try to get back to you by the end of next week.

Have a good afternoon,

Nick Steiner
Delta Diablo - Recycled Water Program Coordinator
nicks@deltadiablo.org

From: Micaela Nino <Mnino@BrwnCald.com>
Sent: Tuesday, February 9, 2021 2:05 PM
To: Steiner, Nick <nicks@deltadiablo.org>
Cc: Buenting, Scott <sbuenting@antiochca.gov>; Rachel Philipson <rphilipson@brwncald.com>; Marissa Tsuruda <MTsuruda@BrwnCald.com>
Subject: 2020 Antioch UWMP- Wastewater and Recycled Water Use

[EXTERNAL EMAIL] DO NOT CLICK links or attachments unless you recognize the sender and know the content is safe.

Hi Nick,

A while back you helped provide us with some useful information for Antioch's Water System Master Plan. We are now helping the City prepare their 2020 UWMP.

Are you able to provide us with (or direct us to the correct point of contact) for the following info?

- Annual wastewater volume collected by Delta Diablo (overall)
- Volume of wastewater collected from Antioch in 2020
- Volume of wastewater discharged within the Antioch's service area in 2020 (see example table below)

Table 1. Wastewater Treatment and Discharge Within Service Area In 2020 (DWR Table 6-3)

Wastewater treatment plant name	Discharge location name or identifier	Discharge location description	Wastewater discharge ID number (opt)	Method of Disposal	Does this plant treat wastewater generated outside the service area?	Treatment level	Wastewater treated	D w
Delta Diablo	New York Slough	Sacramento-San Joaquin Rivers Delta	2071013001	Bay or estuary outfall	Yes	Tertiary	XXX	
						TOTAL	XXX	

- Volume of recycled water used by Antioch in 2020 by use type (e.g landscape irrigation/parks or golf course)
- Projected recycled water use in Antioch on 5-year basis through 2045 by use type
    - Methods for expanding recycled water use and year

It would be wonderful if you could provide us this information in the next 2 weeks, if possible. Please let me know if you have any questions!

Thanks,

Micaela Nino, PE*
Brown and Caldwell | Sacramento, CA
MNino@brwncald.com
T 916.853.5332

Brown AND Caldwell

*Professional Registration in California

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Appendix G: Demand Reduction Actions Savings Assumptions

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Table 1. 2019 Water Use by Sector, ac-ft/yr									
SF		MF		CII		Landscape		NRW	Total
Indoor	Outdoor	Indoor	Outdoor	Indoor	Outdoor	Indoor	Outdoor		
2,119	800	366	79	440	52	-	392	567	4,816

Table 2. Indoor/Outdoor Usage Percentage					
	SF	MF	CII	Landscape	
Indoor usage percent	73%	82%	89%	0%	
Outdoor usage percent	27%	18%	11%	100%	

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Table 3. Demand Reduction Actions

<DWR> Shortage Level	Demand Reduction Actions *Drop down list* *These are the only categories that will be accepted by the WUEdata online submittal tool. Select those that apply to you.*	How much is this going to reduce the shortage gap? *Include volume units used.* , MG						Additional Explanation or Reference *(optional)*	Percent Water Use Reduction by Sector								
									SF		MF		CII		Landscape		NRW
		1	*2*	*3*	*4*	*5*	*6*		Indoor	Outdoor	Indoor	Outdoor	Indoor	Outdoor	Indoor	Outdoor	
1	Landscape - Limit landscape irrigation to specific times	331	331	-	-	-	-	Limit 9am to 5pm		25.0%		25.0%		25.0%		25.0%	
2,3,4,5	CII - Restaurants may only serve water upon request	-	4	4	4	4	-						1.0%				
2,3,4,5	Other - Prohibit vehicle washing except at facilities using recycled or recirculating water	-	5	5	5	5	-			0.5%		0.5%		1.0%			
2,3,4,5,6	CII - Commercial kitchens required to use pre-rinse spray valves	-	9	9	9	9	9						2.0%				
2,3,4,5	Water Features - Restrict water use for decorative water features, such as fountains	-	13	13	13	13	-			1.0%		1.0%		1.0%		1.0%	
2,3,4,5	CII - Lodging establishment must offer opt out of linen service	-	4	4	4	4	-						1.0%				
2,3,4,5	Pools - Allow filling of swimming pools only when an appropriate cover is in place.	-	9	9	9	9	-			1.0%		1.0%		1.0%			
3	Landscape - Prohibit certain types of landscape irrigation	-	-	331	-	-	-	Prohibit sprinklers during and 2 days after rain		25.0%		25.0%		25.0%		25.0%	
3	Landscape - Prohibit certain types of specific days	-	-	397	-	-	-	Limit more than 3 days per week		30.0%		30.0%		30.0%		30.0%	
3,4,5	Other - Prohibit use of potable water for construction and dust control	-	-	4	4	4	-						1.0%				
4	Landscape - Other landscape restriction or prohibition	-	-	-	993	-	-	Irrigation of any landscaping except trees or drought tolerant plantings is prohibited.		75.0%		75.0%		75.0%		75.0%	
4,5,6	Other water feature or swimming pool restriction	-	-	-	9	9	9	Existing pools shall not be emptied and refilled using potable water unless required for public health and safety purposes.		1.0%		1.0%		1.0%			
5	Landscape - Prohibit all landscape irrigation	-	-	-	-	1,257	-	All landscape irrigation prohibited		95.0%		95.0%		95.0%		95.0%	
5,6	Other water feature or swimming pool restriction	-	-	-	-	7	7	No new permits for pools will be issued.		0.5%		0.5%		0.5%		0.5%	
6	Other	-	-	-	-	-	1,842	Water use only for public health and safety purposes	20.0%	95.0%	20.0%	95.0%	20.0%	95.0%	20.0%	95.0%	
NOTES: Shortage levels for demand reduction actions are based on the applicable stage. When demand reduction actions are superseded by demand reductions implemented in a later stage, they are not shown to be applicable to the																	

Table 4: Supply Augmentation and Other Actions

Shortage Level	Supply Augmentation Methods and Other Actions by Water Supplier ***Drop down list*** *These are the only categories that will be accepted by the WUEdata online submittal tool*	How much is this going to reduce the shortage gap? *Include volume units used.*						Additional Explanation or Reference *(optional)*	Percent Water Use Reduction by Sector							
									SF		MF		CII		NRW	
Add additional rows as needed		*1*	*2*	*3*	*4*	*5*	*6*		Indoor	Outdoor	Indoor	Outdoor	Indoor	Outdoor	Unbilled unmetered (operations)	Water losses (Apparent + Real)
1	Expand Public Information Campaign	39	39	39	39	39	39	Offer workshops, increased use of bill inserts, social media	1%	1%	1%	1%	1%	1%		
2	Offer Water Use Surveys	-	19	19	19	19	19	Consumption checks at meter and assist customers via phone to review water usage for their property are always in place. For Stage 4, 5 and 6 SSWD would increase the number of water use survey and potentially offer in person surveys.	0.50%	0.50%	0.50%	0.50%	0.50%	0.50%		
2	Decrease Line Flushing	-	25	25	25	25	25	Operational changes – No routine system flushing							5%	
3	Reduce System Water Loss	-	3	-	3	3	3	Look for opportunities to prioritize projects that reduce system water loss.								5%
4	Increase Water Waste Patrols	-	14	14	14	14	14	Have a Conservation Program Specialist who responds to water waste concerns. During time periods with a declared water shortage, water waste patrols are implemented.		1%		1%		1%	1%	
5	Transfers		526	526	526	526	526	Emergency intertie with neighboring agency (assume 1000 gpm)								

Appendix H: ERP (Table of Contents)

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Appendix I: RRA (Table of Contents)

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List of Tables

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Appendix J: HMP (Table of Contents and Antioch specific section)

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CONTRA COSTA COUNTY HAZARD MITIGATION PLAN

Volume 1—Planning Area-Wide Elements

Draft Final
January 2018

TETRA TECH

CONTENTS

Appendices

2. CITY OF ANTIOCH

2.1 HAZARD MITIGATION PLAN POINT OF CONTACT

Primary Point of Contact
Lynne Filson
Assistant City Engineer II
200 H Street
Antioch, CA 94509
Telephone: 925-779-7025
e-mail Address: lfilson@ci.antioch.ca.us

Alternate Point of Contact
Julie Haas-Wajdowicz
Environmental Resource Coordinator
200 H Street
Antioch, CA 94509
Telephone: 925-779-7097
e-mail Address: jhaaswajdowicz@ci.antioch.ca.us

2.2 JURISDICTION PROFILE

The following is a summary of key information about the jurisdiction and its history:

- **Date of Incorporation**—February 6, 1872
- **Current Population**—114,241 as of January 1, 2017 (California Department of Finance, 2017)
- **Population Growth**—Based upon U.S. Census and California Department of Finance data, City of Antioch's population growth rates have slowed significantly since the 2000 – 2010 Census. Overall population growth in that decade was 13.1 percent. From 2010 to 2017, however, growth slowed to 0.11 percent, and between January 1, 2016 and January 1, 2017 the annual increase was 0.7 percent.
- **Location and Description**—Antioch is a city in the East Bay region of the San Francisco Bay area at the confluence of the Sacramento and San Joaquin Rivers, at the gateway to the agriculturally rich San Joaquin Delta. The city is slightly more than 50 miles east of San Francisco and 55 miles southwest of Sacramento (at 38°00'N, 121°48'21"W). The City has a total area of 28.16 square miles.

  Antioch is home to 31 parks covering 310 acres, with an additional 600 acres of City-owned open space. It has 11 miles of walking paths connecting communities to parks and schools. Within its boundaries, Antioch has Contra Loma Regional Park, the Antioch/Oakley Regional Shoreline and a portion of the Black Diamond Mines Regional Park, and the Mokelumne Coast to Crest Trail and Delta De Anza Regional Trail. These three parks cover 6,493 acres; approximately 38 percent of Antioch's total area. Just outside Antioch's city limit is the 2,024-acre Round Valley Regional Preserve. In addition, established in 1980, the Antioch Dunes National Wildlife Refuge was the first national wildlife refuge in the country established for the purpose of protecting endangered plants and insects. It is located on the south shore of the San Joaquin River in Antioch.

- **Brief History**—In 1849, the town was founded by brothers William and Joseph Smith, who named the town Smith's Landing. On February 5, 1850, Joseph Smith died of malaria and his brother moved to a higher ground overlooking the river. On July 4, 1851, William Smith held a picnic for the town residents on the bluff near his home. They discussed naming the community and Smith finally suggested the biblical name of Antioch, a town in Syria where the Christians were first named. Antioch was the name chosen and dedicated to the memory of Joseph. Around 1859, coal was discovered in the hills south of

Antioch, and coal mining formed the first substantial business in the area apart from farming and dairying. In 1872, Antioch incorporated as a General Law city. The town continued to prosper into the 1900s, becoming a "blue collar" factory community also supporting a fishing and commercial boating industry. In the latter part of the 1900s, as the factories began to close or move elsewhere, Antioch began to take on a new look. Today, Antioch is mainly a "bedroom" community, with most adults working in central Contra Costa County and larger cities toward Oakland and San Francisco. The City has seen an enormous amount of growth in the last 25 years as the population of the greater Bay Area grew. The City will continue to grow as real estate prices force families to move toward the suburbs.

- **Climate**—The climate is mild, with annual temperatures ranging between a high of 96°F and a low of 34°F. Humidity levels are generally low and the City's riverfront location often provides cooling breezes. Annual rainfall is just over 15.4 inches, the majority of which falls between October and May. Average annual snowfall is essentially zero.

- **Governing Body Format**—The City of Antioch has a Council/Manager form of government. Policy making and legislative authority is vested in a five-member City Council consisting of a Mayor and four Council Members. The four Council Members are elected to four-year overlapping terms. The Mayor is directly elected to a four-year term. The City Council assumes responsibility for adoption of this plan, and the City Manager will oversee its implementation.

  The City Council presides over and adopts the City's annual budget and financial affairs; appoints commissions and committees; and hires and supervises the City Manager and City Attorney. City Council members are directly responsible for service to the citizens, businesses and policies of the City. The City Manager advises City Council; supervises personnel and all City departments; enforces ordinances and programs approved by City Council; and, oversees day-to-day city government operations.

2.3 DEVELOPMENT TRENDS

Over the last few years, the City of Antioch has been recovering from the crash of the housing market and the great recession. The pace of residential development in the Bay Area and the State has continued to show consistent positive growth, with generally positive results for local economies reliant on housing construction. Antioch's economy has not seen the same level of growth from the housing market increase as some of our neighboring communities. The focus of development since 2003 has been primarily commercial development. The new office, commercial and flex-space developments have created the opportunity for well over 5,000 new jobs within the City. Over time new jobs will lead to growth in the local economy. The recent Northeast Annexation of some-750 acres has created the opportunity for waterfront development for the properties that front the San Joaquin River. The property is mixed-use commercial, industrial, retail and residential.

A rise in the housing market and a significantly better economy have contributed to economic expansion and vitality. Even with the improved economy, Antioch has suffered from a low number of sworn police officers. In November 2013, the community passed Measure C, a ½ cent sales tax increase, which the City Council dedicated 100 percent to increasing our Police Department and Code Enforcement budgets. This prioritization of public safety and health enabled the City to hire more police officers and code enforcement staff. The results have been a decrease in the crime rate; reduced response times; and, increases in code enforcement and cleanup activities. In 2014, the community passed Measure O to ensure that residential landlords paid a fair business license tax. This revenue has been used to improve City hours of operation and reduce the City's budget deficit.

In spite of increased revenues, the City maintains a focus on continuing to find ways to improve efficiency, seek new ideas for savings and revenue generation, and continue with economic development.

Of significant community and economic value to Antioch are recent completion of the widening State Highway 4 from Loveridge Road to Hillcrest Avenue; completion of the Highway 4/Highway 160 interchange; and, the soon

to be completed Hillcrest eBART station, which will connect Antioch and East Contra Costa County with the Pittsburg/Bay Point BART Station. The recently completed Antioch Community Center at the Prewett Family Park has been a well-received amenity for the community and southeast Antioch. The City Council has other projects and plans that will enrich the City and make Antioch an even better place to live, work and play. In striving to continue positive "development trends," the following projects will be of focus:

- Complete the Downtown Specific Plan to revitalize the Rivertown area.
- Bring a well-established restaurant to the Antioch Marina.
- Revitalize the Amtrak station and surrounding area.
- Establish a water transit system.
- Protect the City's water rights from state proposals.
- Initiate long-term infrastructure planning.
- Seek grants as possible alternative funding for City projects.
- Remain committed to construction of a full-scale library facility at Prewett Park.

Table 2-1 summarizes development trends in the performance period since development of the previous hazard mitigation plan and expected future development trends.

Table 2-1. Recent and Expected Future Development Trends

Criterion	Response
Has your jurisdiction annexed any land since the development of the previous hazard mitigation plan? • If yes, give the estimated area annexed and estimated number of parcels or structures.	Yes Approximately 759 acres of mixed-use county unincorporated real property has recently been annexed to the City of Antioch. Planning is in its earliest stages for this new property. Approximately 144 parcel.
Is your jurisdiction expected to annex any areas during the performance period of this plan?	No
Are any areas targeted for development or major redevelopment in the next five years? • If yes, please briefly describe	Yes • Sand Creek Focus Area—2783 Acres, 4000 Residential Units • East Lone Tree Area—approx. 800 Acres, 241.3 Acres residential, 98.3 Employment, 113.2 Acres Retail, 11.3 Acres School, 10.7 Public Facilities, remaining acreage parks, open space, roads • Hillcrest Station Area—Transit Oriented Development, Mixed Use -- Max 2,500 residential units Portions of these areas are in known hazard areas. Development will mitigate or avoid hazard areas.
How many building permits for new construction were issued in your jurisdiction since the development of the previous hazard mitigation plan?	

	2012	2013	2014	2015	2016
Single Family	263	240	83	68	42
Multi-Family	0	0	0	0	1[a]
Other (commercial, mixed use, etc.)	2	2	4	7	2

Please provide the number of permits for each hazard area or provide a qualitative description of where development has occurred.	• Special Flood Hazard Areas: 0 • Landslide: 20 Landslide vulnerability is described as "scattered small landslides" and slide locations are mapped in locations with primarily very low development. All development required to have a soils report and mitigate hazard. • High Liquefaction Areas: 0 • Dam Failure Inundation Area: 1 [a] • Wildfire Risk Areas: 0

a. One permit for two buildings for a total of 85 apartments

2.4 CAPABILITY ASSESSMENT

The City of Antioch performed an inventory and analysis of existing capabilities, plans, programs and policies that enhance its ability to implement mitigation strategies. The introduction at the beginning of this volume of the hazard mitigation plan describes the components included in the capability assessment and their significance for hazard mitigation planning. This section summarizes the following findings of the assessment:

- An assessment of legal and regulatory capabilities is presented in Table 2-2.
- Development and permitting capabilities are presented in Table 2-3.
- An assessment of fiscal capabilities is presented in Table 2-4.
- An assessment of administrative and technical capabilities is presented in Table 2-5.
- An assessment of education and outreach capabilities is presented in Table 2-6.
- Information on National Flood Insurance Program (NFIP) compliance is presented in Table 2-7.
- Classifications under various community mitigation programs are presented in Table 2‑ 8.
- The community's adaptive capacity for the impacts of climate change is presented in Table 2‑ 9.

Table 2-2. Legal and Regulatory Capability

	Local Authority	Other Jurisdiction Authority	State Mandated	Integration Opportunity?
Codes, Ordinances, & Requirements				
Building Code	Yes	No	Yes	Yes
Comment: 2016 California Building Code and Local Amendments Am. Ord, 2122 C-S and 2123 C-s, passed 1-10-17				
Zoning Code	Yes	No	Yes	Yes
Comment: Ord. 897-C-S, passed 10-25-94; latest Am Ord.2121 C-S, passes 1-10-17				
Subdivisions	Yes	No	Yes	Yes
Comment: Ord. 275-C-S, passed 3-11-75				
Stormwater Management	Yes	No	Yes	Yes
Comment: Ord. 1035-C-S, passed 9-12-04				
Post-Disaster Recovery	Yes	No	No	Yes
Comment: ('66 Code, § 4-2.08) (Ord. 222-C-S, passed 7-26-73; Am. Ord. 911-C-S, passed 9-12-95)				
Real Estate Disclosure	No	Yes	Yes	Yes
Comment: Ca. State Civil Code 1102 requires full disclosure on natural hazard exposure of the sale/re-sale of any and all real property				
Growth Management	Yes	No	Yes	Yes
Comment: Transportation Systems Management Measure C Growth Management Program Ord. 932-C-S, passed 12-9-97; Cal. Gov. Code §65300 et seq.				
Site Plan Review	Yes	No	No	Yes
Comment: Adopted with Zoning Ordinance Ord. 897-C-S, passed 10-25-94; Am. Ord. 2023-C-S, passed 4-14-09				
Environmental Protection	Yes	Yes	Yes	Yes
Comment: California Environmental Quality Act				
Flood Damage Prevention	Yes	No	Yes	Yes
Comment: Floodplain Management Ord. 708-C-S, passed 5-12-88. Am. Ord. 2025-C-S, passed 5-12-09				
Emergency Management	Yes	Yes	Yes	Yes
Comment: Ord. 222-C-S, passed 7-26-73; Disaster Council				
Climate Change	Yes	Yes	Yes	Yes
Comment: SB-379: Land Use: General Plan: Safety Element, no Antioch specific climate change related codes				
Other:	N/A	N/A	N/A	N/A
Comment: None identified				

	Local Authority	Other Jurisdiction Authority	State Mandated	Integration Opportunity?
Planning Documents				
General Plan	Yes	No	Yes	Yes
Is the plan compliant with Assembly Bill 2140? No				
Comment: Adopted November 24, 2003				
Capital Improvement Plan	Yes	No	Yes	Yes
How often is the plan updated? CIP is a 5-year program updated annually with a 2-year budget				
Comment: Antioch Capital Improvement Plan				
Floodplain or Watershed Plan	Yes	Yes	No	Yes
Comment: Contra Costa County Flood Control and Water Conservation District				
Stormwater Plan	No	No	No	No
Comment: None identified				
Urban Water Management Plan	Yes	No	Yes	Yes
Comment: UWMP 2015				
Habitat Conservation Plan	No	No	No	Yes
Comment: Currently being developed by the City of Antioch Community Development Department				
Economic Development Plan	No	No	No	No
Comment: The City does not have and Economic Development Plan				
Shoreline Management Plan	Yes	No	No	Yes
Comment: Adopted with the General Plan November 24, 2003				
Community Wildfire Protection Plan	No	No	No	No
Comment: None identified				
Forest Management Plan	No	No	No	No
Comment: None identified				
Climate Action Plan	Yes	No	No	Yes
Comment: CAPs adopted by Resolution 2001/39				
Comprehensive Emergency Management Plan	Yes	Yes	Yes	Yes
Comment: The Emergency Management Plan is currently being updated by the City Manager (appointed in April 2017) who is, by Code, the Director of Emergency Services				
Threat & Hazard Identification & Risk Assessment (THIRA)	No	No	No	No
Comment: None identified				
Post-Disaster Recovery Plan	Yes	No	No	Yes
Comment: The Emergency Management Plan is currently being updated by the City Manager (appointed in April 2017) who is, by Code, the Director of Emergency Services				
Continuity of Operations Plan	No	No	No	Yes
Comment: None identified				
Public Health Plan	No	Yes	No	No
Comment: Public Health provided by Contra Costa County.				
Other:	N/A	N/A	N/A	N/A
Comment: None identified				

Table 2-3. Development and Permitting Capability

Criterion	Response
Does your jurisdiction issue development permits? • If no, who does? If yes, which department?	Yes Community Development/Building
Does your jurisdiction have the ability to track permits by hazard area?	No, permits by hazard areas were determined by comparing hazard areas with locations of new development
Does your jurisdiction have a buildable lands inventory? • If yes, please briefly describe. • If no, please quantitatively describe the level of buildout in the jurisdiction.	Yes The majority of the buildable land can be found in Southeast Antioch and is referred to as the Sand Creek Focus Area. There are additional buildable lands in the East Lone Tree Specific Plan Area and those lands involve infill and some parcels in the Northeast. N/A

Table 2-4. Fiscal Capability

Financial Resource	Accessible or Eligible to Use?
Community Development Block Grants	Yes
Capital Improvements Project Funding	Yes
Authority to Levy Taxes for Specific Purposes	Yes
User Fees for Water, Sewer, Gas or Electric Service	Yes, for Water and Sewer
Incur Debt through General Obligation Bonds	Yes
Incur Debt through Special Tax Bonds	Yes
Incur Debt through Private Activity Bonds	No
Withhold Public Expenditures in Hazard-Prone Areas	No
State-Sponsored Grant Programs	Yes
Development Impact Fees for Homebuyers or Developers	Yes
Other	Yes

Table 2-5. Administrative and Technical Capability

Staff/Personnel Resource	Available?	Department/Agency/Position
Planners or engineers with knowledge of land development and land management practices	Yes	Community Development & Public Works Departments/staff
Engineers or professionals trained in building or infrastructure construction practices	Yes	Community Development & Public Works Departments/staff
Planners or engineers with an understanding of natural hazards	Yes	Community Development & Public Works Departments/staff
Staff with training in benefit/cost analysis	No	
Surveyors	No	
Personnel skilled or trained in GIS applications	Yes	Community Development & Public Works Departments/staff
Scientist familiar with natural hazards in local area	No	
Emergency Manager	Yes	City Manager and Police Lieutenant/Office of Emergency Services (OES) Coordinator
Grant writers	No	City Manager, Community Development & Public Works Departments/staff
Other	No	

Table 2-6. Education and Outreach Capability

Criterion	Response
Do you have a Public Information Officer or Communications Office?	No
Do you have personnel skilled or trained in website development?	No
Do you have hazard mitigation information available on your website? • If yes, please briefly describe.	Yes A Citizen Guide to Disaster Preparedness includes creating a disaster plan, planning how a family will stay in contact if separated by a disaster, references to other websites, emergency planning for children, emergency planning for people with special needs, creating a medical emergency information list, how to turn off utilities, what should be in a disaster supply kit, emergency preparedness checklist, and disaster preparedness for pets.
Do you utilize social media for hazard mitigation education and outreach? • If yes, please briefly describe.	No Departments have very recently created individual Facebook accounts. Police and Public Works can provide disaster related safety items
Do you have any citizen boards or commissions that address issues related to hazard mitigation? • If yes, please briefly describe.	Yes The Planning Commission acts on land use issues which regulate development in hazard prone areas.
Do you have any other programs already in place that could be used to communicate hazard-related information? • If yes, please briefly describe.	No N/A
Do you have any established warning systems for hazard events? • If yes, please briefly describe.	Yes The Emergency Internet Notification System (EINS) is a system for informing Antioch residents of significant emergency events impacting the entire City. If an event such as a large earthquake occurs, causing considerable damage to buildings and highways, the intent would be to send an email to all persons who have subscribed to EINS. The email would tell residents what has occurred and if there are actions residents should take.

Table 2-7. National Flood Insurance Program Compliance

Criterion	Response
What local department is responsible for floodplain management?	Public Works
Who is your floodplain administrator? (department/position)	Assistant City Engineer
Are any certified floodplain managers on staff in your jurisdiction?	No
What is the date that your flood damage prevention ordinance was last amended? Am. Ord 2025-C-S	May 12, 2009
Does your floodplain management program meet or exceed minimum requirements? • If exceeds, in what ways?	Meets N/A
When was the most recent Community Assistance Visit or Community Assistance Contact?	Unknown
Does your jurisdiction have any outstanding NFIP compliance violations that need to be addressed? • If so, please state what they are.	No N/A
Do your flood hazard maps adequately address the flood risk within your jurisdiction? • If no, please state why.	Yes, although may request update N/A
Does your floodplain management staff need any assistance or training to support its floodplain management program? • If so, what type of assistance/training is needed?	Yes Due to recent retirements, need basic training on all aspects of floodplain management.
Does your jurisdiction participate in the Community Rating System (CRS)? • If yes, is your jurisdiction interested in improving CRS Classification? • Is your jurisdiction interested in joining the CRS program?	No N/A Possibly
How many Flood Insurance policies are in force in your jurisdiction?[a] • What is the insurance in force? • What is the premium in force?	127 $ 38,300,800 $ 133,360
How many total loss claims have been filed in your jurisdiction?[a] • How many claims were closed without payment/are still open? • What were the total payments for losses?	59 13/0 $ 1,400,712

a. According to FEMA statistics as of December 31, 2016

Table 2-8. Community Classifications

	Participating?	Classification	Date Classified
Community Rating System	No	N/A	N/A
Building Code Effectiveness Grading Schedule	No	N/A	N/A
Public Protection	No	N/A	N/A
Storm Ready	No	N/A	N/A
Firewise	No	N/A	N/A

Table 2-9. Adaptive Capacity for Climate Change

Criterion	Jurisdiction Rating[a]
Technical Capacity	
Jurisdiction-level understanding of potential climate change impacts *Comments/Additional Information: Sea level rise study is needed for Antioch Shoreline*	Low
Jurisdiction-level monitoring of climate change impacts *Comments/Additional Information: Currently not occurring, studies and projections are needed for this region*	Low
Technical resources to assess proposed strategies for feasibility and externalities *Comments/Additional Information: Some tools available through ICLEI membership*	Low
Jurisdiction-level capacity for development of greenhouse gas emissions inventory *Comments/Additional Information: GHG inventories every 5 years*	Medium
Capital planning and land use decisions informed by potential climate impacts *Comments/Additional Information: None provided*	Low
Participation in regional groups addressing climate risks *Comments/Additional Information: Contra Costa Climate Leaders, County Sustainability Exchange*	Medium
Implementation Capacity	
Clear authority/mandate to consider climate change impacts during public decision-making processes *Comments/Additional Information: None provided*	Low
Identified strategies for greenhouse gas mitigation efforts *Comments/Additional Information: See Climate Actions Plans*	Medium
Identified strategies for adaptation to impacts *Comments/Additional Information: Study needed*	Low
Champions for climate action in local government departments *Comments/Additional Information: Environmental Resource Coordinator*	Low
Political support for implementing climate change adaptation strategies *Comments/Additional Information: None provided*	Low
Financial resources devoted to climate change adaptation *Comments/Additional Information: None provided*	Low
Local authority over sectors likely to be negative impacted *Comments/Additional Information: None provided*	Low
Public Capacity	
Local residents knowledge of and understanding of climate risk *Comments/Additional Information: None provided*	Low
Local residents support of adaptation efforts *Comments/Additional Information: None provided*	Low
Local residents' capacity to adapt to climate impacts *Comments/Additional Information: Unknown, survey is needed.*	Low
Local economy current capacity to adapt to climate impacts *Comments/Additional Information: Unknown, survey is needed*	Low
Local ecosystems capacity to adapt to climate impacts *Comments/Additional Information: Unknown, study is needed.*	Low

a. High = Capacity exists and is in use; Medium = Capacity may exist, but is not used or could use some improvement; Low = Capacity does not exist or could use substantial improvement; Unsure= Not enough information is known to assign a rating.

Note: As noted in the Final Synthesis Report of the City of Antioch's March 2017 Resilience Dialogues, facilitated by GlobalChange.gov, (U.S. Global Change Research Program), "Antioch is interested in building civic engagement by linking climate resilience to community values and integrating sea-level rise and flooding projects into hazard mitigation planning."

2.5 INTEGRATION WITH OTHER PLANNING INITIATIVES

The information on hazards, risk, vulnerability and mitigation contained in this hazard mitigation plan is based on the best available data. Plan integration is the incorporation of this information into other relevant planning mechanisms, such as general planning and capital facilities planning. It includes the integration of natural hazard information and mitigation policies, principles and actions into local planning mechanisms and vice versa. Additionally, plan integration is achieved though the involvement of key staff and community officials in collaboratively planning for hazard mitigation.

2.5.1 Existing Integration

In the performance period since adoption of the previous hazard mitigation plan, the City of Antioch made progress on integrating hazard mitigation goals, objectives and actions into other planning initiatives. The following plans and programs currently integrate components of the hazard mitigation strategy:

- **Climate Action Plans, 2010—**Highlights potential programs that could be implemented to reduce greenhouse gas emissions and discusses possible impacts of climate change.
- **Capital Improvement Plan**—The Capital Improvement Plan includes projects that can help mitigate potential hazards. The City will act to ensure consistency between the hazard mitigation plan and the current and future capital improvement plans. The hazard mitigation plan may identify new possible funding sources for capital improvement projects and may result in modifications to proposed projects based on results of the risk assessment.

Resources listed in Section 2.12 were used to provide information for this annex on hazard events and local capabilities within the jurisdiction.

2.5.2 Opportunities for Future Integration

As this hazard mitigation plan is implemented, the City of Antioch will use information from the plan as the best available science and data on natural hazards. The capability assessment presented in this annex identifies codes, plans and programs that provide opportunities for integration. The area-wide and local action plans developed for this hazard mitigation plan in actions related to plan integration, and progress on these actions will be reported through the progress reporting process described in Volume 1. New opportunities for integration also will be identified as part of the annual progress report. The capability assessment identified the following plans and programs that do not currently integrate goals or recommendations of the hazard mitigation plan but provide opportunities to do so in the future:

- **General Plan**—The Environmental Hazards Element contains an evaluation of natural and manmade conditions which may pose certain health and safety hazards to life and property in Antioch, along with a comprehensive program to mitigate those hazards. Inherent in this Element is a determination of “acceptable risk.” This determination is based on defining how safe is safe enough, balancing the severity of the hazard, costs and feasibility of hazard mitigation, and expected benefits. In most cases, the level of acceptable risk is widely shared throughout the State and nation. For example, the standard for protection from flooding is a national standard. Standards for protection of structures from earthquake damage are based on the provisions of the Uniform Building Code. The Environmental Hazards Element addresses constraints to development from geologic and seismic conditions, noise, wildland fire, flooding and hazardous materials. Portions of the LHMP with the associated mapping will be considered for inclusion into the General Plan as an Appendix and referenced in this Element. Also, update will include assuring compliance with AB 2140 and SB 379.

- **Urban Water Master Plan**—Chapter 8 of the 2015 UWMP describes the City's water shortage contingency plan (WSCP) for emergency preparedness and plans for a catastrophic event. Portions of the LHMP with the associated mapping will be considered for inclusion into the next UWMP.
- **Zoning Code**—Mitigation can be integrated into future zoning code updates to inform appropriate use of property within the City. Portions of the LHMP with the associated mapping will be considered for inclusion into the next Zoning Code update.
- **Subdivision Ordinance**—The Subdivision Ordinance restricts development in hazard areas. Portions of the LHMP with the associated mapping will be considered for inclusion into the next Subdivision Ordinance update.
- **The Sanitary Sewer Management Plan—**The City of Antioch conveys waste water, but treatment is provided by a special district, Delta Diablo. The 2015 Sanitary Sewer Management Plan provides an inventory of the City's Sewer infrastructure and response procedures for first responders, recovery and cleanup in the case of overflow or backups. Portions of the LHMP with the associated mapping will be considered for inclusion into the next Sanitary Sewer Management Plan update.
- **Emergency Management—**The Emergency Management Plan and Post-Disaster Recovery Plan are currently being updated by the City Manager (appointed in April 2017) who is, by Code, the Director of Emergency Services. Portions of the LHMP with the associated mapping will be considered for inclusion into the next updates of the various plans.
- **Habitat Conservation Plan**—The City is currently preparing a Habitat Conservation Plan . The opportunity to incorporate additional mitigation and abatement measures will be contemplated for inclusion in the plan.
- **Capital Improvement Plan—**Portions of the LHMP with the associated mapping will be considered for inclusion into future Capital Improvement Plans. Capital improvement project proposals may take into consideration hazard mitigation potential as a means of evaluating project prioritization.
- **Northeast Annexation Infrastructure Plan**—The City is in the process of identifying and prioritizing the infrastructure improvements needed in the NE Annexation. Portions of the area have a high chance of flooding. The residential area is generally on well water and septic tanks with soft soils. In the far northern portion of the area the liquefaction susceptibility is very high. In addition to the needs of the property owners, the opportunity to prioritize construction and provide condition specific design for the infrastructure due to potential hazards exists. The City will consider hazards in the plan.

2.6 JURISDICTION-SPECIFIC NATURAL HAZARD EVENT HISTORY

Table 2-10 lists past occurrences of natural hazards for which specific damage was recorded in the City of Antioch. Other hazard events that broadly affected the entire planning area, including the City of Antioch, are listed in the risk assessments in Volume 1 of this hazard mitigation plan.

2.7 JURISDICTION-SPECIFIC VULNERABILITIES

Volume 1 of this plan provides complete risk assessments for each identified hazard of concern. This section provides information on a few key vulnerabilities for the jurisdiction. Repetitive loss records are as follows:

- Number of FEMA-identified Repetitive-Loss Properties: 11
- Number of FEMA-identified Severe-Repetitive-Loss Properties: 3
- Number of Repetitive-Loss Properties or Severe-Repetitive-Loss Properties that have been mitigated: Unknown

In addition, the NE Annexation area has vulnerabilities that are not new, but result from a change in jurisdiction only. Portions of the area have a high chance of flooding. The residential area is generally on well water and septic tanks with soft soils. In the far northern portion of the area the liquefaction susceptibility is very high.

Table 2-10. Past Natural Hazard Events

Type of Event	FEMA Disaster # (if applicable)	Date	Damage Assessment
Flooding	FEMA-4308-DR	February 1-23, 2017	No estimates available. Flooding resulted in road closures, downed trees and flooding to some residences. This is a problem that has occurred multiple times and usually occurs in the O Street corridor.
Flooding	N/A	10/13/2009	No estimates available. Flooding resulted in road closures and flooding to some residences. This is a problem that has occurred multiple times and usually occurs in the O Street corridor.
Flooding	FEMA 1628 CDAA-2006-01 Winter Storm 2006"	December 17, 2005 – January 3, 2006	$ 66,912 Total Maximum 75% reimbursement for a net of $50,184. Citywide clean-up in four (4) locations – road, debris and mud removal. Citywide; James Donlon Blvd. and Tabora Drive – road, mud repairs; Empire Mine Rd. & Lone Tree Way road clean-up;
Flooding	CA Office of Emergency Services (OES) PA (No. 013-02252)(PW 523-15) "El Nino 98"	February 1998	$189,475 Citywide clean-up in seven (7) locations Villa Medanos Apts. $55k) – creek washout; Fairgrounds – sewer blowout $35k; Antioch marina north breakwater riprap $25k; Fulton Shipyard Road flow gate blowout $18k; James Donlon – east of Tabora Dr. – uphill mud slide $10k; Rodeo Court #511 mud on right-of-way $10k; Flood emergency response - $36,475.)
Severe Weather[a]	N/A	Unknown	No estimates available
Earthquake[a]	N/A	Unknown	No estimates available
Wildfire[a]	N/A	Unknown	No estimates available
Landslide[a]	N/A	Unknown	No estimates available
Drought[a]	N/A	Unknown	No estimates available

a. The City of Antioch has had natural hazard events in this category, however no specifics are available. There is no documentation at the City or County level that provides data as to dates, number of occurrences, monetary damage assessments or any other supporting documentation. Known past impacts of the hazards has been minimal as it relates to major property damages and financial losses.

2.8 HAZARD RISK RANKING

Table 2-11 presents a local ranking for the City of Antioch of all hazards of concern for which Volume 1 of this hazard mitigation plan provides complete risk assessments. This ranking summarizes how hazards vary for this jurisdiction. As described in detail in Volume 1, the ranking process involves an assessment of the likelihood of occurrence for each hazard, along with its potential impacts on people, property and the economy.

Table 2-11. Hazard Risk Ranking

Rank	Hazard Type	Risk Rating Score (Probability x Impact)	Category
1	Earthquake[b]	48	High
2	Severe weather	30	Medium
3	Landslide[e]	27	Medium
4	Flood[c]	18	Medium
5	Drought	9	Low
6	Dam and levee failure[a]	6	Low
6	Wildfire[f]	6	Low
7	Sea level rise[d]	6	Low
7	Tsunami	0	None

a. Based on the level of detail conducted in the risk assessment, the risk ranking for this hazard is focused solely on dam failure impacts. See Chapter 6.4 of Volume 1 for combined dam inundation list on which this assessment is based.
b. Haywired M7.05 event was used to assign probability and impacts
c. 1-percent annual chance event was used to assign probability and impacts
d. The sea level rise data used for this analysis did not indicate any risk to the City of Antioch; however, Adapting to Rising Tides Initiative will update Sea Level Rise risks. (See Action 20)
e. Very High and High severity zones were used to assign probability and impacts
f. There is no mapped risk within the jurisdiction; however, a score was given due to potential impacts to people and the economy from smoke

2.9 STATUS OF PREVIOUS PLAN ACTIONS

Table 2-12 summarizes the actions that were recommended in the previous version of the hazard mitigation plan and their implementation status at the time this update was prepared.

Table 2-12. Status of Previous Plan Actions

Action Item	Completed	Removed; No Longer Feasible	Carried Over to Plan Update: Check if Yes	Carried Over to Plan Update: Enter Action #
A-1—Construct West Antioch Creek channel improvements, 4- new box culverts, to eliminate property and environmental damage caused by flooding.			√	A-1
Comment: This is now phase 1 of a multiphase project. See Action A-14. Design complete. Right of way being secured. Utilities being relocated. Construction anticipated to begin in spring of 2018.				
A-2—Finish construction of the Oakley/Trembath Detention Basin			√	A-2
Comment:				
A-3—Construct Wilbur Avenue Culvert Crossing			√	A-3
Comment: No Funding Source Currently Identified.				
A-4—Complete construction of the Municipal Corporation Yard improvements		√		
Comment: Project no longer being considered and is no longer considered feasible.				
A-5—Seismic retrofit the City owned Historical Hard House building			√	A-4
Comment: No Funding Source Currently Identified				
A-6—Construct Water Reservoir Maintenance Improvement projects			√	A-5
Comment: Some Reservoirs have had improvements completed. Others still needed. Additional seismic retrofits analyzed in Seismic Study 2014. Ongoing.				
A-7—Construct Water and Sewer pipeline projects to strengthen system and to ensure safe and reliable provisions of public water and sewer services			√	A-6
Comment: Some projects completed. Ongoing				
A-8—Update Emergency Operations Plan			√	A-7
Comment: Plan Update anticipated in 2017-2018 Fiscal Year				
A-9—Continue to support the implementation, monitoring, maintenance, and updating of this Plan, as defined in Volume 1.			√	A-8
Comment: Ongoing				
A-10—Continue to maintain compliance and good standing under the National Flood Insurance Program (NFIP) • Enforce the flood damage prevention ordinance • Participate in floodplain identification and mapping updates • Provide public assistance/information on floodplain requirements and impacts			√	A-9
Comment: Ongoing				
A-11—Consider participation in the Community Rating System (CRS).			√	A-10
Comment: New staff to initiate participation in the CRS.				
A-12—Integrate Local Hazard Mitigation Plan into the Safety Element of the General Plan			√	A-11
Comment: Full update of the General Plan anticipated in the next several years.				
A-13—Where appropriate, support retrofitting, purchase, or relocation of structures in hazard-prone areas to protect structures from future damage, with repetitive loss and severe repetitive loss properties as priority.			√	A-12
Comment: No funding source has been identified.				

2.10 HAZARD MITIGATION ACTION PLAN AND EVALUATION OF RECOMMENDED ACTIONS

Table 2-13 lists the actions that make up the City of Antioch hazard mitigation action plan. Table 2-14 identifies the priority for each action. Table 2-15 summarizes the mitigation actions by hazard of concern and mitigation type.

Table 2-13. Hazard Mitigation Action Plan Matrix

Applies to new or existing assets	Hazards Mitigated	Objectives Met	Responsible Agency[a]	Estimated Cost	Sources of Funding	Timeline
A-1—Construct West Antioch Creek channel improvements, 4- new box culverts, to eliminate property and environmental damage caused by flooding						
Existing	Flood	1, 2, 3, 9, 10, 13, 17	City of Antioch Public Works Dept.	High	HMGP, PDM, FMA	Short-term
A-2—Finish construction of the Oakley/Trimbath Detention Basin						
New and Existing	Flood	3, 5, 6, 9, 10, 15	City of Antioch Public Works Dept./CCC Flood Control District*	Medium	Development Fees and HMGP, PDM, FMA	Short-term
A-3—Construct Wilbur Avenue Culvert Crossing						
Existing	Flood	3, 6, 9, 10, 15	City of Antioch Public Works Dept./CCC Flood Control District*	High	HMGP, PDM, FMA	Short-term
A-4—Seismic retrofit the City owned Historical Hard House building.						
Existing	Earthquake	3, 15	City of Antioch Community Development Dept.	High	HMGP, PDM, FMA	Long-term
A-5—Construct Water Reservoir Maintenance Improvement projects						
Existing	All Hazards	1, 2, 3, 13	City of Antioch Public Works Dept.	Medium	Water fund and HMGP, PDM, FMA	Ongoing
A-6—Construct Water and Sewer pipeline projects to strengthen systems and to ensure safe and reliable provisions of public water and sewer services						
Existing	All Hazards	1, 2, 3, 13	City of Antioch Public Works Dept.	Low	Water and Sewer funds and HMGP, PDM, FMA	Ongoing
A-7—Update Emergency Operations Plan						
Existing	All Hazards	2, 3, 16	City of Antioch Office of Emergency Services (City Manager)	Medium	General Fund and HMGP	Ongoing
A-8—Continue to support the implementation, monitoring, maintenance, and updating of this Plan, as defined in Volume 1						
Existing and New	All Hazards	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18	City of Antioch Office of Emergency Services (City Manager)	Low	General Funds, Staff Time HMGP, PDM (for update)	Ongoing
A-9—Continue to maintain compliance and good standing under the National Flood Insurance Program (NFIP) • Enforce the flood damage prevention ordinance • Participate in floodplain identification and mapping updates • Provide public assistance/information on floodplain requirements and impacts						
Existing and New	Flood	3, 5, 6, 9, 10, 11, 15	City of Antioch Public Works Dept.	Low	General Fund	Ongoing

Applies to new or existing assets	Hazards Mitigated	Objectives Met	Responsible Agency[a]	Estimated Cost	Sources of Funding	Timeline
A-10—Consider participation in the Community Rating System; (CRS)						
Existing and New	All Hazards	9	City of Antioch Community Development Dept.	Low	General Fund	Ongoing
A-11—Integrate Local Hazard Mitigation Plan into the Safety Element of the General Plan						
Existing and New	All Hazards	1, 4, 5, 7, 11, 12, 14, 17	City of Antioch Community Development Dept.	Low	Developer Fees	Short-term
A-12—Where appropriate, support retrofitting, purchase, or relocation of structures in hazard-prone areas to protect structures from future damage, with repetitive loss and sever repetitive loss properties as priority						
Existing	All Hazards	1, 4, 7, 9, 12, 14, 15, 17	City of Antioch Community Development Dept.	High	HMGP, PDM, FMA	Long-term
A-13—West Antioch Flood Creek Mitigation and Restoration						
Existing and New	Flood	1, 2, 3, 9, 10, 13, 17	City of Antioch Public Works Dept.*/CCC Flood Control District	High	HMGP, PDM, FMA	Long-term
A-14—Update Inundation Analysis						
Existing and New	Dam and Levee Failure	3, 5, 6	City of Antioch Public Works Dept.*/CC Water District	Medium	Water Fund and HMGP	Short-term
A-15—NE Annexation Infrastructure Improvements						
Existing and New	All Hazards	1, 2, 3, 6, 9, 10, 16, 17	City of Antioch Public Works Dept.*/CCC	High	City/County agreement and HMGP, PDM, FMA	Ongoing
A-16—Request FEMA to Update flood Maps						
Existing and New	Flood	3, 4, 5, 6, 7, 10, 12, 14	FEMA/City of Antioch*	Medium	General Funds	Short-term
A-17—NE Annexation Infrastructure Improvements						
Existing and New	All Hazards	1, 2, 3, 6, 9, 10, 16, 17	City of Antioch Public Works Dept.	High	HMGP, PDM, FMA	Ongoing
A-18—Study, Design and Implement project for settlement of the Marina and the L Street approach (north of 2nd Street)						
Existing	All Hazards	1, 2, 3, 9, 10, 13, 17	City of Antioch Public Works Dept.	High	HMGP, PDM, FMA	Long-term
A-19—Participation in the Adapting to Rising Tides Initiative						
Existing and New	Flood	3, 5, 6, 10, 11, 12, 16, 18	Antioch Community Development Dept.	Low	City General Fund, HMGP	Ongoing
A-20—Implement program to track dates, number of occurrences, monetary damage assessments of disasters						
Existing and New	All Hazards	3, 6, 12, 13, 14	City of Antioch Office of Emergency Services (City Manager)	Medium	HMGP	Long-term
A-21—Update/Create various Plans such as Emergency Management, Post-Disaster Recovery, and/or Continuity of Operation						
Existing and New	All Hazards	3, 5, 6, 10, 11, 12, 16, 18	Antioch Office of Emergency Services (City Manager)	Medium	City General Fund, HMGP	Ongoing

a. Where multiple responsible agencies are listed, an asterisk (*) identifies the lead agency.

Table 2-14. Mitigation Action Priority

Action #	# of Objectives Met	Benefits	Costs	Do Benefits Equal or Exceed Costs?	Is Project Grant-Eligible?	Can Project Be Funded Under Existing Programs/ Budgets?	Implementation Priority[a]	Grant Pursuit Priority[a]
A-1	7	High	High	Yes	Yes	No	Medium	High
A-2	6	Medium	Medium	Yes	Yes	No	Medium	Low
A-3	5	Medium	High	No	Yes	No	Low	Low
A-4	2	Medium	High	No	Yes	No	Low	Low
A-5	4	High	Medium	Yes	Yes	No	Medium	High
A-6	4	Low	Low	Yes	Yes	Yes	High	High
A-7	3	Low	Low	Yes	Yes	No	Medium	High
A-8	18	Low	Low	Yes	No	Yes	High	Low
A-9	7	Medium	Low	Yes	No	Yes	High	Low
A-10	1	Low	Low	Yes	No	Yes	Medium	Low
A-11	8	Medium	Low	Yes	No	Yes	High	Low
A-12	8	High	High	Yes	Yes	No	Low	High
A-13	7	High	High	Yes	Yes	No	Medium	High
A-14	3	Low	Medium	No	Yes	No	Medium	High
A-15	8	Medium	High	No	Yes	No	Medium	High
A-16	8	Medium	Medium	Yes	No	Yes	High	Low
A-17	8	High	High	Yes	Yes	No	Medium	High
A-18	7	Medium	High	No	Yes	No	Low	Medium
A-19	8	Medium	Low	Yes	Yes	Yes	High	Medium
A-20	5	Low	Medium	No	Yes	No	Low	Low
A-21	8	Medium	Medium	Yes	Yes	No	Medium	Medium

a. See the introduction to this volume for explanation of priorities.

Table 2-15. Analysis of Mitigation Actions

Hazard Type	Action Addressing Hazard, by Mitigation Type[a]							
	Prevention	Property Protection	Public Education and Awareness	Natural Resource Protection	Emergency Services	Structural Projects	Climate Resilient	Community Capacity Building
All hazards	A-8, A-12, A-14, A-17, A-18	A-8, A-11, A-14, A-17, A-18, A-20	A-8, A-20	A-8	A-7, A-8, A-20	A-8	A-8	A-8
Dam and Levee failure		A-14			A-14			
Drought								
Earthquake	A-15	A-5, A-6, A-15			A-5, A-6	A-4, A-5, A-15		
Flood	A-1, A-2, A-3, A-13	A-1, A-2, A-3, A-9, A-10, A-13	A-16	A-1, A-13	A-1, A-13		A-19	
Landslide								
Severe weather								
Tsunami								
Wildfire								

a. See the introduction to this volume for explanation of mitigation types.

2.11 FUTURE NEEDS TO BETTER UNDERSTAND RISK/VULNERABILITY

In 2012-2013 FEMA conducted a Risk Mapping, Assessment and Planning (Risk MAP) Program nationwide. The purpose of this Risk MAP program was to improve flood hazard information for the National Flood Insurance Program (NFIP); promote increased national awareness and understanding of flood risk; and, support Federal, State, and local mitigation actions to further reduce risk.

FEMA's Final Discovery Report was published in 2013, and covered all of Contra Costa County, to include the Suisun Bay, San Pablo Bay, San Joaquin Delta, and San Francisco Bay watersheds and coastlines.

In March of 2017, the City of Antioch hosted Resilience Dialogues, facilitated by GlobalChange.gov, (U.S. Global Change Research Program), to explore Antioch's risk from climate variability and change. Quoting the Resilience Dialogues Final Synthesis Report, "Antioch is interested in building civic engagement by linking climate resilience to community values and integrating sea-level rise and flooding projects into hazard mitigation planning."

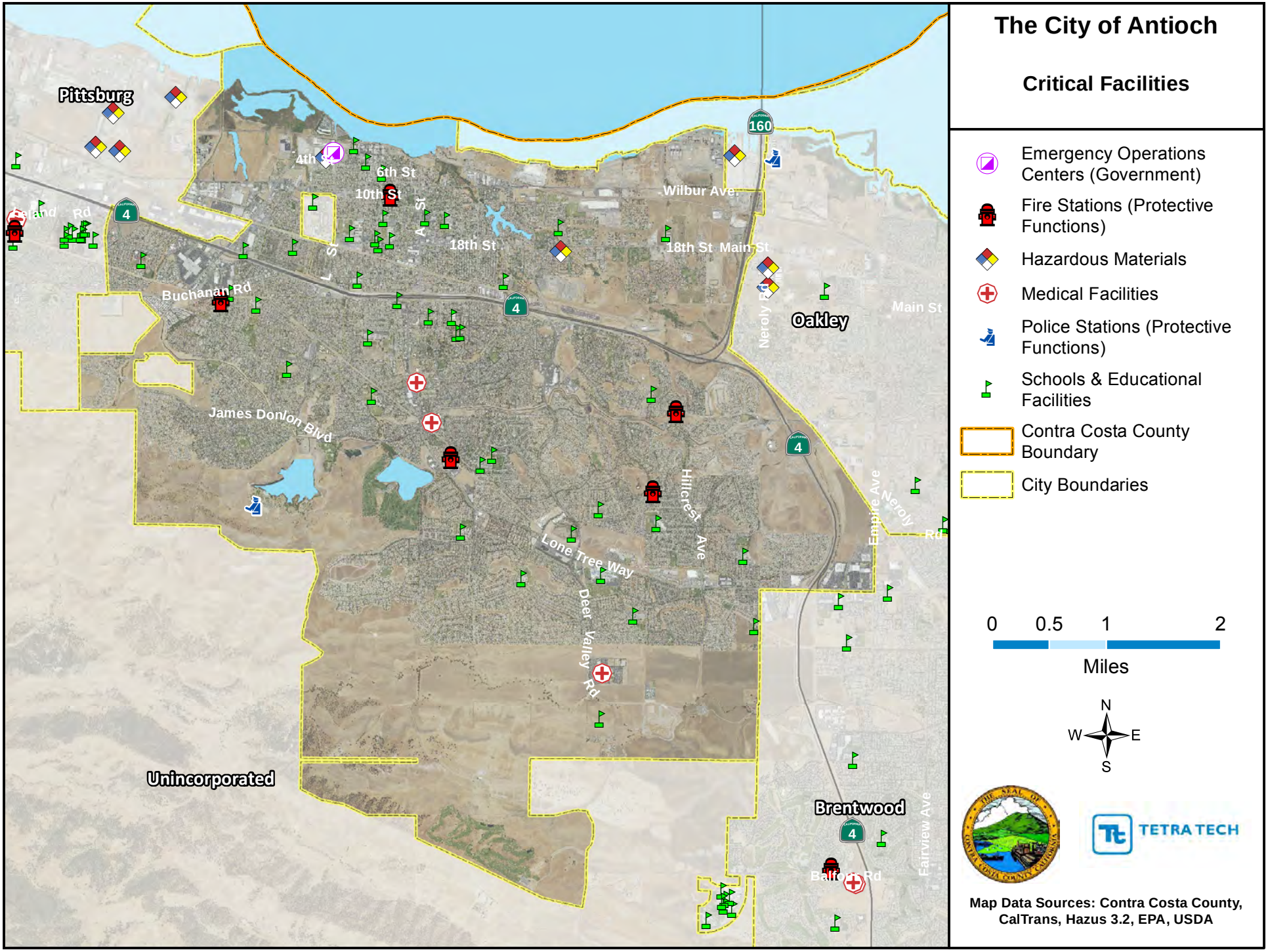
The City also annexed 759 acres of mixed use (commercial, industrial and residential) land with frontage on the water.

These research documents, taken together with the need to plan on behalf of annexed land, and ongoing need to update research and data for the Local Hazard Mitigation suggests an excellent opportunity to integrate these assets and build on local understanding of risks and vulnerabilities.

2.12 REVIEW AND INCORPORATION OF RESOURCES FOR THIS ANNEX

The following technical reports, plans, and regulatory mechanisms were reviewed to provide information for this annex.

- **City of Antioch Municipal Code—**The municipal code was reviewed for the full capability assessment and for identifying opportunities for action plan integration.
- **City of Antioch Flood Damage Prevention Ordinance**—The flood damage prevention ordinance was reviewed for compliance with the National Flood Insurance Program.
- **Community and Municipal Climate Action Plans**—Plans were reviewed to verify that climate related hazards were discussed
- **Urban Water Management Plan, 2015**—Plan was reviewed for discussion of drought forecasting and planning. Also used to review the City's water shortage contingency plan (WSCP) for emergency preparedness and plans for a catastrophic event.
- **City of Antioch General Plan**—Plan was reviewed to see where improvements could be made relative to Hazard Mitigation.
- **Resilience Dialogues and Final Report –**March 2017—Online conference/dialogue intended to better understand risks in communities and plan for long-term resilience. Dialogue included participants representing: Community leaders & citizens; specialist in climate change and environmental policy; community network leaders; public sector staff and elected officials. Facilitated by U.S. Global Change Research Program. Assisted in determining potential action items related to Climate Change.
- **California Department of Finance website**—Used to provide information on City population (http://www.dof.ca.gov)
- **Technical Reports and Information—**The following **o**utside resources and references were reviewed:
    - **Hazard Mitigation Plan Annex Development Tool-kit**—The tool-kit was used to support the development of this annex including past hazard events, noted vulnerabilities, risk ranking and action development.
    - **News archives, Internet search, documentable oral and written local histories**—Archived newspaper articles; media coverage in general; public sector staff and citizens; historical society accounts; photo collections; etc. are utilized for past hazard events when reliable.
    - **Neighboring County and Local Hazard Mitigation Plans (LHMP)**—Proximity to 'neighbor' hazards; differences in points of view and analysis; mutual aid issues in disaster; etc.



The City of Antioch

Critical Facilities

- Emergency Operations Centers (Government)
- Fire Stations (Protective Functions)
- Hazardous Materials
- Medical Facilities
- Police Stations (Protective Functions)
- Schools & Educational Facilities
- Contra Costa County Boundary
- City Boundaries

0 0.5 1 2

Miles

N
W E
S

TETRA TECH

Map Data Sources: Contra Costa County, CalTrans, Hazus 3.2, EPA, USDA

The City of Antioch

Critical Infrastructure

- Airports (Other Critical Functions)
- Bus Facilities (Other Infrastructure)
- Communication Facilities
- Electric Power Facilities
- Highway Bridges
- Highway Tunnels (Other Infrastructure)
- Light Rail (Other Infrastructure)
- Natural Gas (Other Infrastructure)
- Port Facilities (Other Critical Functions)
- Water Supply Facilities
- Rail Facilities (Other Infrastructure)
- Wastewater Facilities
- Contra Costa County Boundary
- City Boundaries

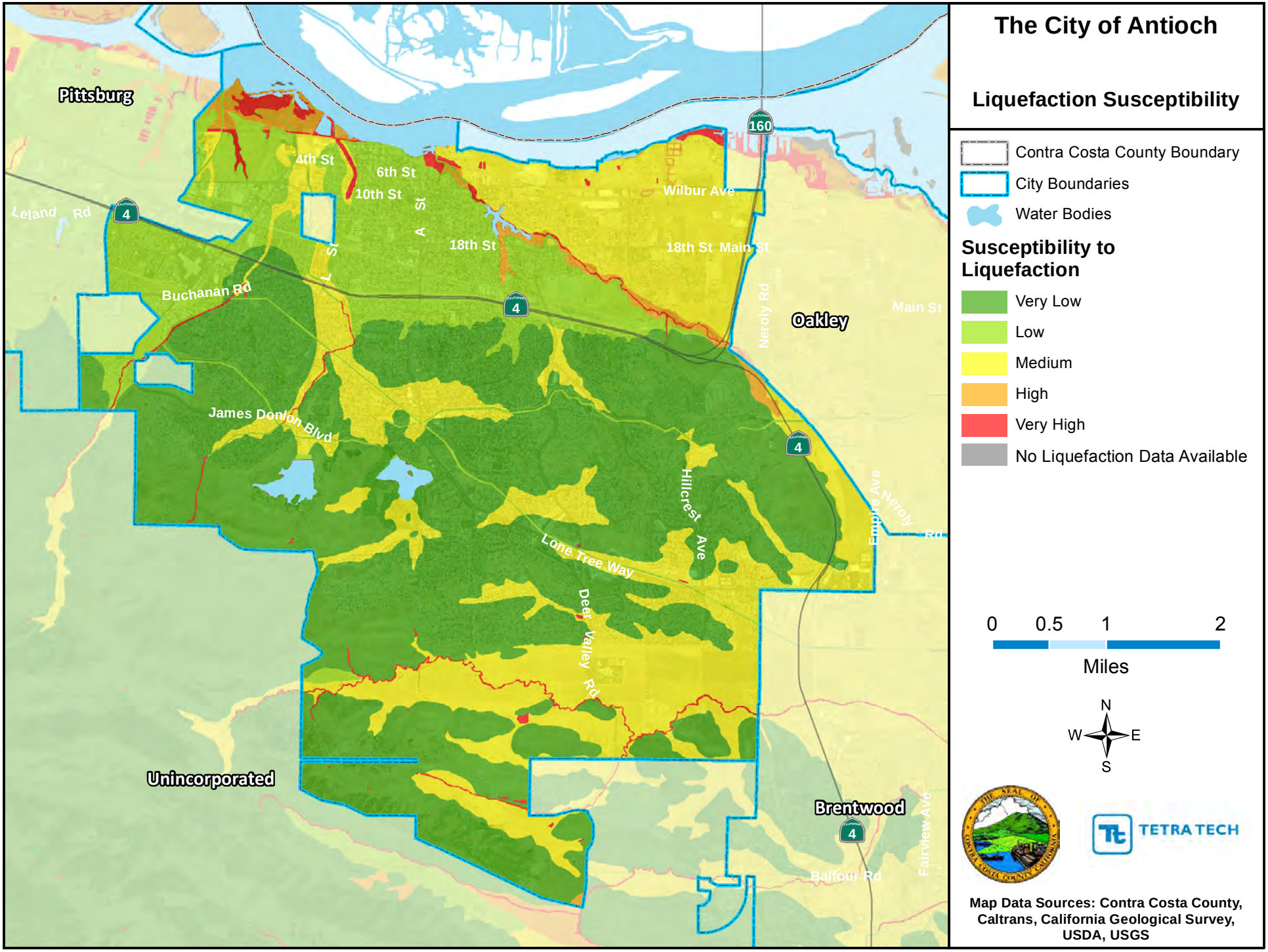
0 0.5 1 2

Miles

N
W E
S

TETRA TECH

Map Data Sources: Contra Costa County, CalTrans, Hazus 3.2, EPA, USDA



The City of Antioch

Liquefaction Susceptibility

Contra Costa County Boundary

City Boundaries

Water Bodies

Susceptibility to Liquefaction

- Very Low
- Low
- Medium
- High
- Very High
- No Liquefaction Data Available

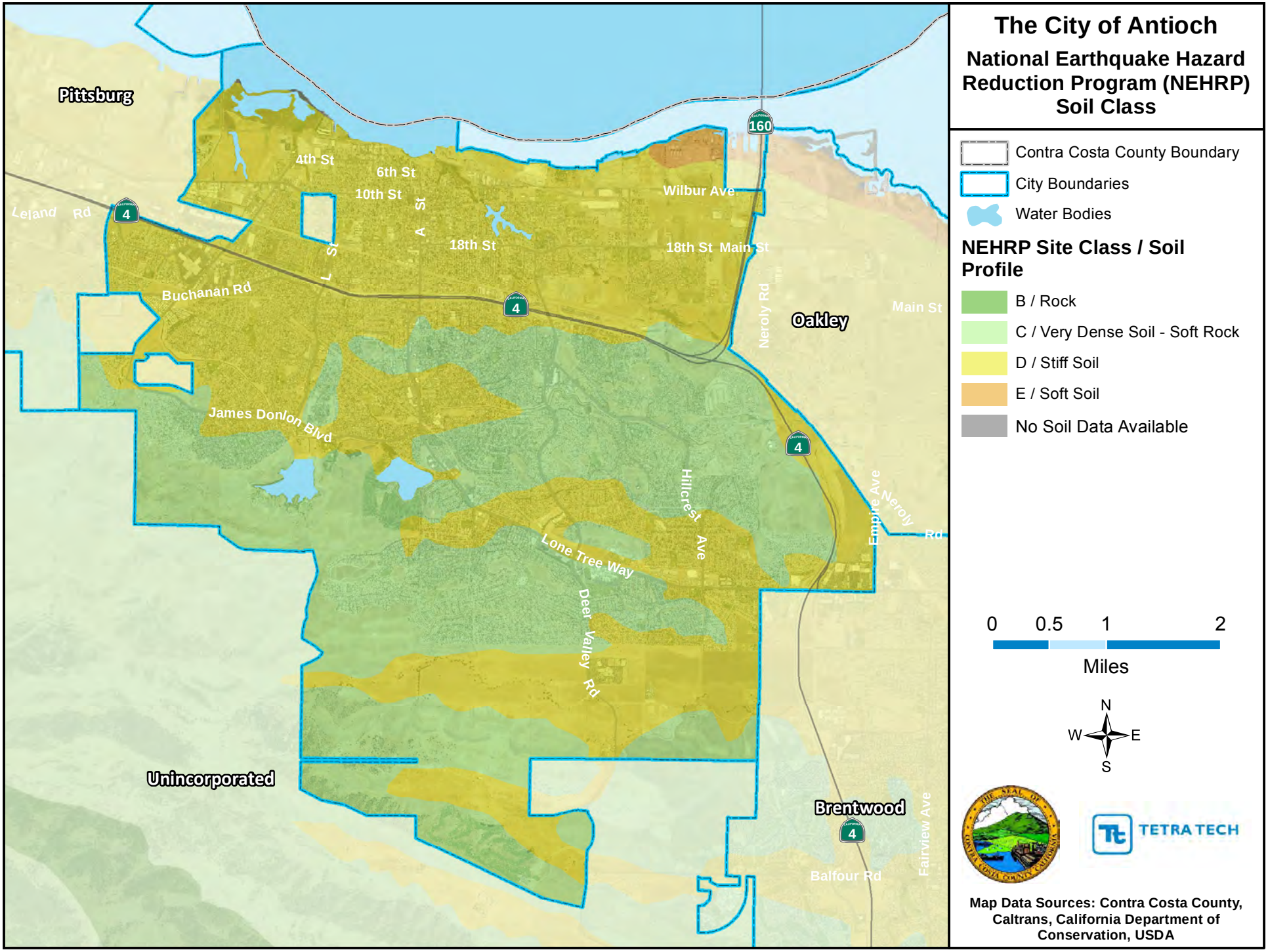
0 0.5 1 2

Miles

N
W E
S

TETRA TECH

Map Data Sources: Contra Costa County, Caltrans, California Geological Survey, USDA, USGS



The City of Antioch

National Earthquake Hazard Reduction Program (NEHRP) Soil Class

Contra Costa County Boundary

City Boundaries

Water Bodies

NEHRP Site Class / Soil Profile

- B / Rock
- C / Very Dense Soil - Soft Rock
- D / Stiff Soil
- E / Soft Soil
- No Soil Data Available

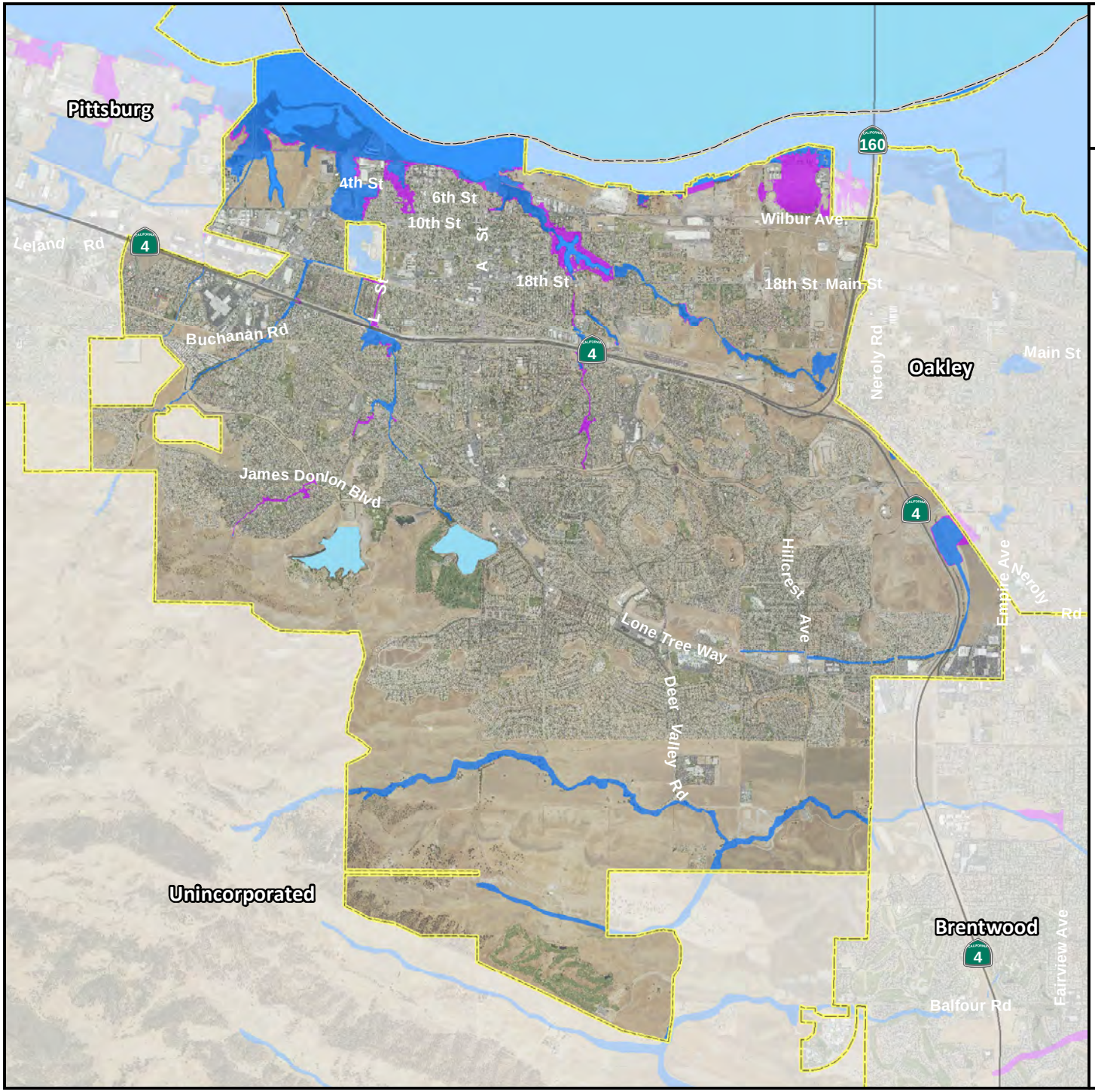
0 0.5 1 2

Miles

N W E S

TETRA TECH

Map Data Sources: Contra Costa County, Caltrans, California Department of Conservation, USDA



The City of Antioch

FEMA DFIRM Flood Hazard Areas

- 1% Annual Chance (100-Year) Flood Zone
- 0.2% Annual Chance (500-Year) Flood Zone
- Contra Costa County Boundary
- City Boundaries
- Water Bodies

Flood hazard areas as depicted on Effective FEMA Digital Flood Insurance Rate Maps (DFIRM)

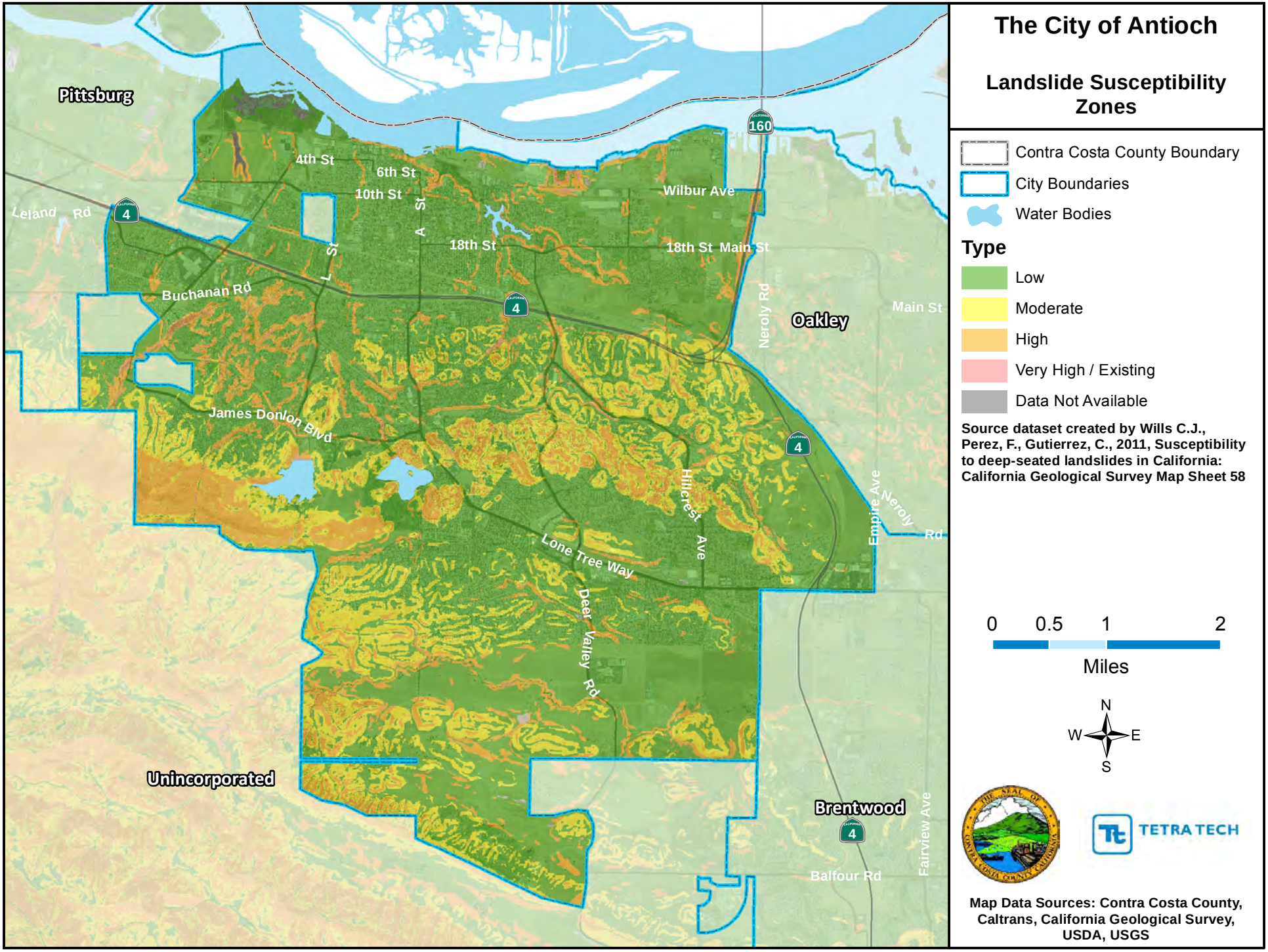
0 0.5 1 2

Miles

N W E S

TETRA TECH

Map Data Sources: Contra Costa County, CalTrans, FEMA, USDA



The City of Antioch

Landslide Susceptibility Zones

Contra Costa County Boundary

City Boundaries

Water Bodies

Type

Low

Moderate

High

Very High / Existing

Data Not Available

Source dataset created by Wills C.J., Perez, F., Gutierrez, C., 2011, Susceptibility to deep-seated landslides in California: California Geological Survey Map Sheet 58

0 0.5 1 2

Miles

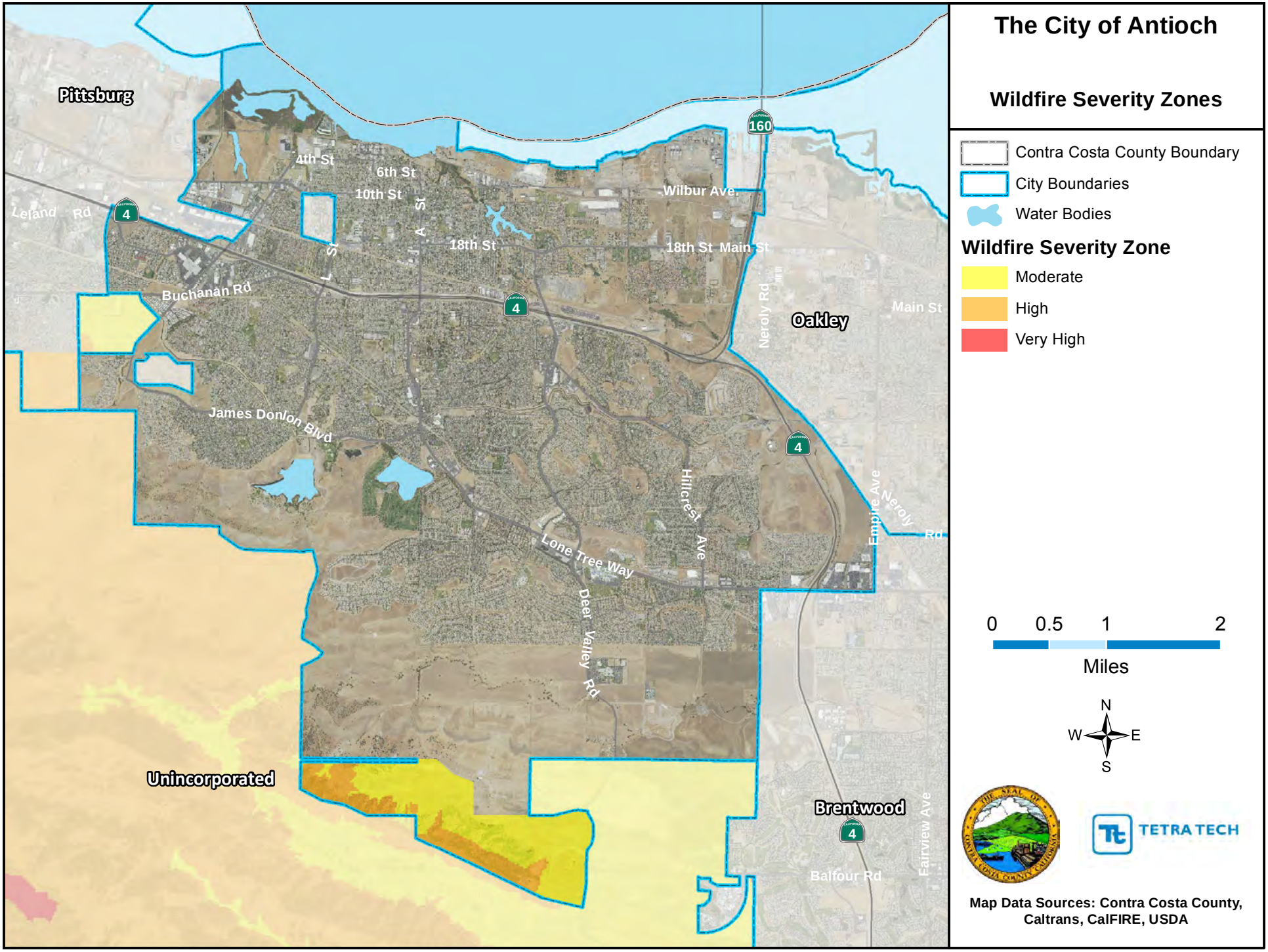
N

W E

S

TETRA TECH

Map Data Sources: Contra Costa County, Caltrans, California Geological Survey, USDA, USGS



The City of Antioch

Wildfire Severity Zones

Contra Costa County Boundary

City Boundaries

Water Bodies

Wildfire Severity Zone

Moderate

High

Very High

0 0.5 1 2

Miles

N

W E

S

TETRA TECH

Map Data Sources: Contra Costa County, Caltrans, CalFIRE, USDA

Appendix K: Notice of Public Hearing

This appendix will be provided with the final document.

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Appendix L: Adoption Resolution

This appendix will be provided with the final document.

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Appendix M: Reduced Delta Reliance

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Appendix M

City of Antioch's Reduced Delta Reliance Reporting

1.1 Background

The Sacramento-San Joaquin Delta Reform Act of 2009 (Delta Reform Act) established two co-equal goals of providing a more reliable water supply for California and protecting, restoring, and enhancing the Delta ecosystem. As part of the Delta Reform Act, the Delta Stewardship Council (DSC) was created who then developed and adopted the Delta Plan in 2013. The Delta Plan is a comprehensive, long-term, legally enforceable plan guiding how federal, state, and local agencies manage the Delta's water and environmental resources. Included in the Delta Plan is Delta Plan Policy WR P1, *Reduce Reliance on the Delta Through Improved Regional Water Self-Reliance* (WR P1). WR P1 is relevant to any state or local public agency that anticipate participating in or receiving water from a proposed covered action such as a multi-year water transfer, conveyance facility, or new diversion that involves transferring water through, exporting water from, or using water in the Delta. Prior to initiating the implementation of that action, agencies must prepare a written certification of consistency with detailed findings as to whether the covered action is consistent with applicable Delta Plan policies and submit that certification to the DSC. WR P1 identifies UWMPs as the tool to demonstrate consistency with state policy to reduce reliance on the Delta for an agency that carries out or takes part in a covered action.

1.2 Demonstrating Reduced Reliance on the Delta

The analysis and documentation provided below includes all of the elements described in WR P1, namely subdivisions (c)(1)(B) and (c)(1)(C), that need to be included in a water supplier's UWMP to document and quantify supplies contributing to reduced reliance on the Delta watershed and improved self-reliance. The approach is consistent with what is included in Appendix C of the DWR Guidebook. Some of the key assumptions that went into the City's reduced reliance analysis include:

- All data were obtained from the current 2020 UWMP or previously adopted UWMPs and represent average or normal water year conditions.
- No projects or programs that are described in the UWMPs as "Future Water Supply Projects or Programs" were included in the accounting of supplies.
- This analysis uses a normal water year representation of 2010 as the baseline. Data for the 2010 baseline was taken from the City's 2005 UWMP as the UWMPs generally do not provide normal water year data for the year that they are adopted (i.e., 2005 UWMP forecasts begin in 2010, 2010 UWMP forecasts begin in 2015, and so on). This approach was used for 2015 and 2020 data as well, in that it was retrieved from the City's 2010 and 2015 UWMPs, respectively. Data for 2025-2045 are from the current 2020 UWMP.

1.2.1 Water Use without Water Use Efficiency

WR P1 considers water use efficiency savings as a source of supply. Because the City does not explicitly estimate water use efficiency as a supply, the water demand data from the current and past UWMPs that was used for this assessment needed to be adjusted to properly reflect normal water year demands in the calculation of reduced reliance. The suggested approach included in Appendix C of the DWR Guidebook was utilized to make these adjustments. The approach assumes that the embedded water use efficiency savings can be calculated based on changes in forecasted per capita water use since the baseline. Once calculated, the embedded water use efficiency savings can be added to the expected outcome of water supplies that contribute to reduced reliance on Delta water. Supporting narratives and documentation for all the data shown in the tables are provided below.

The first step in the analysis involved adjusting total service area demands to reflect only demands that can implement water use efficiency measures (i.e., residential, agricultural, and commercial, industrial and institutional demands) but still include the embedded water use efficiency supply. Demands for non-potable supplies, such as recycling for the City, are subtracted from the total service area demands; this is done to reflect the demand hardening aspects of non-potable supplies. Table 1a presents the results of this adjustment.

Table 1a. Water Use for the City of Antioch

	Baseline (2010)	2015	2020	2025	2030	2035	2040	2045
Service Area Water Demands with Water Use Efficiency Accounted For	5,814	4,521	5,091	4,600	4,682	4,763	4,845	4,946
Non-Potable Water Demands	-	79	74	78	82	86	90	94
Potable Service Area Demands with Water Use Efficiency Accounted For	5,814	4,442	5,017	4,522	4,600	4,677	4,755	4,852

Notes:
Baseline (2010) values – City's 2010 UWMP
2015 values – City's 2015 UWMP
2020-2045 values – City's 2020 UWMP
Units: MG

Table 1b. Service Area Population

	Baseline (2010)	2015	2020	2025	2030	2035	2040	2045
Service Area Population	102,330	108,298	112,520	115,540	118,560	121,580	124,600	127,660

Notes:
Baseline (2010) values – City's 2010 UWMP0
2015 values – City's 2015 UWMP
2020-2045 values – City's 2020 UWMP

Once the total service area water demands were adjusted, these were divided by the service area population numbers shown in Table 1b to obtain the per capita water use in GPCD, as shown in Table 1c. By calculating the incremental change in per capita water use relative to the 2010 baseline and applying those back to the population numbers from Table 1b, the estimated water use efficiency supply can be calculated. These supply totals are shown in Table 1c.

Table 1c. Water Use Efficiency Since Baseline								
	Baseline (2010)	2015	2020	2025	2030	2035	2040	2045
Per Capita Water Use (GPCD)	156	112	122	107	106	105	105	104
Change in Per Capita Water Use from Baseline (GPCD)	--	(43)	(34)	(48)	(49)	(50)	(51)	(52)
Estimated Water Use Efficiency Since Baseline	--	1,711	1,376	2,043	2,136	2,231	2,324	2,401

Notes:
Units: MG

This estimated water use efficiency supply can be considered an additional supply that may be used to show reduced reliance on Delta water supplies. Table 1d provides a summary of the data that were utilized in the next steps of the analysis.

Table 1d. Water Use without Water Use Efficiency Accounted For								
	Baseline (2010)	2015	2020	2025	2030	2035	2040	2045
Service Area Water Demands with Water Use Efficiency Accounted For	5,814	4,521	5,091	4,600	4,682	4,763	4,845	4,946
Estimated Water Use Efficiency Since Baseline	-	1,711	1,376	2,043	2,136	2,231	2,324	2,401
Service Area Water Demands without Water Use Efficiency Accounted For	5,814	6,232	6,467	6,643	6,818	6,994	7,169	7,347

Notes:
Units: MG

1.2.2 Water Supplies Contributing to Regional Self-Reliance

As part of WR P1, agencies must include in their UWMP the expected outcome for measurable improvement in regional self-reliance as a reduction in water used from the Delta watershed. While WR P1 does not require that agencies demonstrate measurable improvement in regional self-reliance directly, the approach presented in Appendix C of the DWR Guidebook suggests agencies quantify the water supplies in their portfolio that contribute to self-reliance as a means of providing documentation that could help support a future certification of consistency for future water supply projects that are covered actions, such as the Los Vaqueros Reservoir Expansion. For this analysis it was assumed that the supplies contributing to the City's self-reliance include the water use efficiency supply calculated in Section 1.2.1 and the recycled water it produces and distributes. The supply totals are summarized in Table 2a.The demands without water use efficiency is summarized in Table 2b.

Table 2a. Water Supplies Contributing to Regional Self-Reliance								
Water Supplies	Baseline (2010)	2015	2020	2025	2030	2035	2040	2045
Water Use Efficiency	--	1,711	1,376	2,043	2,136	2,231	2,324	2,401
Water Recycling	--	79	74	78	82	86	90	94
Stormwater Capture and Use	--							
Advanced Water Technologies	--							
Conjunctive Use Projects	--							
Local and Regional Water Supply and Storage Projects	--							
Other Programs and Projects the Contribute to Regional Self-Reliance	--							
Water Supplies Contributing to Regional Self-Reliance	--	1,790	1,450	2,121	2,218	2,317	2,414	2,495

Notes:
Water use efficiency supply values are from Table 1c
Baseline (2010) water recycling values – City's 2010 UWMP
2015 water recycling values – City's 2015 UWMP
2020-2045 water recycling values – City's 2020 UWMP
Units: MG

Table 2b. Service Area Water Demands without Water Use Efficiency								
	Baseline (2010)	2015	2020	2025	2030	2035	2040	2045
Service Area Water Demands without Water Use Efficiency Accounted For	5,814	6,232	6,467	6,643	6,818	6,994	7,169	7,347

Notes:
Water use demand values are from Table 1d
Units: MG

Using the water supplies from Table 2a, the change in water supplies contributing to regional self-reliance can be calculated relative to the 2010 baseline. These numbers are presented in Table 2c below.

Table 2c. Change in Regional Self Reliance								
	Baseline (2010)	2015	2020	2025	2030	2035	2040	2045
Water Supplies Contributing to Regional Self-Reliance	--	1,790	1,450	2,121	2,218	2,317	2,414	2,495
Change in Water Supplies Contributing to Regional Self-Reliance	--	1,790	1,450	2,121	2,218	2,317	2,414	2,495

Notes:
Units: MG

The calculated values from Table 2c can also be expressed as a percentage of the water demands without water use efficiency savings accounted for. This is done by dividing the water supplies from Table 2a by the water demands included in Table 2b. The change in the percentage of regional water supplies can then be evaluated for each outcome year in the analysis compared to the baseline year to demonstrate increased regional self-reliance as shown in Table 2d.

Table 2d. Percent Change in Regional Self Reliance

	Baseline (2010)	2015	2020	2025	2030	2035	2040	2045
Percent of Water Supplies Contributing to Regional Self-Reliance	0%	28.7%	22.4%	31.9%	32.5%	33.1%	33.7%	34.0%
Change in Percent of Water Supplies Contributing to Regional Self-Reliance	--	28.7%	22.4%	31.9%	32.5%	33.1%	33.7%	34.0%

Notes:
Units: MG

1.2.3 Reliance on Supplies from the Delta Watershed

As part of WR P1, agencies must also include in their UWMP the expected outcomes for measurable reductions in supplies from the Delta watershed either as a quantity or as a percentage of their water supply portfolios. The City has diverted water from the San Joaquin River in the western Delta since at least the 1870s and as such has pre-1914 water rights. The City is currently able to pump from the Delta for varying periods from a few weeks up to about 300 days depending on water quality conditions. The City has a delivered water quality goal of 75 mg/l chlorides. The City's existing intake has a capacity of 16 MGD. The Water Rights Division of SWRCB has identified no quantity limit on the City's diversions from the Delta provided the water is used beneficially.

Table 3a. Reliance on Water Supplies from the Delta

Water Supplies from the Delta Watershed	Baseline (2010)	2015	2020	2025	2030	2035	2040	2045
CVP/SWP Contract Supplies	--	--	--	--	--	--	--	--
Delta/Delta Tributary Diversions	1,831	79	241	2,776	2,776	2,776	2,776	2,776
Transfers and Exchanges								
Other Water Supplies from the Delta Watershed								
Total Water Supplies from the Delta Watershed	1,831	79	241	2,776	2,776	2,776	2,776	2,776

Notes:
Units: MG

Table 3b. Service Area Water Demands without Water Use Efficiency								
	Baseline (2010)	2015	2020	2025	2030	2035	2040	2045
Service Area Water Demands without Water Use Efficiency Accounted For	5,814	6,232	6,467	6,643	6,818	6,994	7,169	7,347

Notes:
Water use demand values are from Table 1d
Units: MG

Using the water supplies from Table 3a, the change in water supplies contributing to Delta reliance can be calculated relative to the 2010 baseline. These numbers are presented in Table 3c below.

Table 3c. Change in Supplies from the Delta Watershed								
	Baseline (2010)	2015	2020	2025	2030	2035	2040	2045
Total Water Supplies from the Delta Watershed	1,831	79	241	2,776	2,776	2,776	2,776	2,776
Change in Water Supplies from the Delta Watershed	--	(1,752)	(1,590)	945	945	945	945	945

Notes:
Units: MG

The calculated values from Table 3c can also be expressed as a percentage of the water demands without water use efficiency savings accounted for. This is done by dividing the water supplies from Table 3a by the water demands included in Table 3b. The change in the percentage of Delta water supplies compared to the baseline year can then be evaluated for each outcome year in the analysis to demonstrate decreased reliance on supplies from the Delta watershed as shown in Table 2d.

Table 3d. Percent Change in Supplies from the Delta Watershed (As a Percent of Demand without Water Use Efficiency)								
	Baseline (2010)	2015	2020	2025	2030	2035	2040	2045
Percent of Water Supplies from the Delta Watershed	31.5%	1.3%	3.7%	41.8%	40.7%	39.7%	38.7%	37.8%
Change in Percent of Water Supplies from the Delta Watershed	--	30.2%	27.8%	10.3%	9.2%	8.2%	7.2%	6.3%

Notes:
Units: MG

1.2.4 Summary of Expected Outcomes for Reduced Reliance on the Delta

The following provides a summary of the near-term (2025) and long-term (2045) expected outcomes for the City's self-reliance and Delta reliance. The results show that the City is measurably improving self-reliance and reducing reliance on the Delta, both as an amount of water used and as a percentage of water used.

Expected Outcomes for Self-Reliance

- **Near-term (2025)** –Self-reliance is expected to increase to 2,121 MG per year from the 2010 baseline (Table 2c); this represents an increase of about 32 percent of 2025 water demands (Table 2d).
- **Long-term (2045)** –Self-reliance is expected to increase to 2,495 MG per year from the 2010 baseline (Table 2c), this represents an increase of about 34 percent of 2045 water demands (Table 2d).

Expected Outcomes for Reduced Reliance on Supplies from the Delta Watershed

- **Near-term (2025)** – While the reliance on supplies from the Delta watershed are projected to increase to 945 MG per year from the 2010 baseline (Table 3c), this represents an overall increase of 10 percent in water supplies from the Delta that will be contributing towards meeting 2025 water demands (Table 3d).
- **Long-term (2045)** – While the reliance on supplies from the Delta watershed are projected to increase to 945 MG per year from the 2010 baseline, this actually represents an overall increase of 6 percent in water supplies from the Delta that will be contributing towards meeting 2045 water demands (Table 3d).

1.3 UWMP Implementation

In addition to the analysis presented above, WR P1 also requires that programs and projects included in the UWMP that are locally cost-effective and technically feasible, and which reduce reliance on the Delta, are identified, evaluated, and are being implemented when feasible. As part of the UWMP process, the City identified ongoing and future projects that will improve existing and future water supplies for the City. These projects include major transmission mains, new water sources, and improvements to existing water wells, reservoirs, and treatment facilities. Section 6.9 of the City's UWMP includes a brief description of each of these projects that include estimates on the water supply that is expected to be available from each project and an implementation timeline for each project or program.

In addition to projects and programs described in the City's UWMP, the City also conducts an ongoing water conservation program and has committed to continue to implement water conservation measures for all customer sectors. Water conservation can be achieved through managing the water supply and water demand. Supply management is used to improve the overall system efficiency and reduce waste within the production and delivery facilities. The City uses DMMs to encourage water conservation by the consumer. Section 9 of the City's UMWP provides narrative descriptions addressing the nature and extent of each DMM implemented.

1.4 Appending the 2015 UWMP

Consistent with WR P1 requirements, the information contained in this appendix is also intended to be appended to the City's 2015 UWMP. As required by the Act, the City is making the UWMP (which includes the Reduced Delta Reliance Reporting) and WSCP available for public inspection and held a public hearing prior to adopting these documents. The City notified cities and counties within the service area more than 60 days before the public hearing (see Appendix B for documentation). The UWMP, WSCP, and Reduced Delta Reliance Reporting for the 2015 UWMP were adopted by the Antioch City Council on May 25, 2021. A copy of the adoption resolution is provided in Appendix D.

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