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City of Brawley

2020 Urban Water Management Plan

Contact Sheet

Date plan submitted to the Department of Water Resources: **July 1, 2021**

Name of person preparing this plan:

Jay Jung, P.E.

LEE & RO, Inc.
1199 S. Fullerton Ave.
City of Industry, CA 91748

Phone: **(626) 667-5342**

Fax: **(626) 912-2015**

Email address: **jay.jung@lee-ro.com**

The water supplier is a: **Municipality, Retailer**

Utility service provided by the water supplier includes: **Water and Sewer**

Is this agency a Bureau of Reclamation contractor? **No**

Is this agency a State Water Project contractor? **No**

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Chapter 1 – Introduction and Overview

This is the City of Brawley's (City) 2020 Urban Water Management Plan (2020 UWMP) which was prepared in compliance with the Urban Water Management Planning Act (Act). The UWMP Act has been codified in the California Water Code (CWC), Division 6, Part 2.6 Urban Water Management Planning sections 10610 through 10657. This 2020 UWMP addresses the CWC throughout the sections found in this plan and includes the conservation measures, programs and policies required therein. Per the CWC, this 2020 UWMP must be submitted to the state by July 1, 2021.

1.1 Background and Purpose

The UWMP Act requires urban water suppliers to adopt and submit an updated UWMP to the Department of Water Resources (DWR) every 5 years. This 2020 UWMP serves as an update to the City's previous 2015 UWMP. The California State Legislature (Legislature) enacted the UWMP Act in 1983 in an effort to establish a method for determining the status of water supply and drought planning in California.

As part of the Act, the legislature intends that conservation and efficient use of water be actively pursued to protect both the people of the state and their water resources. To that end, the legislature determined that urban water suppliers (such as the City of Brawley) shall be required to develop water management plans and that successful implementation of these plans is best accomplished at the local level. Each urban water supplier is required to assess current demands and supplies over a 20-year planning horizon and consider various drought scenarios. This water management plan serves to outline the operations of the City of Brawley's system in the context of its customers, supplies, and service area, and integrates future planning efforts from regional planning agencies such as city or county land-use General Plans, Specific Plans, and Water Master Plans to achieve its holistic forecasting and reliability assessment.

As such, the purpose of this 2020 UWMP is to serve as the City Brawley's long-term planning document to ensure a reliable water supply to its customers. The plan documents the overall supply and demand of water for the City, identifies any possible deficiencies in the water supply for the next 20 years (2020-2040) and aims to confirm compliance with the 2020 water usage goal established in the previous 2015 UWMP**.** This 2020 UWMP follows the outline order of the *2020 Urban Water Management Plans: Guidebook for Urban Water Suppliers* Final, Jan 2021, and includes the following:

- Chapter 1 – Introduction and Lay Description
- Chapter 2 – Plan Preparation
- Chapter 3 – System Description
- Chapter 4 – Customer Water Use
- Chapter 5 – Conservation Target Compliance
- Chapter 6 – System Supplies
- Chapter 7 – Water System Reliability
- Chapter 8 – Water Shortage Contingency Planning
- Chapter 9 – Demand Management Measures
- Chapter 10 – Plan Adoption, Submittal, and Implementation

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In addition to the statement of goals, objectives and policies, the 2020 UWMP includes discussions, data, and water shortage conservation plan which provide for the prudent and conscientious management and utilization of water resources for future development in the City. The implementation of this 2020 UWMP is meant to assure that water resources are conserved and utilized as efficiently as possible, and to provide for the long-term viability and availability of this precious resource.

This reporting by all suppliers allows for the statewide assessment of the reliability of water supply sources over a 20-year planning window, streamlines metrics for baseline demand forecasts, and provides a broad picture of statewide risk, water saving and efficiency measures, and water shortage contingency plans. Development of these UWMPs also serves as the legal and technical water management foundation for the state by gathering, characterizing, and synthesizing local and regional water-related information and concerns for practical knowledge and use by constituents as well as enabling water agencies and, in turn, the state to set targets and track progress toward decreasing daily per capita urban water use throughout California. In this manner, the UWMP Act directs water agencies in carrying out their long-term resource planning responsibilities to ensure adequate water supplies are available to meet existing and future demands (CWC §10612 (b)).

Furthermore, an UWMP which has been determined by DWR to address the requirements of the Water Code is required for an urban water supplier to be eligible for a water management grant or loan administered by DWR, the State Water Resources Control Board (State Water Board), or the Delta Stewardship Council (CWC §10631.5(a)). A current UWMP must also be maintained by the water supplier throughout the term of any grant or loan administered by DWR.

1.1.2 DWR Updates to the UWMPs

In accordance with the need for updating UWMPs every five years, there have been significant changes to the water code for the 2020 UWMP from the previous 2015 requirements.

A significant change from the previous 2015 UWMP is the modification of the “multiyear” time period to a “drought lasting five consecutive water years” for dry-year water reliability planning, an increase from the previous requirement of three years which is incorporated in this 2020 UWMP. Additionally, UWMP laws were modified in 2018 by the legislature to require that a Water Shortage Contingency Plan (WSCP) be included in the 2020 UWMP update. This separate WSCP provides an action plan for a drought or catastrophic water supply shortage as part of the City’s standard procedures and response actions which are discussed in detail in Chapter 8. This WSCP is intended to specify opportunities to reduce demand and augment supplies under various water shortage conditions. These new requirements were implemented in tandem with the new 5-year drought risk assessment planning due to the significant duration of recent California droughts and the predictions about continued or prolonged hydrological changes due to climate change. This 2020 UWMP will serve to assist the DWR, State Water Board, and the Legislature to address water supply availability in the event of extreme drought conditions or statewide calamities. Furthermore, the Water Code now requires Suppliers to also address seismic risks of their water system facilities which are also addressed in detail in Chapter 8.

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1.2 Lay Description

There is no foreseeable water shortage in the City of Brawley for the next 20 years. The City of Brawley uses Colorado River water that can supply the City with sufficient water to meet all projected demand. Thus the City is not affected by climatic related supply shortages. There was a 10-year drought on the Colorado River (Oct 1999 - 2010); however, storage on the river remained sufficient for its recipients. In addition, Imperial Irrigation District (IID) has senior water rights to Colorado River water and ranks urban supply higher than the agricultural supply; so even if the drought on the Colorado River were to impact IID's supply, the City's use would not be impacted.

An awareness of the importance of a sound water policy is important in recognizing that water in California is becoming a stretched resource. In fact, California's past use of 5.2 MAFY of Colorado River water exceeds its right to 4.4 MAFY. This led to the Quantification Settlement Agreement of 2010 (QSA), under which the amount of Colorado River water available to California and to the Imperial Valley was quantified.

Land use decisions based in part upon water resources have significant effects on the physical, social, and economic character of the county. Although the UWMP is concerned with long-range goals and objectives, attention is also given to currently existing conditions and issues. This approach enables the City to face important issues today, thereby avoiding problems in the future.

1.2.1 Water Service Reliability

IID has assured the City that all of its required water supply demands will be delivered, even under shortage, drought conditions, and/or a worst case water supply scenario. IID has senior water rights to the Colorado River flows, and it is unlikely that the urban water supply of IID, which comprise less than three percent of its annual water deliveries, will ever be affected. Thus, the City expects no supply shortage at any point in the future. In the event of a water shortage due to a catastrophic interruption, the City will follow the newly established Water Shortage Contingency Plan (WSCP) accompanying this 2020 UWMP.

1.2.2 Challenges Ahead

The challenges ahead include continuing water conservation measures for the foreseeable future to curb the effects of varying hydrological conditions and increasing population demands. However, the City is aptly prepared for the rise in demand and maintains supply reliability for the next 20 years.

1.2.3 Strategies for Managing Reliability Risks

The City continues to plan for managing reliability risks. Formalized plans and strategies are not yet in place, however, the City continues to manage and prepare for the possibility of catastrophic events and is working on preparing assessment and mitigation plans for implementation in the near future.

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Chapter 2 – Plan Preparation

This chapter serves to provide information on the processes used for developing this 2020 UWMP, including efforts in coordination and outreach. The City of Brawley utilized DWR's *Urban Water Management Plan Guidebook 2020* in preparation of this 2020 UWMP.

**** The following paragraphs in italicized text are verbiage from the law.*

2.1 Plan Preparation

Similar to the previous 2015 UWMP, the City of Brawley has prepared this 2020 UWMP in an individual planning effort. However, the City of Brawley reached out and coordinated with the Imperial Irrigation District (IID) for sections of the plan for regional consistency. The City of Brawley utilized DWR's *Urban Water Management Plan Guidebook 2020* in preparation of this 2020 UWMP.

In preparing this 2020 UWMP the City of Brawley has encouraged broad community participation. Copies of the City's draft plan were made available for public review at the City's office. The City of Brawley noticed a public hearing to review and accept comments on the draft plan prior to its final adoption.

2.2 Basis for Preparing a Plan

"Urban water supplier" means a supplier either publicly or privately owned, providing water for municipal purposes either directly or indirectly to more than 3,000 customers or supplying more than 3,000 acre-feet of water annually. An urban water supplier includes a supplier or contract for water, regardless of the basis of right, which distributes or sells for ultimate resale to customers. This part applies only to water supplied from public water systems… (10617).

Per CWC 10617. urban water suppliers are defined as agencies that provide water for municipal purposes to more than 3,000 customers or supply more than 3,000 acre-feet of water annually (CWC §10617) and are required to prepare an UWMP every five years.

The City of Brawley meets this criterion as it supplies over 3,000 connections and over 3,000 acre-feet of water per year; see **Figure 1** for further information.

Table 2-1 Retail: Public Water Systems			
Public Water System Number	**Public Water System Name**	**Number of Municipal Connections 2015**	**Volume of Water Supplied 2015**
1310001	City of Brawley	5,490	2,171
	TOTAL	5,490	2,171
NOTES: Units in Million Gallons (MG)			

Figure 1 – Table 2-1 Retail: Public Water System

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The plan, or amendments to the plan, submitted to the department … shall include any standardized forms, tables, or displays specified by the department (10644(a)(2)).

This report has been completed in compliance with the CWC requirements and uses the standardized data tables and SB X7-7 verification forms specified in the *Urban Water Management Plan Guidebook 2020* in accordance with CWC §10644(a)(2).

2.3 Individual or Regional Planning and Compliance

The City of Brawley is reporting solely on its own service area and is not a member of a Regional Alliance, see **Table 2-2**. IID is the regional supplier from which the City of Brawley receives its water supply. In past years IID would prepare a regional UWMP which included the City of Brawley amongst others. Beginning in 2010 IID no longer prepared a UWMP and the cities it served were required to prepare and submit their own individual UWMP's.

Table 2-2 Retail: Plan Identification			
Select Only One	**Type of Plan**		**Name of RUWMP or Regional Alliance** *if applicable drop down list*
☑	**Individual UWMP**		
	☐	Water Supplier is also a member of a RUWMP	
	☐	Water Supplier is also a member of a Regional Alliance	
☐	**Regional Urban Water Management Plan (RUWMP)**		
NOTES:			

Figure 2 – Table 2-2 Retail Plan Identification

2.4 Fiscal or Calendar Year and Units Measure

Urban retail water suppliers…may determine the targets on a fiscal year or calendar year basis (1608.20(a)(1)).

The City of Brawley reports its water data and assessments on a calendar year basis and on a million-gallon (MG) unit of measure as summarized on **Table 2-3** below. The UWMP data is consistent with the data submitted in other reports to the state. This 2020 UWMP includes the water use and planning data for the entire calendar year of 2020.

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Table 2-3 Retail: Supplier Identification	
Type of Agency (select one or both)	
☐	Agency is a wholesaler
☑	Agency is a retailer
Fiscal or Calendar Year (select one)	
☑	UWMP Tables Are in Calendar Years
☐	UWMP Tables Are in Fiscal Years
If Using Fiscal Years Provide Month and Day that the Fiscal Year Begins (dd/mm)	
Units of Measure Used in UWMP (select from Drop down)	
Unit	MG
NOTES: Million Gallons	

Figure 3 - Table 2-3 Retail: Supplier Identification

2.5 Coordination and Outreach

Development of this 2020 UWMP was coordinated with the Imperial Irrigation District, City Staff, the Mayor's Office, City Planning, Fire, Building, Police, and local Emergency Services offices.

Community participation was encouraged and drafts of the 2020 UWMP were distributed to the Imperial Irrigation District, Imperial County Planning/Building and Public Works Departments, and the City of Brawley for review and recommendations. The final draft will be distributed to staff of the Imperial Irrigation District; the cities of Brawley, Calexico, Imperial; and Imperial County within 30 days after the final draft is submitted to DWR.

2.5.1 Wholesale and Retail Coordination

An urban water supplier that relies upon a wholesale agency for a source of water shall provide the wholesale agency with water use projections from that agency for that source of water in five-year increments to 20 years or as far as data is available. The wholesale agency shall provide information to the urban water supplier for inclusion in the urban water supplier's plan that identifies and quantifies, to the extent practicable, the existing and planned sources of water as required by subdivision (b), available from the wholesale agency to the urban water supplier over the same five-year increments, and during various water-year types in accordance with subdivision (c). An urban water supplier may rely upon water supply information provided by the wholesale agency in fulfilling the plan informational requirements of subdivisions (b) and (c) (10631(j)).

The City of Brawley's water usage is, and always has been, well below the available supply and has therefore never provided projection information to the IID. Going forward for all future years, the City will ensure that the basic projected usage information is provided to IID to allow both agencies to properly

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analyze current and future water usage. **Table 2-4** identifies the Water Supplier(s) who are notified of projected water uses by the City of Brawley.

Table 2-4 Retail: Water Supplier Information Exchange
The retail supplier has informed the following wholesale supplier(s) of projected water use in accordance with CWC 10631.
Wholesale Water Supplier Name *(Add additional rows as needed)*
IMPERIAL IRRIGATION DISTRICT (IID)
NOTES:

Figure 4 - Table 2-4 Retail: Water Supplier Information Exchange

2.5.2 Coordination with Other Agencies and the Community

Each urban water supplier shall 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 (10620(d)(2)).

Prior to adopting a plan, the urban water supplier shall make the plan available for public inspection and shall hold a public hearing thereon. Prior to the hearing, notice of the time and place of hearing shall be published within the jurisdiction of the publicly owned water supplier pursuant to Section 6066 of the Government Code. The urban water supplier shall provide notice of the time and place of hearing to any city or county within which the supplier provides water supplies. A privately owned water supplier shall provide an equivalent notice within its service area (10642).

The City provides water to connections within its service boundary only. All those within the City's supply area have been notified in accordance with CWC above.

The City of Brawley encourages community participation in its urban water management planning efforts and has made the draft available to the community for review and comments. Copies of the draft plan are available at City Hall.

2.5.3 Notice to Cities and Counties

Every urban water supplier required to prepare a plan pursuant to this part shall, at least 60 days prior to the public hearing on the plan required by Section 10642, notify any city or county within which the supplier provides water supplies that the urban water supplier will be reviewing the plan and considering amendments or changes to the plan. The urban water supplier may consult with, and obtain comments from, any city or county that receives notice pursuant to this subdivision (10621(b)).

To accomplish the community's participation, the City of Brawley noticed a public hearing to all parties to review and accept comments on the draft plan. The City published notice in the local newspaper of the

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availability of the draft UWMP for public inspection and stating the date and time of the public hearing to adopt the UWMP. The notice was published once a week for two successive weeks.

The hearing took place on June 7, 2021 at 7:00pm at:

City Council Chambers
383 Main Street
Brawley, CA 92227

The final plan, which was adopted by City Council on June 07, 2021, was distributed to the cities of Brawley, Calexico, Calipatria, El Centro, Holtville, and Westmorland; Imperial County Planning/Building and Public Works departments; Imperial Irrigation District's Public Affairs; public libraries in the cities of El Centro, Calexico, Brawley, and Imperial; the California State Library, and to others upon request. The signed resolution to adopt the plan may be found in **Appendix E**. The final plan was submitted to the California Department of Water Resources within 30 days of Council approval. Refer to Chapter 10 for further discussion on the notice, public hearing, and adoption process conducted for the final submittal of the adopted and approved plan to DWR.

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Chapter 3 – System Description

This chapter serves to describe the Supplier's system, service area and climate, and organizational structure and history. **Figure 5** shows the location of the city with respect to the State of California.

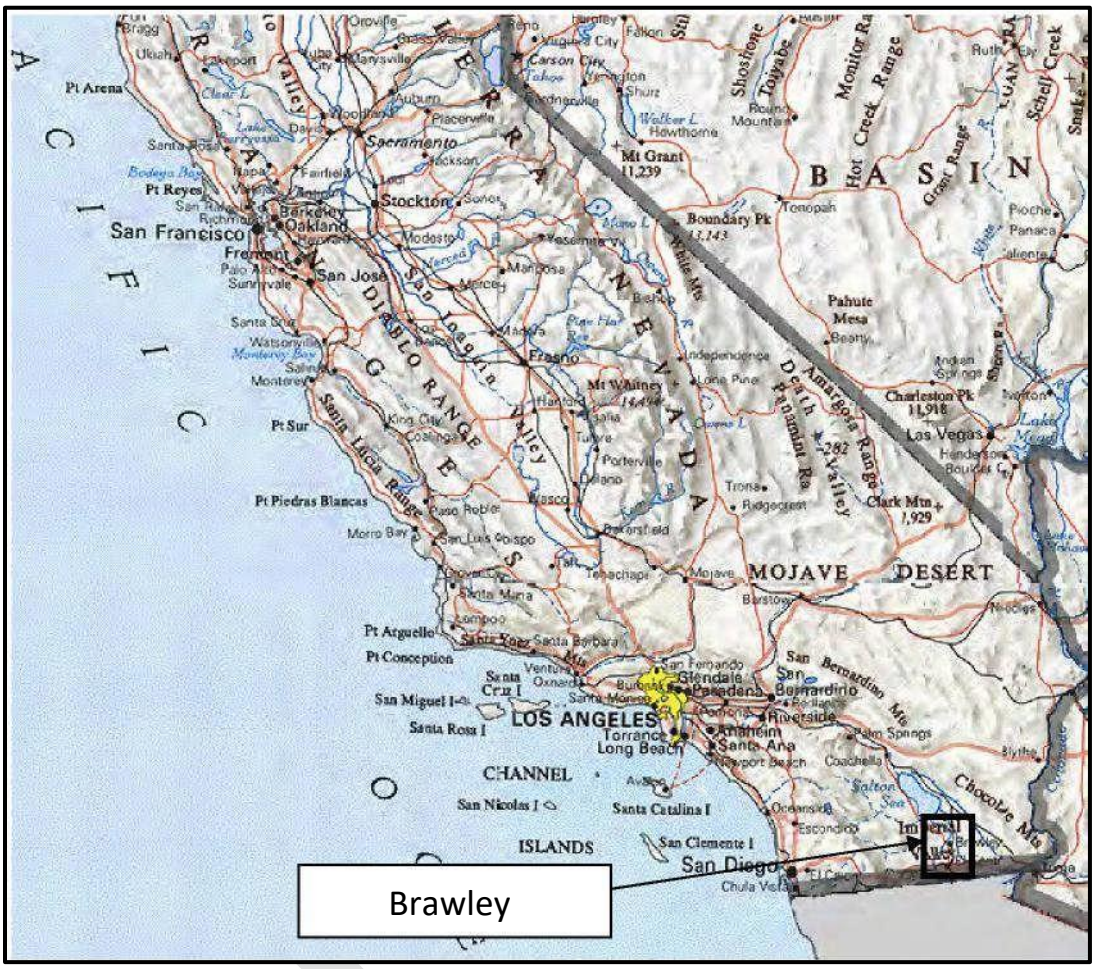

Figure 5 - Vicinity Map for the City

3.1 General Description

The City of Brawley is a retail-only water agency which supplies its service area with the raw water received from the IID wholesaler. According to the United States Census Bureau, the incorporated City of Brawley currently covers an area of approximately 7.7 square miles (approx.4,902 acres).

The City of Brawley is located at the intersection of Highways 86 and 78 in the Imperial Valley within the Imperial County. The City is approximately 6 miles southeast of the City of Westmorland, approximately 9 miles to the south of the City of Calipatria, 9 and 12 miles north of the Cities of Imperial and El Centro respectively, and approximately 21 miles north of Calexico. The Brawley city limit is shown on **Figure 6**. The city's elevation, like other Imperial Valley towns, is below sea level and all is land within the city limits, except for the Alamo River and New River that seasonally flow through the city. The New River flows from

the southwest to the northern portion of the city and the Union Pacific Railroad generally extends north-to-south and bisects central Brawley.

Figure 6 - Brawley City Limits

3.1.1 City History

The City of Brawley was founded in October of 1902 and was incorporated in February of 1908. The first settlers were Charles E. Guest, Edwin Mead and Earl Pound and started as a tent city of only 100 persons involved in railroads and the earliest onset of agriculture. The first building was the town site company office building which is now located on the property of Mr. J. F. Warner. The first bank was built on March First in 1904 and was called Imperial Valley Bank. The first church was the Methodist Episcopal, organized by Mr. H. C. Mullen of Imperial. The first grade school was erected in September, 1903, the first high school in 1909. In 1904 the Brawley Chamber of Commerce was chartered. In February of 1908 a petition was circulated to incorporate and was signed by fifty citizens. The Brawley Airport was built in 1928 and the City has continued to grow to the current City it is today. The city had a population of 11,922 in the year 1950. The population growth was rather slow during the 1960s to the early 1990s. However,

recent developments in the city have made it a main cattle raising center in California. The City's continued growth is largely due to the formation of the Imperial Irrigation District.

The IID was formed in 1911 under the California Irrigation District Act to acquire the properties of the previous California Development Company. IID was formed as a public agency, acquiring 13 mutual water companies in the valley which had developed and operated water distribution canals. IID took over where the California Development Company left off and was involved in the planning and construction of a replacement for the Imperial Canal. The replacement has since become known as the All-American Canal which provides wholesale water to the City of Brawley along with other cities within the Imperial County.

3.1.2 Economy

The City of Brawley has grown slowly but consistently and on an economically sound basis. Brawley has historically played a significant role in the agricultural economy that characterizes Imperial County. The landscape around the urbanized areas is dominated by agricultural fields, scattered farmhouses, and related agricultural structures and open spaces. Agricultural production, along with cattle and feed industries, has been one of the most important economic activities in Brawley throughout the 1900s until the present day and is expected to play a major economic role for the foreseeable future. This is due to several environmental factors including good soils, a year-round growing season, availability of adequate water transported from the Colorado River, extensive areas committed to agricultural production, a gently sloping topography, and a climate that is well-suited for growing crops and raising livestock.

The economic conditions in the City of Brawley have largely mirrored that of the Imperial County which has also relied on agriculture. More than 120 types of crops are currently grown within the Imperial County. In addition, a number of feedlots and dairies located in the Valley have significant economic impact. In 2009, based on acreage, Imperial Valley's top twelve crops were alfalfa, wheat, Bermuda grass, Sudangrass, lettuce, sugar beets, carrots, kleingrass, broccoli, onions, melons and sweet corn, representing nearly 90% of the cropped acreage. In the Imperial Valley, the total area farmed was 488,499 acres in1990, 481,151 acres in 1995, 479,000 acres in 2000, 473,903 acres in 2009, and 417,668 in 2013.

However, the local economy in Brawley is increasingly becoming more diversified and less reliant on the economic cycles of agriculture. Brawley's strategic crossroads location at several major highways and the railroad facilitates easy access for residents and visitors, and regional shipping services. Furthermore, a number of other factors in the area including the construction of two State prisons; growth of the renewable energy industry in the area; expansion of the Naval Air Facility; and additional Mexico/USA border crossing will serve to add occupations and improve the area's economy.

Currently, the City has a weak commercial base. As a result, many residents as well as nearby jurisdictions, commute to El Centro for their shopping needs. However, as commercial development and urbanization grows, the City has the potential to capture more sales tax revenue by providing additional commercial opportunities to those who might otherwise not shop in the City. In addition, more residential development within the City will increase property tax revenue which will help to pay for further City facilities and services. A balance between new urban development and conservation of agricultural lands is important for expansion of the local economy, continuation of prime agricultural production, and maintenance of the City's rural character.

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3.1.3 City of Brawley Organizational Structure

The City of Brawley operates under a City Council and City Manager form of government. The City Manager serves on behalf of the City Council which consists of five council members elected to four-year terms. The City Manager and staff manage the City's resources to implement the policies set by City Council to meet the needs of the City of Brawley. The City's Public Works Director, with oversight by the City Manager, runs the Public Works Department which operates and maintains the infrastructure of the City of Brawley including the City's water system.

3.1.4 City of Brawley Water System

The City of Brawley supplies the raw water received from the IID wholesaler through its potable water system. Untreated water to be used for agricultural purposes is delivered to customers directly from the IID canal systems, while water to be used for domestic and industrial or commercial purposes is delivered to the City of Brawley's Water Treatment Plant (WTP).

Brawley's water system is comprised of a water treatment plant, three storage facilities, two pump stations, and approximately 75 miles of 4 to 36 inch water mains. The City consists of one pressure zone and serves approximately 6,100 potable water service connections. The City's current WTP is permitted to treat 15 million gallons per day (MGD) to accommodate peak daily use but has a hydraulic capacity of 22.5 MGD. The WTP is also expandable to 30 MGD to accommodate future growth. **Figure 7** below illustrates a summary of the City's potable water system.

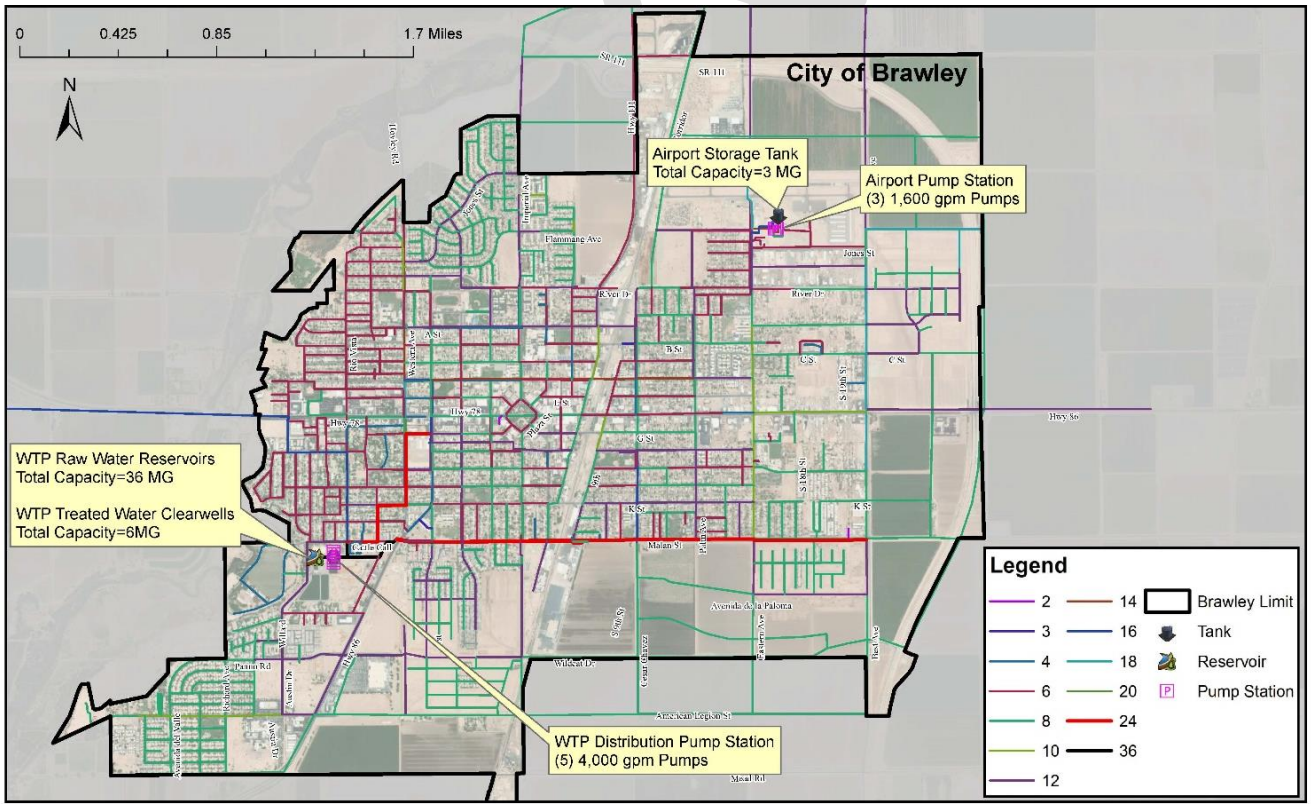

Figure 7 - City of Brawley's Potable Water Distribution System

The City purchases Colorado River water from IID via the IID-owned and operated All-American Canal system which is ultimately supplied to Brawley's WTP via the Mansfield Canal off the Central Main Canal. The capacity of the Mansfield Canal is 30 CFS (19 MGD) and delivers the purchased water to the City's raw water storage reservoirs. The City utilizes two (2) raw water storage reservoirs located at the WTP with a total capacity of 36 MG which are then treated at the City's 15 MGD capacity WTP and pumped and distributed via its pump station located at the WTP.

The pump station consists of five (5) 4,000 gpm capacity pumps. Four (4) of the pumps are equipped with variable frequency drives (VFD) and one (1) is a constant speed pump. The City of Brawley also operates a second potable water pump station located adjacent to the Brawley Municipal Airport in the northeastern portion of the City. The Airport Booster Pump Station includes three (3) 1,600 gpm constant speed pumps which pump from the storage tank located onsite during peak demand periods to maintain pressures within the system.

Within the WTP, the pumps deliver water to the flash mixer where ferric chloride is added to coagulate the suspended solids. The water then proceeds to the two flocculation basins in parallel. Three stage flocculation is provided. The flow continues to two sedimentation basins where the floc is settled. Filtration is provided with four conventional dual media, anthracite and sand, gravity filters, with a surface area of 576 sqft. per filter. Filters are designed with a filter to waste system and air scour during the backwash. Backwash water flows by gravity to two backwash recycle ponds. The supernatant is returned to the raw water ponds. Inactivation with gas chlorination is provided in three clear wells with a combined capacity of 10 MG. The city incorporates a comprehensive water quality program originating at the treatment facility and on through its pumping and distributions systems to ensure that all regulatory requirements are met. Overall the treatment train reduces the NTU from approximately 20 NTU from the raw water to less than 0.03 NTU flowing into the finished clear water reservoirs.

The City's network consists of approximately 100 miles of pipelines ranging from 2-inch diameter to 36 inches. The majority of the City's transmission and distribution mains generally consist of 6-inch to 12-inch diameter pipelines. Per the 2012 Water Master Plan, it is typically understood that pipelines 12 inches in diameter and larger are considered transmission mains, while all smaller pipes are considered distribution mains.

For finished water storage the City has three separate (3) MG above ground storage tanks. Two of the tanks are at the water plant, and one is located at the airport.

The treatment incorporates several processes including pumping, chemical injection, primary sedimentation, flocculation, filtration, and finish water storage to ensure the city is provided with a reliable supply of safe, clean drinking water. Currently the treatment facility is producing an average of 8.5 million gallons per day of potable water (9,479 acre-feet per year). Total supply is regulated only by the total amount of water that can be treated at the water treatment plant. The **Figure 8** below shows the 2020 distribution system flows.

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Table 3-0 Retail: 2020 Distribution System Flows		
Parameter	**MGD**	**GPM**
Annual Daily Average	5.93	4,120
Maximum Day	8.89	6,174
Minimum Day	1.38	959
Maximum Day Peak Hour	13.88	9,639
Minimum Day Peak Hour	3.67	2,554
Maximum Month Average	253.93	176,340
Minimum Month Average	120.13	83,424

Figure 8 - Table 3-0 Retail: 2020 Distribution System Flows

3.2 Service Area Boundary Maps / Current Water Service Area

The City of Brawley's total service area includes the limits within its incorporated City boundary as well as its extended sphere of influence (SOI). Together, these areas comprise the City's total planning area. The County of Imperial has identified a SOI for the City of Brawley which extends beyond the City's current jurisdictional boundaries. This sphere of influence is an area in which a city of county has power to affect developments although not within its current jurisdictional limits. It is defined in the City's General Plan as the probable ultimate physical boundaries and service area of a local agency (city or district) as determined by the Local Agency Formation Commission (LAFCo) of the County. It is anticipated that these areas will eventually be annexed or incorporated as the city grows and develops and thus should be included as part of the city's Planning Area. According to the City's General Plan, the SOI boundary consists of approximately 5,943 acres outside the existing boundaries of the City. Therefore, the current City limits and SOI boundaries consist of approximately 4,902 and 5,943 acres, respectively, for a combined total of approximately 10,845 acres. The last updated boundary map by LAFCo dated December 2018 is presented in **Figure 9** showing the City's boundary and SOI area limits.

The City and its SOI are not adjacent to any other cities or areas of urban development, and the nearest such communities are the cities of Westmorland approximately 6 miles to the northwest, Imperial approximately 6 miles to the south, and Calipatria approximately 8 miles to the north. The City of Brawley provides an array of services within its incorporated limits and these services will be provided to areas within the SOI after they are annexed. The City already provides water and wastewater treatment to some areas in the SOI.

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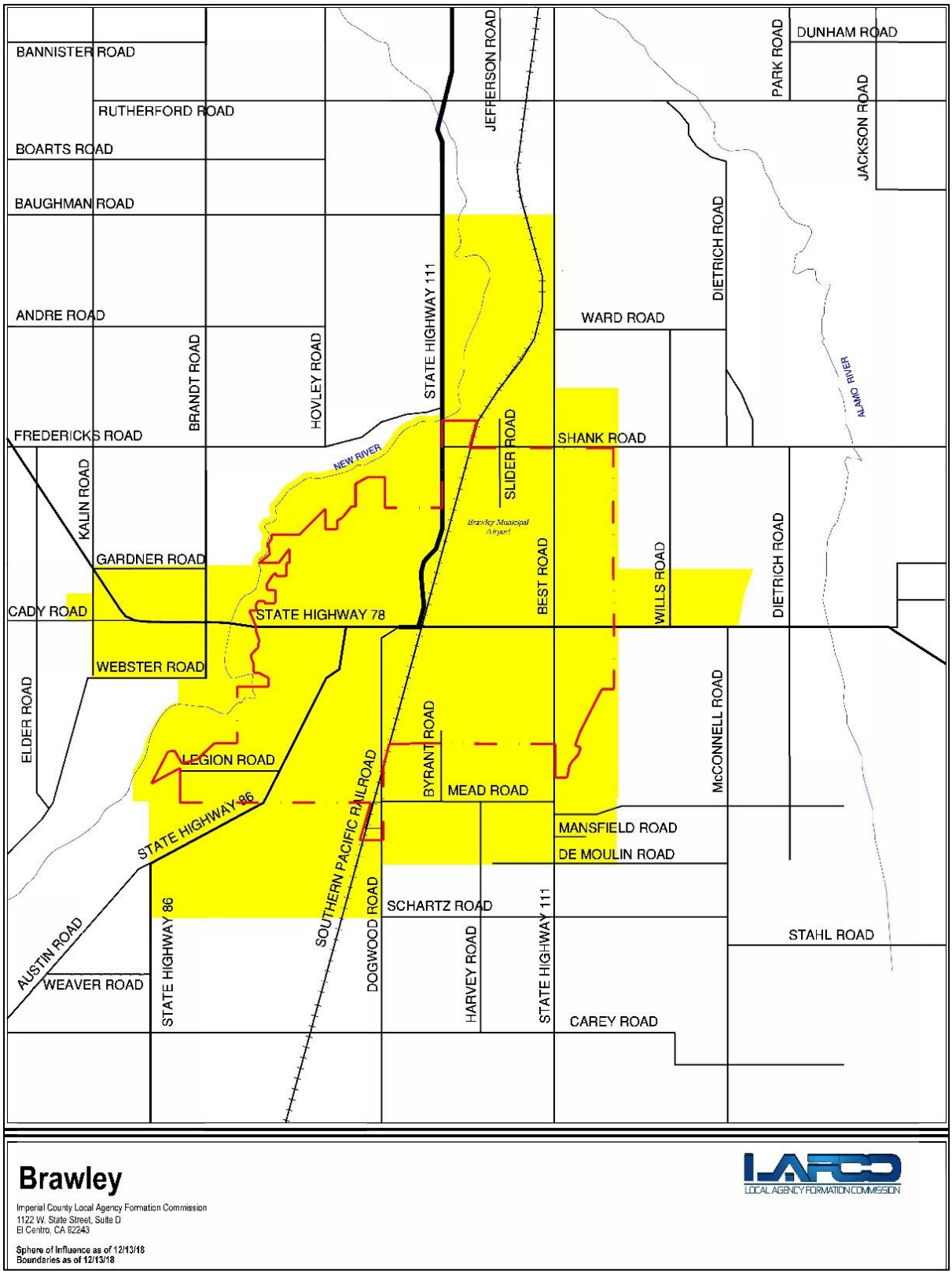

Figure 9 - City of Brawley Boundary and Sphere of Influence

3.2.2 Regional Boundary

The City of Brawley is located in the Imperial Valley within Imperial County. The Imperial County encompasses an area of 4,597 square miles or 2,942,080 acres and is situated in the southeast comer of California which is bordered on the west by San Diego County, on the north by Riverside County, on the east by the Colorado River which is the California/Arizona boundary, and on the south by 84 miles of the International Boundary with the Republic of Mexico.

The Imperial Valley is an area within Imperial County that extends southward for 50 miles from the southern end of the Salton Sea to Mexico. The Imperial Valley was created when the Colorado River formed a delta that isolated the Salton Trough from the Gulf of California. Subsequently, under desert conditions, the inland sea dried up. Later, the trough was occupied by lakes for various periods, and deposition into these lakes gave the valley its characteristic flat lands and fertile soils.

The general area of the Imperial Valley, also known as the Imperial Unit, is bounded on the north by the Salton Sea, on the south by the U.S. Mexico border, on the east generally by the East Highline Canal, and on the west generally by the Westside Main Canal. The 699,092 acre Imperial Unit serves the Imperial Valley including the urban areas for the cities of El Centro, Calexico, Imperial and Brawley, and approximately a quarter of Imperial County's unincorporated area.

The City of Brawley's planning area is located within the Imperial Unit of the IID service area, shown on **Figure 10**. IID is the regional water supplier in the Imperial Valley, delivering Colorado River to all agricultural lands and urban water retailers within its water service area.

The IID's total service area, lying entirely within Imperial Valley, is divided into four units: Imperial, West Mesa, East Mesa, and Pilot Knob, with a gross acreage of approximately 1,062,000 acres. IID's water service area encompasses seven cities (Brawley, Calexico, El Centro, City of Imperial, Holtville, Westmorland, and Calipatria); three census-designated places (Niland, Seeley, and Heber); two state prisons (Calipatria and Centinela); and Naval Air Station El Centro. In total, IID delivers water to an area of just over 520,000 acres, including cities, cemeteries, schools, parks, golf courses, and facilities in addition to the irrigated land. IID operates open channel gravity flow irrigation and drainage systems which ultimately provides wholesale canal water to the City of Brawley.

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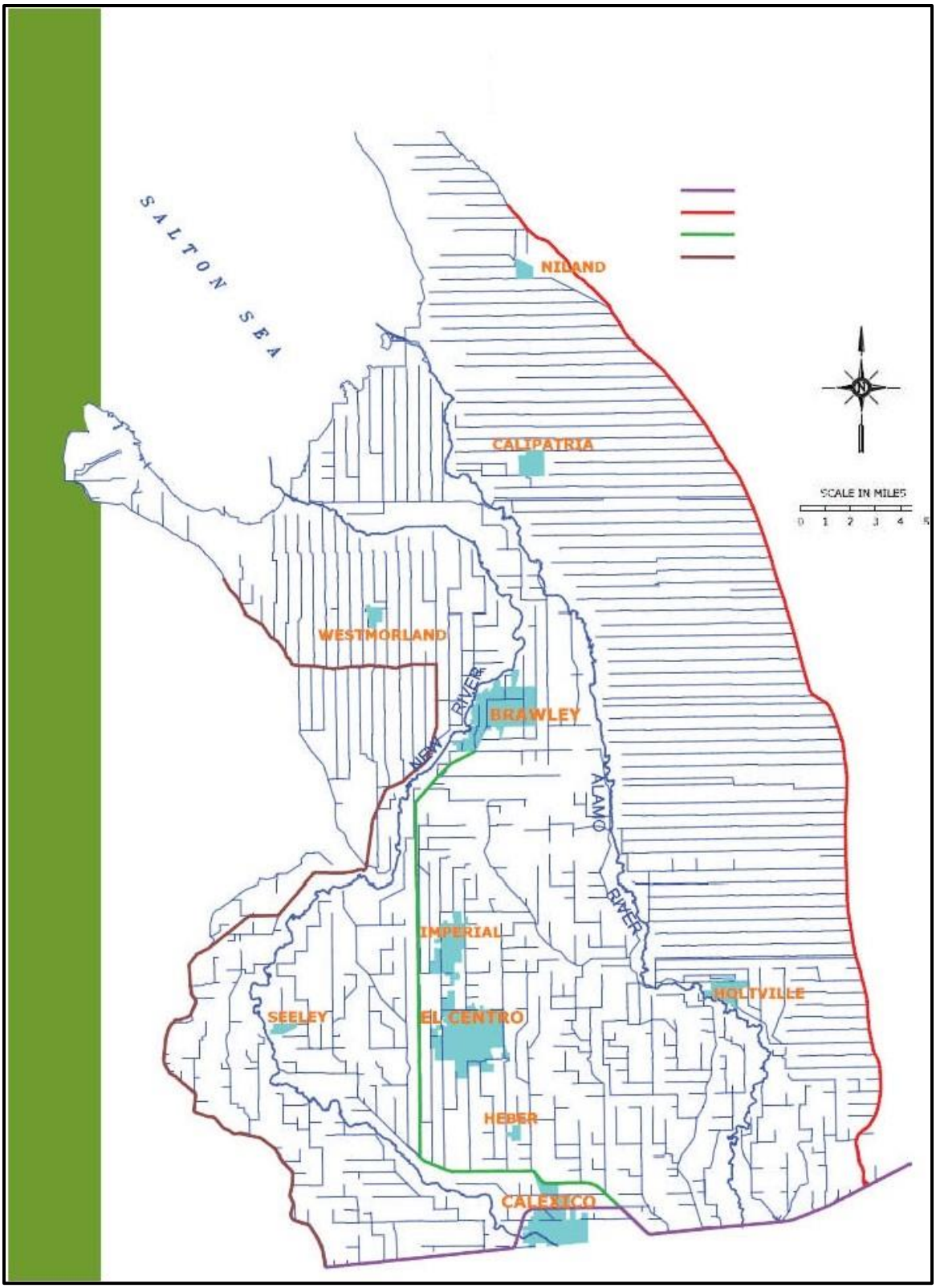

Figure 10 - IID Imperial Unit Service Area

3.3 Land Uses Within Service Area

Data derived from the City of Brawley's General Plan, Service Area Plan, and Water Master Plan, along with the Imperial County's current Land Use Element General Plans are included in this section to provide a holistic understanding of the region and its potential for growth.

3.3.1 Imperial County Land Use

Per IID's 2020 Service Area Plan, the Imperial County remains a predominantly agricultural area. The geographic center of the Imperial Valley is one of the most productive agricultural areas in the world, despite the fact that it is in a very arid region. Agricultural development in the Imperial Valley began at the turn of the twentieth century and now support a $1billion-plus annual local agricultural economy. Approximately one-fifth (534,328 acres) of the nearly 3 million acres of the County is irrigated for agricultural purposes, most notably the areas known as Coachella Valley and the Imperial Valley.

Developed and Urban land uses within the Imperial Valley consist of cities, state prisons, a military base, geothermal plants, and other smaller industrial users. Most of the urban lands are concentrated in and around the incorporated and unincorporated cities with some small clusters of rural residences located away from the population centers. The developed area within the Imperial Valley represents less than one percent of the total amount of land.

In addition, approximately 50 percent of Imperial County lands are largely undeveloped and under federal ownership. The federal government owns approximately one-half of all land in the County, with approximately 1,460,000 acres primarily for the Department of the Interior's Bureau of Land Management property and U.S. Military lands. Bureau of Land Management allows open recreational uses in several areas, including three sites in the Imperial (Algodones) Sand Dunes: Gloomiest/Gawky, Buttercup Valley, and Mammoth Wash. Furthermore, approximately seven percent of Imperial Valley is within the boundaries of the Salton Sea. A breakdown of the Imperial County Land Use distribution is provided in **Figure 11** and the Imperial County Land Use Plan Map is provided on **Figure 12**.

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Imperial County Land Use Distribution (in Acres)			
IMPERIAL COUNTY Land Use Distribution (in Acres), 1985			
Irrigated (Agriculture)			
	Imperial Valley per County General Plan Current Farmable per IID (2013) Total Area Receiving Water from IID (2010)	512,163 473,311 520,000	
	Bard Valley (Including Reservation)	14,737	
	Palo Verde Valley	7,428	
	Total	534,328	(18.2%)
Developed			
	Incorporated	9,274	
	Unincorporated	8,754	
	Total	18,028	(0.6%)
Salton Sea**		211,840	(7.2%)
Desert/Mountains			
	Federal	1,459,926	
	State	37,760	
	Indian	10,910	
	Private	669,288	
	Total	2,177,884	(74.0%)
IMPERIAL COUNTY TOTAL		2,942,080	Acres

*All acreages are approximations and are, therefore, only for informational purposes.
**Elevation of 230 feet below mean sea level.
Source: Imperial County General Plan, County Overview-September 1985 (still current as of 2021)

Figure 11 - Imperial County Land Use Distribution (in Acres)

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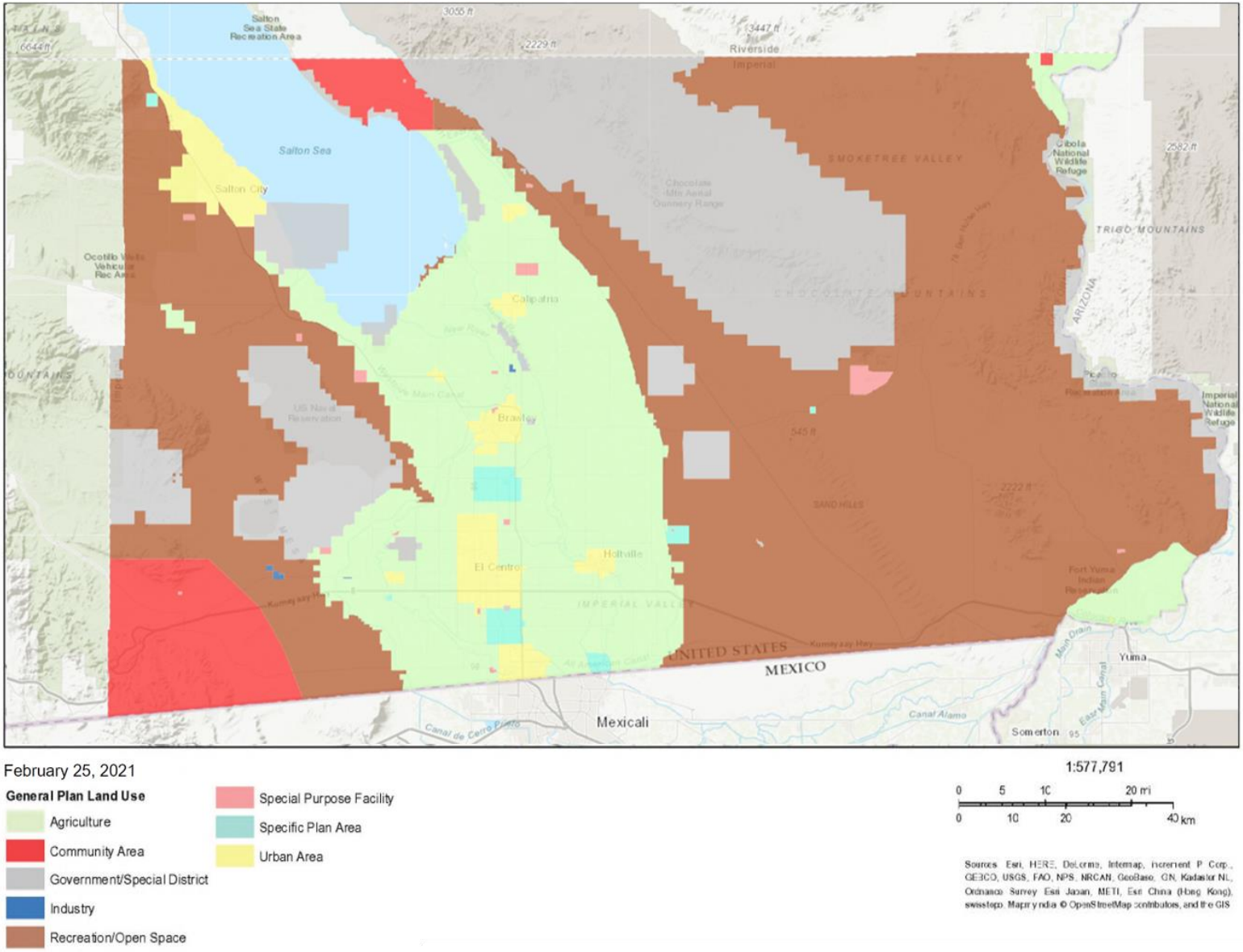

Figure 12 - Imperial County Land Use Map

To support Imperial County's land uses, IID delivers to over 520,000 acres within its water service area. In 2014, around 95.5 percent of the delivered water was used for agricultural purposes on nearly 475,000 irrigated acres as shown on **Figure 13**. The remaining 4.5 percent was delivered for municipal, commercial and industrial use, including rural homes and businesses, and some environmental and recreational uses.

IID Size and Crop Census (in Acres)			
	1994	2004	2014
Field Crops	418,749	390,999	320,662
Garden Crops	98,714	91,078	101,537
Permanent Crops	22,204	19,962	20,424
Total Acres of Crops	**539,667**	**502,039**	**442,623**
Total Multiple Cropped Area	83,627	66,436	37,447
Total Net Acres in Crops	**456,040**	**435,603**	**405,176**
Area Being Reclaimed: Leached	2,860	169	70
Net Acres Irrigated	**458,900**	**435,772**	**405,246**
IID Fallowing Program (12-Month Average)	0	11,827	46,453
IID Solar Fallowing (12-Month Average)	0	0	6,912
Area Farmable but Not Farmed During Year	21,441	27,912	15,648
Total Area Farmable	**480,341**	**475,511**	**474,259**
Farm Area in Homes, Feed Lots, Corrals, Experimental Farms & Industrial Area	16,124	16,821	15,485
Area in Cities, Towns, Airports, Cemeteries, Fairgrounds, Golf Courses, Recreational, Parks, Lakes & Rural Schools	25,307	28,331	30,563
Total Area Receiving Water	**521,772**	**520,663**	**520,307**
Area in Drains, Canals, Reservoirs, Rivers, Railroads & Roads	73,237	74,346	74,742
Area below -230 MSL Salton Sea Reserve Boundary Minus Area Receiving Water	40,150	40,150	40,150
Area in Imperial Unit Not Entitled To Water	63,933	63,933	63,893
Undeveloped Area: Imperial, E & W Mesa, Pilot Knob Units	277,629	277,629	277,629
Total Acreage Included – all units	**976,721**	**976,721**	**976,721**
Acreage within District Boundary Not Included in Units	84,916	84,916	84,916
Total gross Acreage within District Boundaries.	**1,061,637**	**1,061,637**	**1,061,637**
Source: 1992-1994 Annual Inventory of Area Receiving Water, 2002-2004 Annual Inventor of Area Receiving Water and 2012-2014 Annual Inventory of Area Receiving Water. Fallowing acres represent 12-month averages.			

Figure 13 -IID Size and Crop Census (in Acres)

As of 2018, an estimated 520,307 acres were serviced by IID with raw water. The 2018 Annual Inventory of Areas Receiving Water indicated that the total net area irrigated for crops was 444,098. Another 27,584 were farmable acres while an additional 48,625 acres received raw water for rural home sites, feed lots, solar and industrial areas as well as municipal uses.

Due to contractual restrictions related to IID's Colorado River entitlement, total farmable acres within the imperial valley remain fairly constant and total net acres cropped exhibit minor fluctuations as shown above. While the agriculture-based economy is well-established, land use is expected to vary somewhat over the coming years as urbanization and growth occur. An increase could require additional water

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resources if California's use of Colorado River water is limited to its legal entitlement. However, per the Imperial County's 2016 Water Conservation Plan, no change to the size of IID's water service area is anticipated. Understanding of the regional land use allows for identifying potential trends in adjacent areas of incorporated cities and factors that may influence the City itself.

3.3.2 Brawley Land Use

The City of Brawley's 2008 General Plan (City General Plan) guides the City's growth and projects buildout estimates both within the City limits and the SOI. As such, the City has established what types of land uses are allowed throughout specific areas within its boundaries. Data derived from the City's General Plan and Service Area Plan identified that the current land use within Brawley's City limits consist of the following ten major land use designations: Agriculture, Rural Residential, Low-Density Residential, Medium-Density Residential, Commercial, Light Industrial/Business Park, Industrial, Public Facilities such as schools. Parks, and other administrative facilities, Open Space areas, and Special Study Areas as shown in **Figure 15**.

Uses outside the incorporated City limits are primarily farmland or vacant land. Occasional commercial uses such as farm equipment and services, and farm residences also occur within the SOI. Agricultural operations include field crops such as alfalfa, bermudagrass, and sudangrass; vegetable and melon crops such as lettuce, carrots, onions, and broccoli; and grazing land. Other land uses in the existing SOI include a golf course (Del Rio Country Club) and the City's WTP.

In the absence of other up-to-date publications that show the status of current land uses, this 2020 UWMP has used the City's Water Master Plan projections for 2020 shown in **Figure 14**. About 26% of the area within the City's SOI remains as vacant land (1,386 acres). Of this vacant land, 43% is zoned for future residential development. The other large future use is Industrial, with roughly 35% designated for this use.

Brawley Existing Land Use (in Acres)					
General Plan Land Use Category	**Sphere of Influence Total Area**	**Existing Developed Area (2020)**	**Vacant Area**	**% Vacant by Land Use**	**% of Total Vacant Land**
Residential					
Low Density	1,977	1,535	442	22%	32%
Medium Density	621	465	156	25%	11%
Residential Subtotal	2,598	2,000	598	23%	43%
Commercial	704	508	196	28%	14%
Public Facilities	747	634	113	15%	8%
Industrial					
Industrial	1,073	737	336	31%	24%
Light Industrial/Business	309	166	143	46%	11%
Industrial Subtotal	1382	903	479	35%	35%
Total	**5,431**	**4,045**	**1,386**	**26%**	**100%**
Acreage does not include rural residential, open space, transportation, and agricultural land use types as they were considered negligible in terms of water demands.					

Figure 14 - Brawley Existing Land Use (in Acres)

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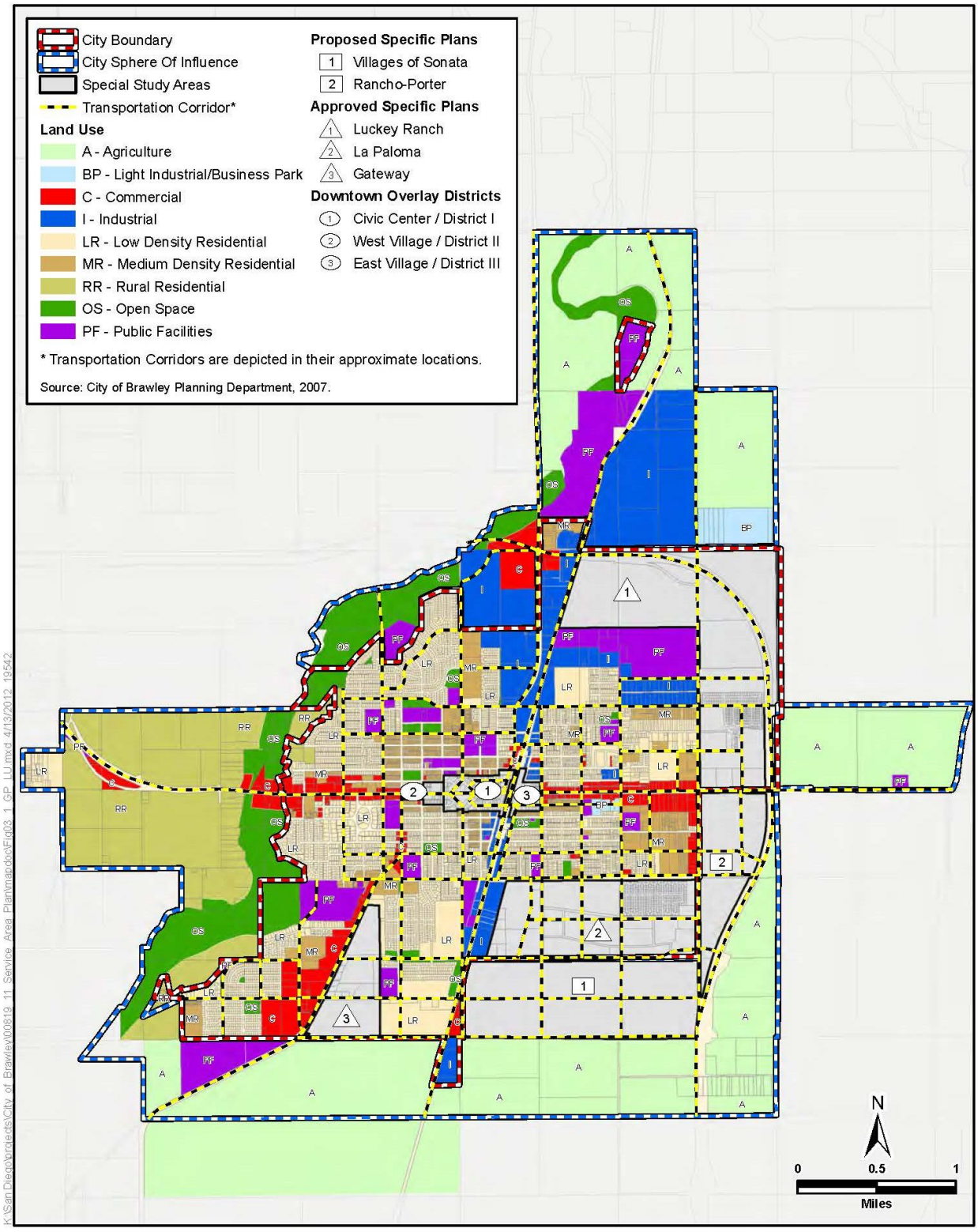


Figure 15 - Brawley General Plan Land Use Summary Map

3.3.3 Future Land Use

Included in the General Plan Land Use map are areas designated within the City for proposed and approved residential specific plans. These specific plans are master planned developments which have been identified within the current planning to allow for the inclusion of their continued infill development. Existing and ongoing developments remain in different stages of development and 4 specific plans are currently in progress per the City's official 2020 Planned Projects List. Refer to **Appendix C** for the City's recent projects description list as downloaded from the City website. Much of these developments remain to be completed despite being initiated as early as 2005. However, all surrounding land is projected to be developed by the year 2030 and the City is anticipated to have reached its buildout capacity. **Figure 16** shows the City's anticipated buildout condition (Year 2030) Official Land Use Map and **Figure 17** below from the City's General Plan provides the projected breakdown of the future land uses and effective development capacity for population growth and the number of units possible under build-out conditions.

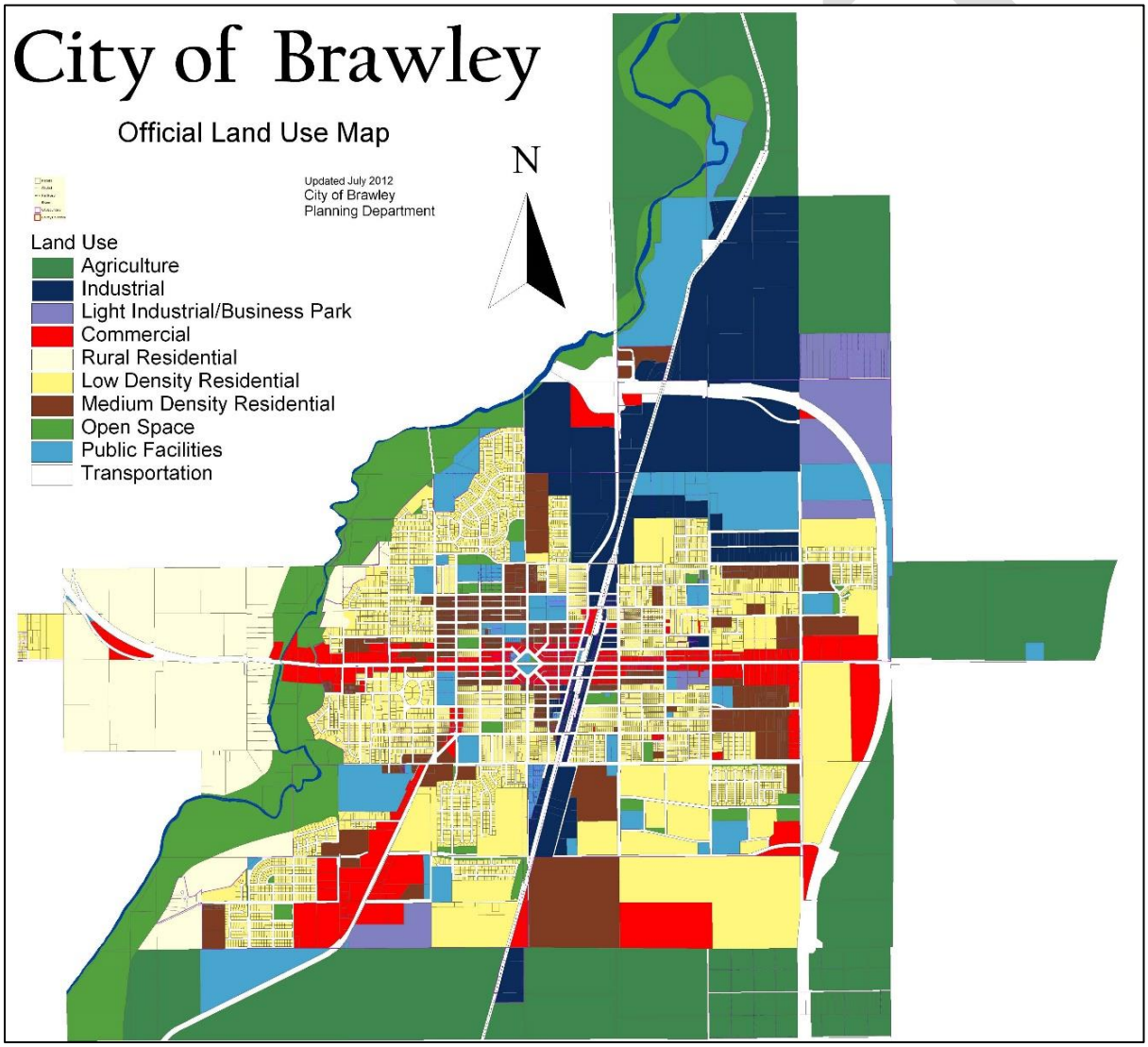


Figure 16 - City of Brawley Land Use Map Build Out Projection

General Plan Land Use Designations	Gross Acres	% of Total Brawley Planning Land Area	% of Gross Acreage Reduced to Achieve Net Acres	Net Acres	Effective Dwelling Unit/ Net Acre	Effective Floor Area Ratio/ Net Acre	Dwelling Units	Population	Square Footage
Agricultural	2,554	23.6%	N/A	2,554	0.025	N/A	64	207	N/A
Rural Residential	914	8.4%	N/A	914	1.2	N/A	1,097	3,554	N/A
Low Density Residential*	2,069	19.1%	10.0%	1,862	5.5	N/A	10,242	33,183	N/A
Medium Density Residential*	542	5.0%	10.0%	488	13.0	N/A	6,341	20,546	N/A
Commercial*	631	5.8%	5.0%	599	N/A	0.3:1	N/A	N/A	7,827,732
Light Industrial / Business Park*	299	2.8%	15.0%	254	N/A	0.4:1	N/A	N/A	4,425,696
Industrial*	1,087	10.0%	15.0%	924	N/A	0.4:1	N/A	N/A	16,099,776
Public Facility*	729	6.7%	5.0%	693	N/A	0.2:1	N/A	N/A	6,037,416
Open Space	853	7.9%	N/A	853	N/A	0.01:1	N/A	N/A	371,567
Transportation Corridor	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Downtown Overlay District	N/A	N/A	N/A	N/A	N/A	N/A	942	3,053	N/A
TOTAL	9,678	89.0%	N/A	9,141	N/A	N/A	18,686	60,542	34,762,187

(1) Approximately 11 percent of the Brawley Planning Area is assumed to be used for non-transportation corridor circulation

(2) * For purposes of establishing density/intensity for certain land use designations marked with an asterisk (*), the gross acreage for residential and non-residential land uses is converted to net acreage through a reduction of gross acreage to primarily account for the land area devoted to roadways.

(3) The Persons Per Household of 3.24 as projected by the Department of Finance in 2006, was used to project the total population

Figure 17 - Brawley Future Land Use Density and Population Per the City's General Plan

The City of Brawley anticipates continued infill developments and future redevelopment within its planning area. Trends in land use point to a focus in the development of existing urban areas to provide residential capacity for an increased population. Any urban areas yet to be developed will be characterized by a broad range of residential, commercial, and industrial uses. Even so, total urban land use in the buildout year of 2030 will remain small in comparison to agriculture land use within the Imperial Unit.

Although the City has established their anticipated land use buildout projections, changing market conditions will govern the remaining infill developments within the City and surrounding areas. Recent developments include the continuation of the approved and proposed residential specific plans and further infill developments. In addition to the existing specific plans, although not yet formally approved, the City has also indicated that in the future the City may expand its water service to include a future planned development to the south of the City known as the Rancho Los Lagos (RLL) Development, which has also sometimes been referred to as the Imperial Development. The proposed development is approximately 1,100 acres of mixed use, including residential, multifamily, commercial, and various public facilities as shown in **Figure 18**.

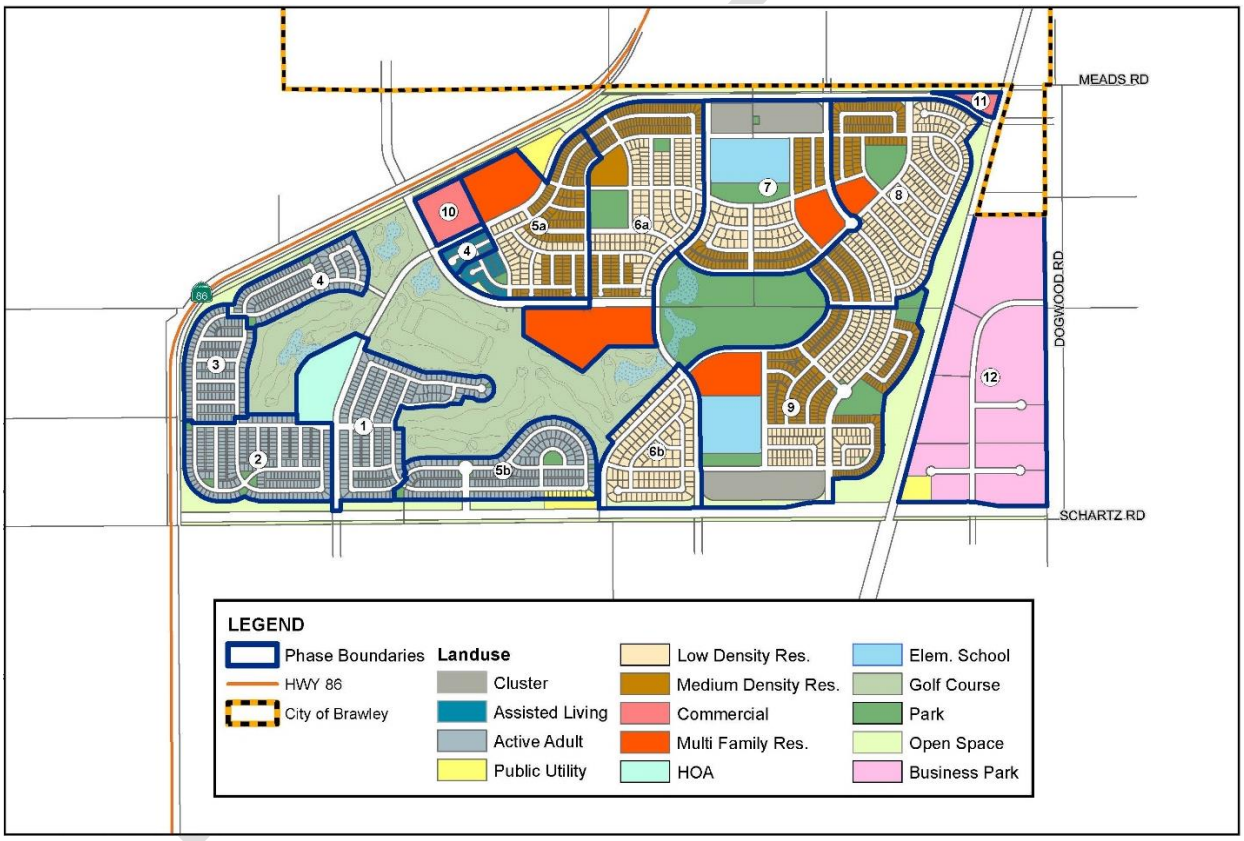
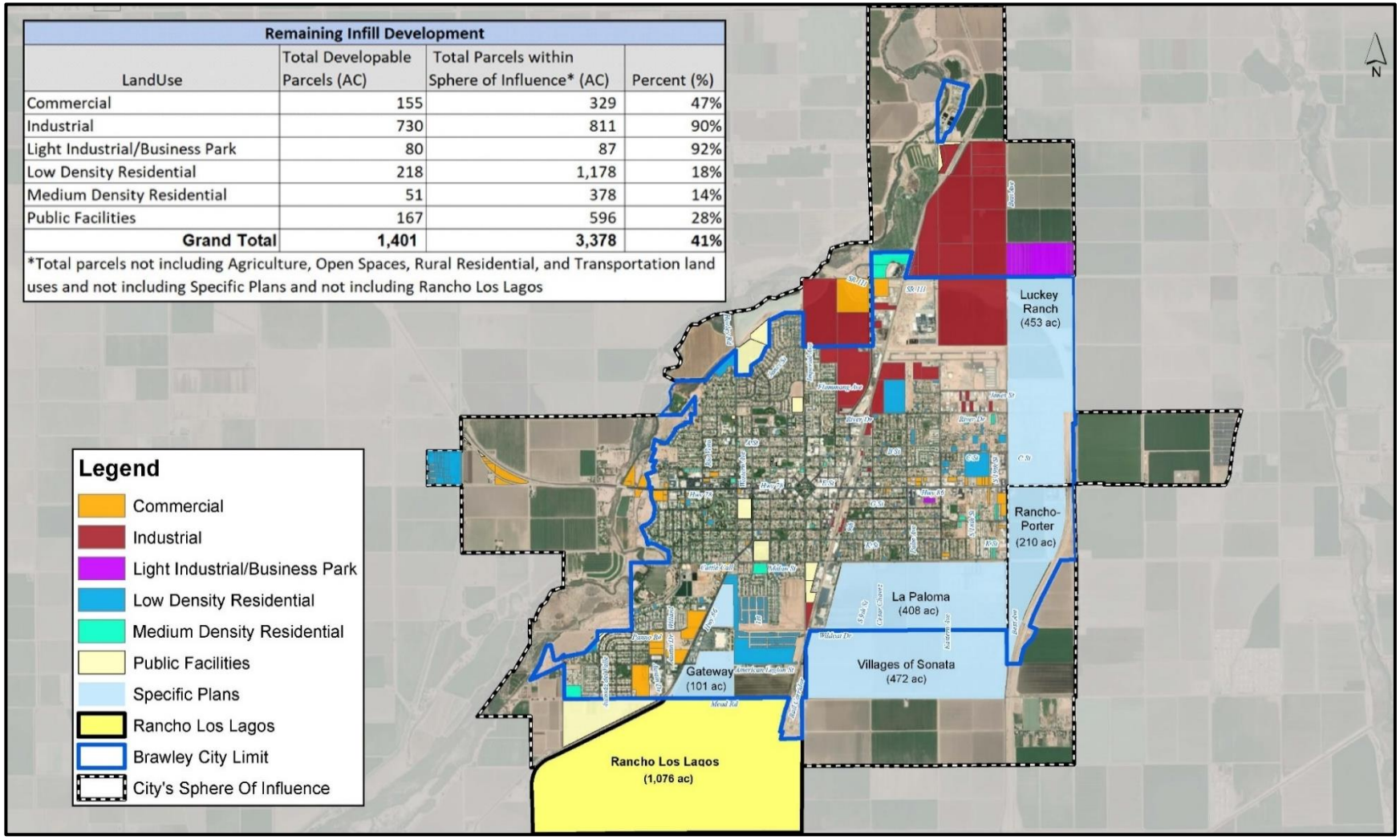


Figure 18 - Rancho Los Lagos Land Use and Phasing Map

This development will take the place of land currently designated as agricultural land. Urbanizations around the City is anticipated to continue; however, the City maintains its goal of balancing the preservation of its agricultural land and rural character while also meeting the needs of its community.

In 2020 the City of Brawley conducted a water study for the RLL development to determine whether the City's existing water system has adequate capacity or if improvements are required to serve the additional demands to RLL, after meeting the City's existing and future commitments. The study included an analysis of remaining infill developments in the area which is summarized in **Figure 19** below.



Remaining Infill Development

LandUse	Total Developable Parcels (AC)	Total Parcels within Sphere of Influence* (AC)	Percent (%)
Commercial	155	329	47%
Industrial	730	811	90%
Light Industrial/Business Park	80	87	92%
Low Density Residential	218	1,178	18%
Medium Density Residential	51	378	14%
Public Facilities	167	596	28%
Grand Total	**1,401**	**3,378**	**41%**

*Total parcels not including Agriculture, Open Spaces, Rural Residential, and Transportation land uses and not including Specific Plans and not including Rancho Los Lagos

Figure 19 - Remaining Infill Development

Furthermore, the Imperial County General Plan (County General Plan), last updated in October 2015, identified and revised the additional service areas for the City of Brawley. It identified "Urban Areas" for urbanizing areas around its the incorporated cities. It noted that previous Imperial County Land Use Plans (prior to 1993) duplicated the land use planning efforts of the cities and, at times, conflicted with them. As such, the County General Plan implemented updates intended to include zone reclassification studies for areas adjacent to cities based on the adopted Land Use Plan of each city. The County General Plan identified urban areas surrounding the incorporated cities of Brawley with 9,890 acres, Calexico with 8,302 acres, Calipatria with 4,285 acres, El Centro with 14,288 acres, Holtville with 4,080 acres, Imperial with 8,480 acres, and Westmorland with 880 acres.

As such, future planning efforts for the City of Brawley includes the revised 9,890 acres of Urban Area surrounding the incorporated City of Brawley from the previous 5,943 acres. Per the County General Plan, the Brawley Urban Area is generally bounded on the west by the New River, Brandt Road, Kahn Road, Poe Subdivision and State Highway 86; on the north by Ward Road; on the east by Best Road, the Livesely Drain, and a line approximately one-half mile east of Best Road; and on the south by the Rockwood Canal, Mead Road, the Best Canal, Dogwood Road, and Shartz Road. The updated SOI boundary including the urban area is provided and shown in yellow in **Figure 20**.

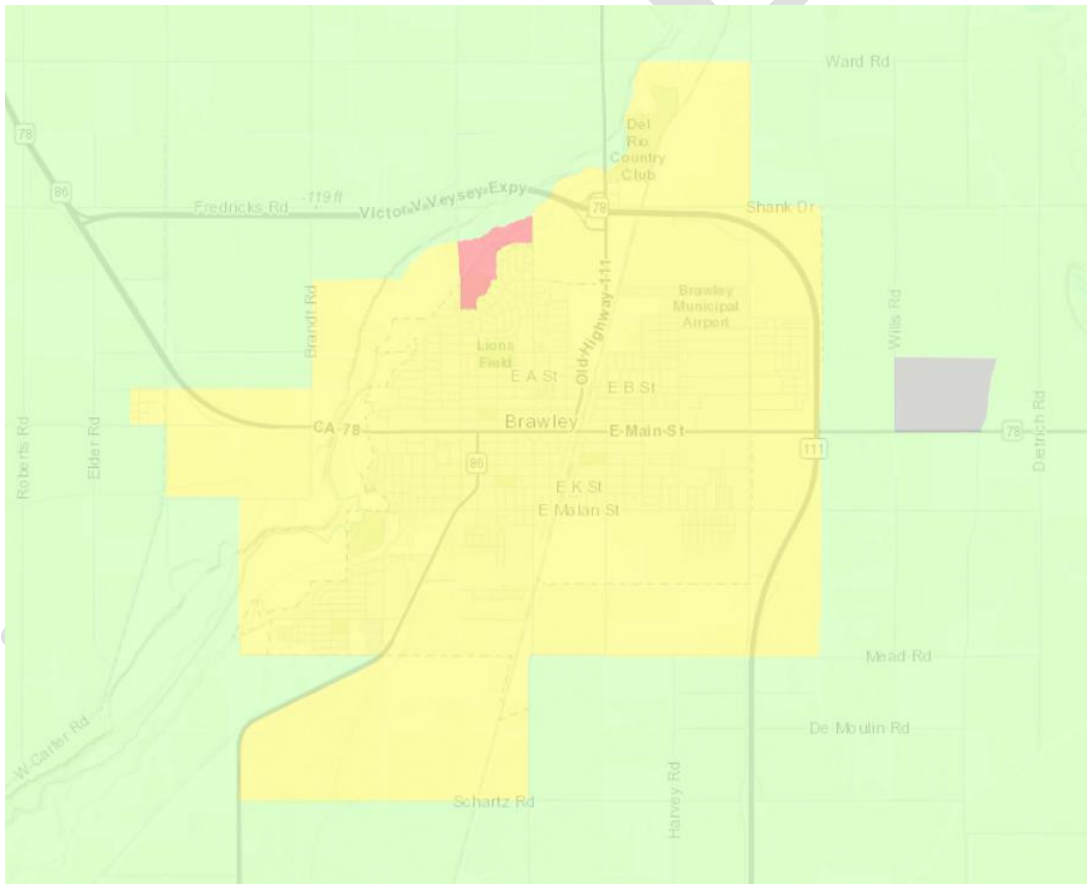


Figure 20 - City of Brawley Urban Area Sphere of Influence

3.4 Service Area Population and Demographics

Describe the service area of the supplier, including current and projected population …The projected population estimates shall be based upon data from the state, regional, or local service agency population projections within the service area of the urban water supplier and shall be in five-year increments to 20 years or as far as data is available (10631).

Due to the continued infill developments, the City of Brawley's service area population has grown steadily over the years. The California Department of Finance (CADoF) has developed population estimates for Imperial County through 2020 which are used herein for current population estimates.

According to the most recent published data estimates (May 2020) from the CADoF, E-5 Population and Housing Estimates for Cities, Counties and the State, 2011-2020, with 2010 Benchmark, the City's current (2020) population estimate is 27,349; up from 26,357 in 2015 and 24,953 in 2010. This represents an annual growth rate of 0.75 percent from 2015 to present –much lower than the growth rate of 1.1 percent from 2010 to 2015. Based on this data the yearly average growth rate for the decade was 0.93 percent. Total housing units for 2020 are estimated to be 8,538 units, of which 7,814 are estimated to be currently occupied (91 percent occupancy rate).

In accordance with the City's growing population and anticipated remaining occupancy, the City of Brawley will continue to serve an increasing number of customers. The City of Brawley bills its customers on a monthly basis for water services to its residential, commercial, and industrial customers. A breakdown of past and current connections by connection type is summarized in **Figure21**.

Past and Current Number of Connections by Customer Type			
Customer Type	**2015**	**2020**	**Five Year Increase**
Single family res.	5,111	5,344	4.6 %
Multi-family residential	421	242	-42.5 %
Commercial/Institutional	366	356	-2.73 %
Industrial	1	5	400 %
Landscape Irrigation	8	14	75 %
Other (Gov & Hospital)	24	155	545.8 %
Brawley Total	**5,931**	**6,116**	

Figure 21 - Past and Current Number of Connections by Customer Type

This population estimate is similar and justifiably representative of the population for the City's SOI as a whole. The areas outside the City limits but within the SOI are currently predominantly agricultural.

3.4.1 Future Population

For consistency with the 2020 UWMP Guidebook intentions, the CADoF estimates were also used as the basis for future population projections herein. **Figure 22** shows the current and projected population

estimates for the City of Brawley. For projection purposes, the average growth rate of 0.93 percent calculated from 2010 to 2020 was used to estimate the population growth through 2040.

Table 3-1 Retail: Population - Current and Projected						
Population Served	2020	2025	2030	2035	2040	2045*(opt)*
	27,349	28,621	29,952	31,344	32,802	34,327
NOTES: Data obtained from Department of Finance, E-5 Population and Housing Estimates for Cities, Counties and the State, 2011-2020, with 2010 Benchmark. A 4.65 percent population growth was estimated for every 5-year cycle.						

Figure 22 - Table 3-1 Retail: Population - Current and Projected

As shown above, the City is projected to increase to 34,327 new residents by the year 2045. This current projection is lower than the anticipated growth projected in the City's Service Area Plan of 59,564 which utilized a higher growth rate due to the economic forecasts at that time. This updated population estimate reflecting current CADoF trends remains within the City's overall water demand preparations and planning and ensures the City of Brawley will easily maintain sufficient service for the next 20 years.

3.4.2 Other Demographic Factors

Describe the service area of the supplier, including. . . other demographic factors affecting the supplier's water management planning (10631).

3.4.2.1 Median Household Income

The U.S. Census Bureau estimated the median household income in California at $75,235 in 2019. In comparison, median household income in Imperial County was $47,622 with a per capita income of $18,018 and the City of Brawley's median household income was $42,236 with a per capita income of $17,185. The U.S. Census Bureau also estimated that while 11.8 percent of Californians are below the poverty level, in Brawley 33.8 percent are below the poverty level compared to the 22 percent for the Imperial County (Census 2019). Imperial County as a whole, and the City of Brawley in particular, are each designated as a disadvantaged community. Per the California Code of Regulations Section 596.1 (b)(2) "disadvantaged community" means a community with a median household income that is less than 80 percent of the statewide annual median household income.

Source:https://www.census.gov/quickfacts/fact/table/brawleycitycalifornia,imperialcountycalifornia,CA,US/PST045219

3.4.2.2 Age, Education, Housing, and Living Arrangements

Social and economic factors can often affect water usage and may indicate patterns and trends for future water management and planning. Additional U.S. Census Bureau demographic data for population, age, education, housing units, average household size, income and poverty levels, and population density for the City of Brawley are shown and summarized in **Figure 23** below. Data for Imperial County and State of California are also included for frame of reference.

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Demographic Data for City of Brawley and Imperial County[1,2]			
Demographic	**City of Brawley**	**Imperial County, CA**	**State of California**
Population			
Population estimates, July 1, 2019, (V2019)	26,227	181,215	39,512,223
Age and Sex			
Persons under 5 years, percent	9.00%	8.00%	6.00%
Persons under 18 years, percent	33.80%	28.50%	22.50%
Persons 65 years and over, percent	12.40%	13.30%	14.80%
Female persons, percent	51.60%	48.70%	50.30%
Housing			
Owner-occupied housing unit rate, 2015-2019	52.50%	58.30%	54.80%
Median value of owner-occupied housing units, 2015-2019	$188,900	$195,800	$505,000
Median gross rent, 2015-2019	$828	$830	$1,503
Families and Living Arrangements			
Households, 2015-2019	6,887	44,829	13,044,266
Persons per household, 2015-2019	3.77	3.81	2.95
Language other than English spoken at home, percent of persons age 5 years+, 2015-2019	67.00%	76.50%	44.20%
Education			
High school graduate or higher, percent of persons age 25 years+, 2015-2019	72.50%	69.70%	83.30%
Bachelor's degree or higher, percent of persons age 25 years+, 2015-2019	11.70%	15.20%	33.90%
Income and Poverty			
Median household income (in 2019 dollars), 2015-2019	$42,326	$47,622	$75,235
Per capita income in past 12 months (in 2019 dollars), 2015-2019	$17,185	$18,018	$36,955
Persons in poverty, percent	33.80%	22.00%	11.80%
Geography			
Population per square mile, 2010	3,248.20	41.8	239.1
Land area in square miles, 2010	7.68	4,176.60	155,779.22

Notes:
1– Data per U.S. Census Bureau 2010-2019, QuickFacts Data Tables
2– QuickFacts data are derived from: Population Estimates, American Community Survey, Census of Population and Housing, Current Population Survey, Small Area Health Insurance Estimates, Small Area Income and Poverty Estimates, State and County Housing Unit Estimates, County Business Patterns, Non-employer Statistics, Economic Census, Survey of Business Owners, Building Permits.

Figure 23 - Demographic Data for City of Brawley and Imperial County

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3.4 Service Area Climate

Describe the service area of the supplier, including… climate…(10631).

The Imperial Valley is an arid desert, characterized by hot, dry summers and mild winters. Summer temperatures typically exceed 100 degrees Fahrenheit and the winter low temperatures rarely drop below 32 degrees Fahrenheit. The remainder of the year has a relatively mild climate with temperatures averaging in the mid-70s. The region receives 85 to 90 percent of possible sunshine each year, the highest value in the United States. The average annual air temperature is 72 degrees Fahrenheit and the average frost- free season is about 300 days per year. These strong night and day temp differentials, particularly in the summer, produce moderate (10 mph) to strong (above 35 mph) winds and deep thermal circulation systems, which facilitate general dispersion of air and impact water use.

Annual rainfall in the Imperial Valley averages three inches per year (100-year average, 1915-2014), with most rainfall associated with brief storms. The majority of the rainfall occurs from November through March. Periodic summer thunderstorms are common in the region. Data obtained from the western Regional Climate Center is summarized and provided in **Figure 24** below.

City of Brawley Historical Climate Data 1927 – 2007													
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Avg. Temp (F)	54.4	58.5	63.5	69.8	77.2	84.9	91.5	91.3	86.1	75.1	62.5	54.9	72.5
Avg. Max. Temp (F)	69.5	73.7	79.2	86.2	94.4	103.0	107.8	106.6	102.5	91.7	78.8	70.1	88.6
Avg. Min. Temp (F)	39.3	43.3	47.8	53.4	60.1	66.8	75.3	76.0	69.7	58.5	46.2	39.6	56.3
Ave. Total Precip. (in.)	0.38	0.39	0.26	0.08	0.03	0.01	0.05	0.32	0.28	0.24	0.16	0.43	2.63
Source: https://wrcc.dri.edu/Climate/comp_tables_states_a-l.php													

Figure 24 - City of Brawley Historical Climate Data 1927-2007

3.3.1.1 Topography and Environment

Most of the irrigated valley is relatively flat, with its low-lying canal/drain systems, and is subject to minor, shallow flooding and ponding due to the lack of local topographic relief. Imperial Valley elevations range from a few feet above to 273 feet below mean sea level. The U.S./Mexico border, which forms the southern edge of IID's water service area, has an elevation of four feet above mean sea level. The Salton Sea is located at the northern end of Imperial Valley, and the water level is 230 feet below MSL (the sea bottom is 273 feet below MSL).

The relatively flat topography of the service area and surrounding areas makes drainage difficult in some areas and occasional intense storm events, and low soil infiltration rates produce rapid runoff flows.

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However, within the context of this UWMP, this flooding does not impact or disrupt the canal water supply nor does it damage the infrastructure.

Per IID's Water Conservation Plan, common plant species in this vegetative community include arrow-weed, mesquite, cottonwood, salt-cedar, cattails, bulrush and phragmites. Creosote Desert Scrub is the dominant natural vegetation found in the service area.

Additionally, soils in the Imperial Valley consist of layers deposited over centuries by the Colorado River. The soils are formed in two principal landscapes. One is the lower Colorado River flood plain, the other the dry basin of old Lake Cahuilla. The other is the nearly level to gently sloping plain of the Imperial East and West mesas, which lie above the shoreline of the old lake. The valley is a large bowl filled with a conglomerate of elements transported by Colorado River flood waters, with soils up to a full mile or deeper. Imperial Valley soil is naturally salty. As river floods left alluvial soils, they also left salt. Saline soils are often recognized by a white crust on the surface.

Beneath the surface is a maze of passages of aquifers and aquicludes of clay barriers and sand lenses. In general, there is no gravel and sand water-bearing stratum. Stratum of any one type of soil does not extend over a large area but occurs more as a lens or pocket.

3.3.1 Climate Change

Aside from seasonal variability, long term climate change impacts must also be accounted for to ensure service reliability. To determine developing climate change impacts, annual trends can be analyzed to identify long term trends and deviations from the region's baseline.

Moreover, climate change projections in California indicate a further intensification of wet and dry extremes and shifting temperatures that can have affect both water uses and supplies. Extreme and higher temperatures can lead to increases in water use. A declining snowpack and earlier runoff patterns could result in changes in stream flows and reservoir operations. Without implementing preparedness and other strategies to adapt to or mitigate these impacts, the changing climate jeopardize a supplier's reliability over near-term and long-term. Refer to Section 4 for further discussion on climate change impacts to water use demands.

3.3.1.1 Climate Factors & Trends

A notable trend observed from the following tables for monthly mean rainfall and monthly mean temperatures is that while average annual rainfall measured by IID has been decreasing, monthly average temperatures are remarkably consistent.

Monthly Mean Rainfall (in Inches) Imperial CA (10-Year, 30-Year, & 100-Year)													
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
10-year	0.47	0.36	0.15	0.03	0.00	0.00	0.21	0.38	0.17	0.21	0.24	0.34	2.54
30-year	0.44	0.44	0.26	0.06	0.04	0.00	0.13	0.23	0.26	0.30	0.23	0.34	2.67
100-year	0.42	0.38	0.26	0.11	0.02	0.00	0.12	0.35	0.37	0.26	0.21	0.50	3.00
Source: IID Imperial Headquarters Station record													

Figure 25 - Monthly Mean Rainfall for Imperial, CA (10-Year, 30-Year & 100-Year)

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Monthly Mean Temperature for Imperial, CA (10-Year, 30-Year, & 100-Year)												
	January			February			March			April		
	Max	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max	Min	Avg
10-year	81	31	56	84	36	59	94	40	66	99	45	71
30-year	80	33	56	84	36	60	92	41	65	100	47	71
100-year	80	31	55	84	35	59	91	40	64	98	45	71
	May			June			July			August		
	Max	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max	Min	Avg
10-year	107	54	79	113	60	86	115	68	92	114	67	91
30-year	105	54	79	112	60	86	114	68	92	113	69	92
100-year	105	52	78	112	59	86	114	68	92	113	67	91
	September			October			November			December		
	Max	Min	Avg	Max	Min	Avg	Max	Min	Avg	Max	Min	Avg
10-year	107	54	79	84	36	59	94	40	66	99	45	71
30-year	105	54	79	84	36	60	92	41	65	100	47	71
100-year	105	52	78	84	35	59	91	40	64	98	45	71
Source: IID Imperial Headquarters Station record												

Figure 26 - Monthly Mean Temperature for Imperial, CA (10-Year, 30-Year & 100-Year)

The noticeable decline in rainfall will continue to be tracked to determine intensification of droughts in the region. In many regions, particularly in the western United States, drought is an important factor affecting communities which is increasingly brought on by climate changes in the area. Climate change considerations are becoming increasingly crucial for projected future uses, water supply characterization projections, and reliability of supplies.

The areas rainfall along with irrigation practices also have an effect on the region's Salton Sea. The existing sea was formed in 1905 spanning approximately 316,000 acres with a water elevation of approximately 197 feet below sea level. With the high evaporation rates in the region the sea shrank to approximately 165,000 acres by 1920 with an elevation of approximately 250 feet below sea level. As agricultural production increased in the Imperial, Coachella and Mexicali valleys the water level rose to around 230 feet below mean sea level. In the late 1990s, water levels began to drop in response to lower inflows and decreasing annual rainfall.

Hydrologic projections suggest that after 2020, the sea will receive approximately 700,000 to 800,000 acre-feet of inflow annually; the result will be a sea that is approximately the same size as the sea in 1920 at 162,000 acres with an elevation of 254 feet below mean sea level. Should this occur, upwards of 70,000 acres of previously inundated seabed (playa) will be exposed over the next 10 years. While the exact composition of the playa soils are unknown, current data suggests that the soils are highly saline and may be a source of particulate matter that will become airborne in windy conditions that could further deteriorate the compromised air quality in the Imperial and Coachella valleys.

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While the decreased elevation and exposed playa are a risk to human and wildlife health, the level of salinity in the sea is of more concern to maintaining its wildlife ecosystem. As a terminal waterbody, the Salton Sea has no outlet to purge accumulated salts and nutrients and over the years since its formation, the water has become increasingly saline. Present day salinity concentrations are significantly higher than ocean water. With agricultural-to-urban water conservation and transfer programs further reducing inflows, the salinity concentration will continue to increase, accelerating significant changes to the sea's ecosystem.

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Chapter 4 – Water Use Characterization

This chapter serves to describe and quantify water usage trends within the City and quantifies projected use based on anticipated growth, changing climate conditions, and water use behavior trends per customer type. Accurately tracking and reporting past and current customer water use trends will allow the City to properly analyze its water supply and effectively assess its long-term reliability.

4.1 Non-Potable Versus Potable Water Demand

The City does not currently provide non-potable water services and therefore no deductions for recycled water were used. The following information provided herein is for potable water use which comply with Title 23 Drinking Water Standards.

4.2 Water Uses by Sector

The City's water billing system identifies customers' categories so that accounts can be classified by use class and can identify each customer by sector and usage category. Water use within the City's service area varies depending on many factors including the time of year, residential and business use types, economic conditions, household densities, established conservation programs, and extended drought periods and climate changes. Many of these variables are intrinsically captured in the 10 water use sectors identified in CWC 10631(d). As different water use sectors have different per capita water usage, **Figure 27** and **Figure 28** display current and projected water consumption for each category to more accurately and proportionately project future uses.

Table 4-1 Retail: Demands for Potable and Raw Water - Actual

Use Type	2020 Actual		
Use Drop down list *These are the only Use Types that will be recognized by the WUEdata online submittal tool*	Additional Description	Level of Treatment When Delivered	Volume
Single Family		Drinking Water	1,043
Multi-Family		Drinking Water	202
Commercial		Drinking Water	137
Industrial		Drinking Water	230
Institutional/Governmental		Drinking Water	54
Landscape	Irrigation	Drinking Water	6
Other	Trailer Parks	Drinking Water	20
Sales to other Agencies	N/A		
Groundwater recharge	N/A		
Saline water intrusion barrier	N/A		
Agricultural Irrigation	N/A		
System Water Losses		Drinking Water	479
		TOTAL	2,171
NOTES: Volumes measured in MG			

Figure 27 - Table 4-1 Retail: Demands for Potable and Raw Water - Actual

Single family residences' water usage in 2020 comprised approximately 49% of the total amount of water that is billed by the City. Multiple family housing units (apartments, duplexes) use a further 9%, thereby bringing the portion consumed by residences to approximately 58% of the total water.

Since, the City's implementation of meters in 2009, consumption has continued to reduce. Prior to meters, water rates were based on a flat rate system with no oversite on the consumption. Once meters were installed and rates tiered, residential and commercial consumption was drastically decreased. Based on these average proportions (%) of water use by sector listed in this table, **Figure 28** shows total water demand by sector for 2020 and projects demand at 5-year intervals out to 2045.

Table 4-2 Retail: Demands for Potable and Raw Water - Projected						
Use Type (Add additional rows as needed)	Additional Description (as needed)	Projected Water Use* Report To the Extent that Records are Available				
Use Drop down list May select each use multiple times These are the only Use Types that will be recognized by the WUEdata online submittal tool		2025	2030	2035	2040	2045 Optional
Single Family		1,091	1,142	1,195	1,251	1,309
Multi-Family		212	222	232	243	254
Commercial		138	140	141	143	144
Industrial		232	234	237	239	241
Institutional/Governmental		54	55	55	56	57
Landscape		6	7	7	7	7
Other	Trailer Parks	20	20	21	21	21
Sales to other Agencies	N/A	0	0	0	0	0
Groundwater recharge	N/A	0	0	0	0	0
Saline water intrusion barrier	N/A	0	0	0	0	0
Agricultural irrigation	N/A	0	0	0	0	0
System Water Losses		497	515	533	553	573
	TOTAL	2,251	2,335	2,421	2,511	2,606
NOTES: Data obtained by calculating percentage factor from the difference of billed water usage between 2015 and 2020 and then applied this factor to calculate projections until 2045.						

Figure 28 - Table 4-2 Retail: Demands for Potable and Raw Water - Projected

Losses are shown to increase in proportion to the population estimate increase, however actual losses are actually expected to decrease as improved efficiency and maintenance occur and the increase of meters at parks become installed.

Table 4-3 Retail: Total Water Use (Potable and Non-Potable)						
	2020	2025	2030	2035	2040	2045*(opt)*
*Potable Water, Raw, Other Non-potable From **Table 4-1** and **Table 4-2***	2,171	2251	2335	2421	2511	2,606
Recycled Water Demand* *From **Table 6-4***	0	0	0	0	0	0
TOTAL WATER DEMAND	2,171	2251	2335	2421	2511	2,606
NOTES: City does not currently use recycled water services.						

Figure 29 - Table 4-3 Retail: Total Water Demands

4.3 Distribution System Water Losses

Currently un-metered flows and system losses account for approximately 22% of the total flows. These losses include un-metered flows from park irrigation. It is anticipated that this will be significantly reduced over the next 20 years as the City continues preparing to install meters at all park locations and improvements to the distribution system are put in place. The treated water flows from 2005 to 2010 decreased 12.5% over the five-year period, likely due to the fact that the City began installing residential water meters in 2009. **Figure 30** shows the City of Brawley's water loss audit for the last 4 years. The City is not expected to finalize its audit for 2020 until September of this year so the difference between water processed and water billed to customers is currently shown. The individual audit reports are provided in **Appendix F**.

Table 4-4 Retail: Last Five Years of Water Loss Audit Reporting	
Reporting Period Start Date (mm/yyyy)	Volume of Water Loss[1]
01/2020	479[2]
01/2019	251.294
01/2018	269.635
01/2017	164.85
01/2016	157.75
Notes: [1]Taken from the field "Water Losses" (a combination of apparent losses and real losses) from the AWWA worksheet. [2]Formal audit not completed. 2020 Losses reported were obtained as the difference in volume from WTP production and customer billing	

Figure 30 - Table 4-4 Retail: Last Five Years of Water Loss Audit Reporting

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4.4 Estimating Future Water Savings

If available and applicable to an urban water supplier, water use projections may display and account for the water savings estimated to result from adopted codes, standards, ordinances, or transportation and land use plans identified by the urban water supplier, as applicable to the service area 10631(e)(4)(A).

To the extent that an urban water supplier reports the information described in subparagraph (A), an urban water supplier shall do both of the following: (i) Provide citations of the various codes, standards, ordinances, or transportation and land use plans utilized in making the projections.(ii) Indicate the extent that the water use projections consider savings from codes, standards, ordinances, or transportation and land use plans. Water use projections that do not account for these water savings shall be noted of that fact 10631(e)(4)(B).

Figure 31 summarizes the method of water demand projection. Future water savings are not included in projections. Lower income residential demands are not included in projections.

Table 4-5 Retail: Inclusion in Water Use Projections	
Are Future Water Savings Included in Projections? (Refer to Appendix K of UWMP Guidebook)	NO
If "Yes" to above, state the section or page number, in the cell to the right, where citations of the codes, ordinances, etc… utilized in demand projections are found.	
Are Lower Income Residential Demands Included In Projections?	YES
NOTES:	

Figure 31 - Table 4-5 Retail: Inclusion in Water Use Projections

4.4.1 Water Use for Lower Income Households

The water use projections required by Section 10631 shall include projected water use for single-family and multifamily residential housing needed for lower income households, as defined in Section 50079.5 of the Health and Safety Code, as identified in the housing element of any city, county, or city and county in the service area of the supplier (10631.1(a)).

Per the City's 2013-2021 Housing Element Plan, there are a total of 3,550 low-income households. Of these households there are 980 low income, 1,395 very low income, and 1,175 extremely low-income units in the City of Brawley. The Housing Element anticipates growth increases by 2% each year. To estimate the projected water demands the units are multiplied by 3.77 (# of capita per household per recent County Data) and the Urban Water Target for 2020 calculated in the 2015 UWMP.

<u>2020 (estimated)</u>
Extremely low income:
1,535 units * 3.77 cap/unit * 275 gallon/cap/day = 1,591,411 gallon/day or
581 million gallons per year

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Very low income:
1,293 units * 3.77 cap/unit * 275 gallon/cap/day = 1,340,517 gallon/day or
489 million gallons per year

low income:
980 units * 3.77 cap/unit * 275 gallon/cap/day = 1,016,015 gallon/day or
371 million gallons per year

4.5 Climate Change Considerations

Along with social and economic demographic factors, thorough water resource management requires consideration and planning for substantial climatic and seasonal variability. California faces changes in water use habits due to a variety of issues including population growth, regulatory restrictions and climate change. Precipitation variabilities brought on by climate changes as discussed in **Section 3.3.1.1** including increases in extreme drought and flood events, not only impact water supplies but also water usage patterns. Since supply has been determined to not be an issue for the City due to its reliance on IID, focuses within the UWMP are shifted to climate change's impact on user consumption. Water demand may increase in times of drought due to increased irrigation, and general and prolonged heat waves will also increase water usage in heat related cooling activities like irrigation, pool use, and general consumption. However, during these times, conservation measure are typically put in place decreasing use and generally establishing a return to normalcy of what water consumption would be.

Documentation and understanding of these seasonal changes for a supplier's service area allows for more accurate preparedness and allows assessments and strategies to be updated over time. As such, the City of Brawley implemented a Climate Action Plan in 2019 to support urban greening projects, sustainable community planning, and promote water conservation. Climate change preparedness has also led the City to promote for the use of drought resistant landscaping to its residents and the push to install meters at all park locations to further account, manage, and implement conservation measures to curb the City's overall usage, as well as mandatory prohibitions and rationing during times of drought as discussed in detail in **Section 8**. Furthermore, included in this 2020 UWMP is a drought risk assessment (DRA) discussed in detail in **Section 7** to address the City's long-term reliability and it incorporates potential climate change impacts on water use and supply projections. All these climate change considerations have been incorporated into the City of Brawley's planning and water use trends and projections throughout this 2020 UWMP.

4.5.1 Climate Impacts to City of Brawley's Wholesaler IID

Climate change impacts have also been analyzed locally to understand the regional impacts within the service area and forecast the impacts climate change may have on the state's and IID's water resources. A study completed for IID found that by 2050 some likely climate changes for the Imperial Regional Water Management Plan (IRWMP) region include milder winters, warmer maximum temperatures for spring and fall, and hotter summers. As water resources are also affected by water demands, these forecasts of warmer climates point to the likely increase in demand.

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However, as the Imperial Valley's climate changes so do the measures and preparations by IID. IID has continually and proactively tracked water usage and continues to implement their Water Conservation Plans. Furthermore, IID's distribution system includes seven regulating and four interceptor reservoirs with a total water storage capacity of 4,372 acre-feet. These reservoirs allow increased delivery flexibility and provide conservation opportunities within the IID water service area. By implementing extraordinary conservation projects, developing innovative efficiency measures and utilizing progressive management tools, IID is working to ensure both the long-term viability of agriculture and the continued protection of water resources within its water service area. IID's Colorado River water entitlement is significant, and as the agency in charge of these water rights IID continues to responsibly manage its Colorado River water supply and related resources.

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Chapter 5 – SB X7-7 Baseline, Targets, and 2020 Compliance

This chapter serves to confirm the City of Brawley's compliance with the 2020 per-capita water conservation mandate. The City of Brawley established its baseline water use as well as its 2020 per-capita target value in the 2015 UWMP, which is referenced herein to demonstrate its compliance with meeting that goal. Included in this section are the methodology, discussion of baseline calculations, and Urban Water Use Target (target) goals established for the City of Brawley by the 2015 UWMP. This target along with all other suppliers' target assists California's water resources with collectively achieving the state's 20-percent reduction mandate by 2020.

5.1 Water Conservation Bill of 2009 (SB X7-7)

The Water Conservation Bill of 2009 was one of four policy bills enacted by the California legislature as part of the November 2009 Comprehensive Water Package (Special Session Policy Bills and Bond Summary). With the adoption of the Water Conservation Act of 2009, also known as the SB X7-7, the State of California was required to reduce urban per capita water use by 20 percent by the year 2020.

For California to achieve its 20-percent reduction goal by 2020, each water supplier was required to determine and report its existing baseline water consumption in gallons per capita per day (gpcd) and establish a 2020 gpcd target for water use reduction. As such, the City of Brawley established its baseline water use and 2020 per-capita target value in the 2015 UWMP. This reporting began with the 2010 UWMP, and SB X7-7 Verification forms were used to establish their interim water conservation targets and track their progress toward achieving the final 2020 target.

5.2 SB X7-7 Forms and Summary Tables

SB X7-7 Verification Forms were a set of tables submitted as part of the 2015 UWMP containing the detailed calculations for establishing the City of Brawley's baselines and targets and are attached as **Appendix B**. DWR recommends that suppliers relying on the SB X7-7 Verification Form submitted in the 2015 UWMP include the 2015 Verification Form as a reference document in the 2020 UWMP.

New to the 2020 UWMP are the new forms labeled "SB X7-7 2020 Compliance Form". These forms are an abbreviated version of the SB X7-7 Verification Form that is solely for 2020 compliance calculations. All suppliers must demonstrate their 2020 compliance and submit the SB X7-7 2020 Compliance Form.

A summary of these forms (SB X7-7 Verification Form and SB X7-7 2020 Compliance Form) are provided in Submittal Table 5-1 (baseline and target summary) and Table 5-2(2020 Compliance Summary) in the following sections.

5.3 Baseline and Target Calculations for 2020 UWMPs

As the City of Brawley calculated its baselines and targets in the 2015 UWMPs as discussed above, it will not need to recalculate their baselines and targets in this 2020 UWMP. Per the 2020 Guidebook, suppliers must use their same baseline water use as reported in 2015 UWMPs to determine whether the supplier has met its per-capita water reduction obligation.

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Additionally, the City of Brawley has not had any changes to its distribution area due to mergers, annexations, or contractions since the 2015 plan. Due to this, no changes or updates to its baseline gpcd or 2020 target are required.

5.3.1 Determination and Methods Used for Calculating Baseline and Compliance

As such, the data used in the 2015 UWMP is summarized herein to illustrate the baseline targets and goals established for 2020.

Using Department of Finance population information and city pumping records, the consecutive 10 year average per capita, per day baseline was 344 gallons between 2001 and 2010 resulting in the interim target for 2015 shown in SB X7-7 Table 6 located in **Appendix B**. Method 1 which refers to the use of the State Department of Finance population estimates and 80 percent of the supplier's baseline per capita water use, as described in the UWMP Guidebook, was used to calculate the target per capita water use. It is noteworthy to address that there are several tables from the SB X7-7 Verification Form that are related to gross water calculations. The City of Brawley will not deduct indirect recycled water and/or process water from their gross water because recycled water is not currently used nor is it planned to be used in the future.

Figure 32 provides a summary of the baselines and targets established in the 2015 UWMP using the SB X7 Verification forms. Refer to **Appendix B** for all SB X7-7 Verifications forms and tables used.

Table 5-1: Baselines and Targets Summary

From SB X7-7 Verification Form

Baseline Period	Start Year	End Year	Average Baseline GPCD*	Confirmed 2020 Target*
10-15 year	*2001*	*2010*	*344*	*275*
5 Year	*2003*	*2007*	*361*	
*All values are in Gallons per Capita per Day (GPCD)				
NOTES: Baselines and target data in accordance with previous 2015 UWMP and previous SB X7-7 Verification forms.				

Figure 32 - Table 5-1: Baselines and Targets Summary

5.4 2020 Compliance Daily per capita water use (GPCD)

(e) An urban retail water supplier shall include in its urban water management plan due in 2010 . . . compliance daily per capita water use, along with the bases for determining those estimates, including references to supporting data (CWC 10608.20(e)).

The City of Brawley has successfully met its 2020 target goal. In accordance with the baselines and targets established in the 2015 UWMP, the City's Urban Water Use Target for 2020 was 275 GPCD. This target was calculated based on 20% reduction of that 10-15 year baseline GPCD of 344 gallons as discussed

above. Actual 2020 GPCD was 218 gpcd and is compared against the 2020 Target in **Figure 33** to demonstrate the City of Brawley has met its 2020 Target. As shown, there were no adjustments made to gross water use in 2020.

Table 5-2: 2020 Compliance From SB X7-7 2020 Compliance Form				
2020 GPCD			2020 Confirmed Target GPCD*	Did Supplier Achieve Targeted Reduction for 2020? Y/N
Actual 2020 GPCD*	2020 Total Adjustments*	Adjusted 2020 GPCD* (Adjusted if Applicable)		
218	-	*218*	*275*	YES
*All data obtained from SB X7-7 2020 Compliance Form and reported in gallons per capita per day (GPCD)				
NOTES: All values reported in GPCD				

Figure 33 - Table 5-2: 2015 Compliance

5.3.1 2020 Adjustments for Factors Outside of Supplier's Control

(1) When determining compliance daily per capita water use, an urban retail water supplier may consider the following factors: (A) Differences in evapotranspiration and rainfall in the baseline period compared to the compliance reporting period. (B) Substantial changes to commercial or industrial water use resulting from increased business output and economic development that have occurred during the reporting period. (C) Substantial changes to institutional water use resulting from fire suppression services or other extraordinary events, or from new or expanded operations, that have occurred during the reporting period. (2) If the urban retail water supplier elects to adjust its estimate of compliance daily per capita water use due to one or more of the factors described in paragraph (1), it shall provide the basis for, and data supporting, the adjustment in the report required by Section 10608.40 (10608.24(d)(1&2)).

As discussed and shown In **Figure 33** above, there were no adjustments necessary to 2020 gross water use in GPCD. No optional adjustments from Methodology 8 were made.

5.5 Regional Alliance

The City of Brawley has prepared this 2020 UWMP in an individual planning effort. The City of Brawley is not currently a part of any Regional Alliance.

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Chapter 6 – Water Supply Characterization

This chapter serves to describe and quantify the City's current and projected water supplies and provide a realistic assessment of its water assets under various hydrological conditions. Included in this section is a narrative description of each supply source and availability for each supply source identified.

6.1 Water Supply Analysis Overview

The City of Brawley receives raw water from IID wholesaler. As such, the City of Brawley's supply availability is ultimately determined by IID's water rights. A summary of IID's annual entitlement and future consumptive use projections are provided to illustrate the region's surplus availability up to 2077.

IID Quantification and Transfers, Volumes in KAF at Imperial Dam [1]										
Col 1	2	3	4	5	6	7	8	9	10	11
	IID Priority 3(a)									
		IID Reductions								IID Net [Available for] Consumptive Use (Col 2 - 10)
Year	IID 3(a) Quantified Amount	1988 MWD Transfer [2]	SDCWA Transfer	AAC Lining	Salton Sea Mitigation SDCWA Transfer [3]	Intra-Priority 3 CVWD Transfer	MWD Transfer w\ Salton Sea Restoration [4]	Misc. PPRs	IID Total Reduction (Σ Cols 3-9) [5]	
2003	3,100	105.1	10.0	0.0	0.0	0.0	0.0	11.5	126.6	2978.2
2004	3,100	101.9	20.0	0.0	15.0	0.0	0.0	11.5	148.4	2743.9
2005	3,100	101.9	30.0	0.0	15.0	0.0	0.0	11.5	158.4	2756.8
2006	3,100	101.2	40.0	0.0	20.0	0.0	0.0	11.5	172.7	2909.7
2007	3,100	105.0	50.0	0.0	25.0	0.0	0.0	11.5	191.5	2872.8
2008	3,100	105.0	50.0	8.9	26.0	4.0	0.0	11.5	205.4	2825.1
2009	3,100	105.0	60.0	65.5	30.1	8.0	0.0	11.5	280.1	2566.7
2010	3,100	105.0	70.0	67.7	33.8	12.0	0.0	11.5	294.8	2540.5
2011	3,100	103.9	63.3	67.7	0.0	16.0	0.0	11.5	262.4	2915.8
2012	3,100	104.1	106.7	67.7	15.2	21.0	0.0	11.5	326.2	2,903.2
2013	3,100	105.0	100.0	67.7	71.4	26.0	0.0	11.5	381.6	2,554.9
2014	3,100	104.1	100.0	67.7	89.2	31.0	0.0	11.5	403.5	2,533.4
2015	3,100	107.82	100.0	67.7	153.3	36.0	0.0	11.5	476.3	2,480.9
2016	3,100	105.0	100.0	67.7	130.8	41.0	0.0	11.5	456.0	2,504.3
2017	3,100	105.0	100.0	67.7	105.3	45.0	0.0	9.9	434.5	2,548.2
2018	3,100	105	130	67.7	0.1	63	0.0	11.5	377.3	2,722.8
2019 [6]	3,100	105	160	67.7	46.55	68	0.0	11.5	458.75	2,687.8
2020	3,100	105	193	67.7	0.0	73	0.0	11.5	450.2	2,649.8
2021	3,100	105	205	67.7	0	78	0.0	11.5	467.2	2,632.8
2022	3,100	105	203	67.7	0	83	0.0	11.5	470.2	2,629.8
2023	3,100	105	200	67.7	0	88	0.0	11.5	472.2	2,627.8
2024	3,100	105	200	67.7	0	93	0.0	11.5	477.2	2,622.8
2025	3,100	105	200	67.7	0	98	0.0	11.5	482.2	2,617.8
2026	3,100	105	200	67.7	0	103	0.0	11.5	487.2	2,612.8
2027	3,100	105	200	67.7	0	103	0.0	11.5	487.2	2,612.8
2028	3,100	105	200	67.7	0	103	0.0	11.5	487.2	2,612.8
2029-37	3,100	105	200	67.7	0	103	0.0	11.5	487.2	2,612.8
2038-47 [7]	3,100	105	200	67.7	0	103	0.0	11.5	487.2	2,612.8
2048-77 [8]	3,100	105	200	67.7	0	50	0.0	11.5	434.2	2,665.8

Figure 34 - IID Annual Entitlement and Net Consumptive Use Schedule (KAF), 2003-2077

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Per IID's current extent of rights, the Secretary of Interior shall deliver Priority 3(a) Colorado River water to IID. As observed above, IID's annual consumptive use is capped at 3.1 million acre-feet (MAFY) of water, less its QSA/Transfer Agreement obligations per the Quantification Settlement Agreement (QSA). The QSA was enacted in 2003 as the nation's largest agriculture-to-urban water conservation and transfer program between the Secretary of Interior, IID, Coachella Valley Water District (CVWD), the Metropolitan Water District of Southern California (MWD), San Diego County Water Authority (SDWA) and other affected parties.

From this entitlement amount, IID projects to retain 2,649.8 thousand acre-feet (KAF) and 2,665.8 KAF available supply for use for years 2020 and 2077, respectively. Due to this balance availability, both long-term and short-term reliability is not a concern for the City of Brawley.

In summary, the City's supply reliability is not foreseen to be impacted over the next 20 years as the City receives all of its water from IID and due to the fact that IID's supply is significant. As a result of this arrangement with IID, the City's production capacity is its only limitation. The supply data provided and projected herein analyzes the amount (volumes) of water that IID has provided and is expected to provide to the City. The actual supply volume of 2,302 MG in 2020 is used as a basis for quantifying similar supply volumes anticipated in future years in proportion to the City's growth. Actual supply available is much higher as the City is capable of augmenting its supply to match the WTP's capacity of 15MG per day or approximately 5,475 MG per year. For purposes of this 2020 UWMP and the drought risk assessment (DRA), the difference between the max daily WTP capacity and the normal projected supply anticipated will be reserved and used for augmentation purposes.

6.2 Purchased or Imported Water

The City of Brawley purchases raw water from IID on a daily as-needed basis. Day to day operations is maintained by City WTP staff in real-time and operators at the WTP monitor and maintain the City's reservoirs' water level around 18 feet depth. The raw water reservoirs act as the City's WTP holding tank as opposed to an emergency supply source. That is, the water in the reservoir is constantly being fed by the All-American Canal while also feeding the City's WTP. In this way, daily communication is maintained with IID staff to increase or decrease water supply as necessary. There is no predetermined amount of water and the City adjusts in real time to ensure the desired storage is available at all times. The City maintains a record of the volumes requested and receives a log for each month from IID every year summarizing the City's use. The total capacity of raw water that can currently be supplied to the City via the pipeline and storage tank system is 31.6 MGD (35,755 acre-feet per year to be exact), which is a fraction of the total capacity of the canal at that point. As such, the City operates on a supply-demand basis and is not affected by variations in hydrological conditions and has historically not had its water supply restricted nor impacted.

Outside of the City's production is the amount provided by IID from whom the City receives all of its raw water. However, IID places no restrictions on the amount that can be supplied. As the City of Brawley receives its water supply from IID, the following section's emphasis is in the infrastructure systems that convey water to the City of Brawley's service area.

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IID holds legal title to all its water and water rights. Per IID's Water Conservation Plan published September 2018, IID's surface water supply is entirely from the Colorado River, except for a small volume from Lower Colorado Water Supply Project (LCWSP). Rainfall average is less than three inches per year and does not contribute to IID's water supply, although at times it may reduce agricultural water demand.

IID's net monthly supply available after its transfer obligations remain significant. **Figure 35** shows the Information from U.S Bureau of Recreation (USBR) 2014 Decree Accounting Report for IID monthly water balance analysis.

	All Surface Water (USBR)	Groundwater Extraction		Effective Precipitation	Reclaimed Water Used	Total Effective Water Supply
		LCWSP (USBR)	IID Customers			
January	118,093	520	0	3,029	3,029	145,229
February	153,047	585	0	2,676	2,676	156,308
March	246,639	583	0	3,032	3,032	250,345
April	275,660	585	0	3,244	3,244	288,978
May	302,145	529	0	3,217	3,217	307,021
June	285,409	675	0	3,721	3,721	289,805
July	288,395	655	0	3,775	3,775	292,825
August	217,518	502	0	3,721	3,721	221,832
September	199,814	587	0	3,505	3,505	211,589
October	197,573	720	0	3,777	3,777	202,251
November	152,414	582	0	3,098	3,098	156,953
December	96,707	672	0	2,824	2,824	126,080
Totals	**2,533,414**	**7,195**	**0**	**39,619**	**39,619**	**2,649,216**

Figure 35 - IID Monthly Water Supplies (AF), 2014

6.2.1 Imperial Irrigation District Demand Use

Demand for water in the Imperial Unit service area is divided into three basic categories: agricultural, municipal, and industrial. Presently IID delivers the vast majority of its annual flows to agricultural water users, and only a very small percentage to municipalities and industrial purposes. Per IID's 2016 Water Conservation Plan, around 95.5 percent of the delivered water was used for agricultural purposes on nearly 475,000 irrigated acres, making possible Imperial County's ranking as one of the top ten agricultural regions nationwide in 2014. The remaining 4.5 percent was delivered for municipal, commercial and industrial use, including rural homes and businesses, and some environmental and recreational uses.
In summary, the projected raw water demand for agricultural use is projected to remain the same unless there is substantial permanent irrigated land retirement as a result of planned land use changes (conversion of farmland to urban use). Non-agricultural water demands are anticipated to increase over the planning period, consistent with population projections. Moreover, as cities grow and develop on existing agricultural land, theoretically there will be more supply of water available. Agriculture requires more raw water per acre than developed land. Agricultural operations use an average of 4.6 AF Water/Acre annually in 2018 while municipal uses use an average of 0.53 AF Water/Acre annually.

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As IID diverts water from the Colorado River, which it delivers to over 520,000 acres within its water service area, a portion of the use is allocated to natural water losses. Water distribution systems "lose" water during distribution for several reasons. Specific water distribution "losses" depend on the type of distribution system. A piped water distribution system can lose water due to pipe failures or leaks. Open channels, ponds, reservoirs, and water basins can "lose" water from seepage through the soil, surface evaporation into the air, and plant consumptive use. An open channel, gravity flow water distribution system has operational spill. Operational spills are excess flows discharged from a channel into a drain or other sump (Salton Sea). Operational spills can result from: carriage water that is required to fill and empty the reaches of sloping channels; increases in water user flexibility for water ordering and delivery scheduling; and terminating water deliveries during rainfall events, storm runoff, and flood flows.

IID has an open channel gravity flow water distribution system. Its water distribution system losses result from three major conditions: seepage, operational spills, and evaporation. The IID's water distribution system losses have been reduced through the years by numerous water conservation and demand management programs and projects. The demand management programs and projects are described in detail in the Imperial Irrigation District Demand Management Section of this plan. **Figure 36** below shows IID's water distribution use per their most current published Water Conservation Plan.

a	b	c	d	f1	f2	f3	f4	g
			b-(c+f4+g)	Delivered to Non-Ag			f1+f2+f3	
USBR Category	Water Supply (USBR)	Operational Spills	Transportation "Losses"	(1) Muni & Industry	(2) Wildlife	(3) Misc	Delivered to Non-Ag	Delivered to Farms
IID WB Component		Main Canal Spill + Main Canal Spill Due to Rainfall		Non-Ag Water Delivery	Envr Water Delivery	Recr Water Delivery		Ag Water Delivery
January	118,093	218	12,059	7,472	89	398	7,959	97,857
February	153,047	75	17,113	6,902	94	401	7,397	128,462
March	246,639	64	22,486	7,555	93	399	8,047	216,042
April	275,660	114	27,472	7,944	123	439	8,506	239,568
May	302,145	65	30,564	8,312	240	539	9,091	262,425
June	285,409	108	27,530	8,303	415	528	9,246	248,525
July	288,395	68	27,819	8,770	557	612	9,939	250,569
August	217,518	829	22,868	8,260	530	562	9,352	184,469
September	199,814	288	21,241	7,606	506	621	8,733	169,552
October	197,573	73	13,347	7,868	487	570	8,925	175,228
November	152,414	87	11,747	7,024	532	566	8,122	132,458
December	96,707	303	10,033	6,655	215	527	7,397	78,974
Totals	**2,533,414**	**2,292**	**244,279**	**92,613**	**3,881**	**6,162**	**102,714**	**2,184,129**

Source: 2014 Decree Accounting Report, Table 5a, volume at Imperial Dam; and IID WIS 2014 Provisional Water Balance Run Date 03/21/2017

Figure 36 - Provisional IID Monthly Water Distribution (AF), 2014

From IID's monthly water distribution example above we can observe IID's average monthly available supply to municipalities including Brawley is approximately 7,717.75 AF or 2,514.8 MG per month and approximately 92,613 AF or 30,178 MG per year. As agricultural irrigation measures and practices improve, moving away from flood irrigation and on to drip irrigation practices, consumptive water use will decrease, improving the efficiency and availability of water.

6.3 Groundwater

The City does not treat or use groundwater. Similarly, IID does not use groundwater except for a small volume from Lower Colorado Water Supply Project (LCWSP). However, this volume is considered negligible to the amount of surface water received from the Colorado River.

All of the IID water service area is underlain by the Imperial Valley groundwater basin. Imperial Valley groundwater basin consists of younger and older alluvium with a groundwater storage capacity of 14 MAF and encompasses the West Mesa, Imperial Valley and East Mesa subbasins. However, the basin has no usable capacity for IID as it is highly saline water. Additionally, although a large amount of water is stored in the groundwater basin, few wells have been drilled for production purposes because the yield is low and of poor quality. The groundwater is also generally unusable for irrigation in the Imperial Valley as the salinity, or total dissolved solids count, is too high. In the central part of the Imperial Valley, the groundwater has a higher salinity than the Colorado River water, which has an approximate salinity of 750mg/L. Most wells had total dissolved solids concentrations of between 1,000 and 3,000 mg/L. The pH of these waters is usually slightly basic, with an occasional value less than seven.

As such, for purposes of the City's UWMP, groundwater is not considered a water supply source. Historically there has been little need to investigate and develop the groundwater in the Imperial Valley due to the availability and relatively higher quality of imported Colorado River water.

6.3.1 Groundwater Management

(Provide a) copy of any groundwater management plan adopted by the urban water supplier, including plans adopted pursuant to Part 2.75 (commencing with Section 10750), or any other specific authorization for groundwater management (10631(b)(1)).

Table 6-1 Retail: Groundwater Volume Pumped						
☑	Supplier does not pump groundwater. The supplier will not complete the table below.					
☐	All or part of the groundwater described below is desalinated.					
Groundwater Type ***Drop Down List***	**Location or Basin Name**	**2016***	**2017***	**2018***	**2019***	**2020***
Add additional rows as needed						
N/A	N/A	0	0	0	0	0
	TOTAL	0	0	0	0	0
NOTES: Not Applicable						

Figure 37 - Table 6-1 Retail: Groundwater Volume Pumped

There is no groundwater management plan for the City as the City does not use groundwater.

6.4 Surface Water

The City of Brawley has been supplying potable drinking water since the early years of the 1900's when water became available from the Colorado River. The City of Brawley depends solely on the Colorado River for surface water inflows, supplied by the IID via the All-American Canal and the Central Main Canal. The raw water is stored in reservoirs before undergoing treatment. The City treats the raw surface water to meet state and federal drinking water standards before distribution.

As mentioned throughout this 2020, IID's supply is entirely from surface water from the Colorado River. IID's annual consumptive use is capped at 3.1 million acre-feet (MAFY) of water, less its QSA/Transfer Agreement obligations. From this entitlement amount, IID has projected to retain 2,649.8 thousand acre-feet (KAF) and 2,665.8 KAF available supply for use for years 2020 and 2077, respectively. Due to this balance availability, both long-term and short-term reliability is not a concern for the City of Brawley.

IID water conveyance and operational storage facilities are all located within the County of Imperial and are reviewed in context with IID's water system. These facilities include reservoirs, canal systems, pipelines, and flow equipment that convey and measure raw water for irrigation to agricultural operations, rural residences, municipalities and water districts for treatment to potable water users and businesses within the service area.

6.4.1 Surface Water Types

There are three general categories which describe the surface water in Imperial Valley. These are freshwater, brackish water, and saline water. The freshwater (with TDS generally less than 1,000 ppm) include the All-American Canal and other canals and laterals which deliver irrigation water to the agricultural fields within the County. The brackish waters (with TDS in the range of 2,000 to 4,000 ppm) include the Alamo River, New River and the agricultural drains that flow into these rivers or directly into the Salton Sea. The salton sea represents the saline water category.

6.4.2 Agricultural Drains

As part of its operating system, the IID maintains an extensive drainage system. The IID water service area is dissected by the New and Alamo Rivers, which function primarily as agricultural drains. Agricultural and storm water drainage is provided by the Alamo and New Rivers, over 1,405 miles of IID open drains and drainage pumps and over 34,400 miles of landowner tile drains. The ultimate repository for drainage water from the IID is the Salton Sea with a surface area of about 383 square miles (or 245,000 acres), which is California's largest lake. The Salton Sea receives approximately 1,100,000 acre feet of drainage flows annually (since 2003) from Imperial, Coachella, and Mexicali Valleys, as well as rainfall, storm runoff from the surrounding mountains and groundwater inflow. Water from agricultural drains, the New and Alamo Rivers are high in total dissolved solids and other contaminants and are unsuitable for potable water use.

6.4.3 Salton Sea

The Salton Sea represents the saline surface water. Salinity concentrations have been rising and are currently higher than ocean water (the Salton Sea's current TDS was approximately 53,000ppm in 2010

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vs. an average of 34,000ppm for ocean water). The Salton Sea evaporates between eight and nine feet per year. The surface waters in Imperial Valley thus pass through a salinity gradient from the Colorado River to the Salton Sea.

This regional salinity gradient exists because of the high evaporation of the Imperial Valley, high temperatures, low annual rainfall, and continual leaching of salts from irrigated areas due to the high salinity of the Colorado River Water (approximately 750ppm). Evapotranspiration is water transported and evaporated from plants and surrounding soil surfaces. Although water is continually evaporated from the major canals, this evaporation represents a relatively minor increase in dissolved solids concentration because of the short residence times within the water conveyance system.

Normal evapotranspiration rates from the irrigated fields from efficient irrigation practices substantially reduce the amount of water and increase the concentration of salt entering the drainage system. For these reasons and due to salinity within the soils, a 300% to 500% increase in total dissolved solids concentration is normal within the Imperial Unit as water is efficiently applied to agricultural lands from the All- American Canal and is conveyed to the IID drains, the New River and the Alamo River, and eventually to the Salton Sea. The increase in salinity is extremely important because it affects the aquatic ecosystems. However, salinity is not the only water quality issue. The intensive irrigation in the valley presents the potential for the introduction of agricultural chemicals, such as pesticides and herbicides, into downstream waters. Field erosion and dredging activities also result in siltation in the New and Alamo Rivers and the Salton Sea. The bacteriological quality of these waters is also a concern because these streams receive locally generated municipal waste discharges, in addition to the waste load entering the United States from Mexico.

6.4.4 New River

The New River originates in Mexico, and flows northward across the International Boundary into Imperial Valley. The flow continues through the Imperial Valley and ultimately discharges into the Salton Sea. The primary purpose of the New River is to convey agricultural drainage in the Imperial and Mexicali valleys to the Salton Sea. A corollary use of the New River is to convey treated community and industrial wastewaters. This corollary use is strictly controlled in the Imperial Valley by waste discharge requirements prescribed and enforced by the California Regional Water Quality Control Board. However, Mexico's corollary use of the New River is largely ignored and uncontrolled.

Mexico discharges raw and inadequately treated sewage, toxic industrial wastes, garbage and other solid wastes, animal wastes, and geothermal wastewaters out of the Mexicali area of Mexico and into the Imperial Valley. This process has continued for over forty years, resulting in the on-going pollution of the New River at the International Boundary. As Mexico's industry and population continue to grow, these problems have a high potential to increase if corrective measures are not taken.

Until August of 1983, the problem of Mexico polluting the New River had been the responsibility of United States Section of the International Boundary and Water Commission (IBWC), a joint United States/Mexico federal agency with responsibility for dealing with border water and sanitation problems between the two nations. Over a period of thirty years, the California Regional Water Quality Control

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Board made several representations to the United States Commissioner on the IBWC to obtain corrections to the problem. Since 1975, the California Regional Water Quality Control Board has been monitoring water pollution of the New River to identify the pollutants actually coming from Mexico. This information is presented to the United States Commissioner to aid and encourage Mexico in implementing corrective measures.

In August of 1980, Minute No. 264 to the Mexico-American Water Treaty was signed, which specified time schedules for completing work that was to result in a full cleanup of the river. In addition, minimum water quality standards were specified for New River water quality at the International Boundary. Mexico has been in violation of practically all of the specified schedules and standards since Minute No. 264 went into effect in December of 1980. There is no evidence that Minute No. 264 has had any influence on actions in Mexico to clean up the river.

In July of 1983, the California Regional Water Quality Control Board conducted an investigation. The purpose of the investigation was to determine the type(s) and extent of waste discharges into the New River and its tributaries from Mexico so that possible corrective action could be considered and pursued. The investigation identified problems that must be addressed to obtain adequate corrections. These problems included:

- City sewer lines which are not connected to the City's main sewer system discharging raw sewage to the river;
- Breakdowns in the sewer system resulting in the discharge of raw sewage to the river;
- Discharge of wastes to the river by septic tank pumpers;
- Discharge of wastes to the river from adjacent unsewered residences;
- Discharge of untreated industrial wastes to the river including highly toxic chemicals wastes, many of which are on the Environmental Protection Agency's list of 129 priority pollutants and some of which are carcinogens;
- Inadequate treatment of sewage and industrial wastes by Mexicali, whose sewage treatment plant consists of nothing more than raw sewage lagoons;
- Location of the City's garbage dump such that refuse is disposed of directly into the river water;
- Discharges of untreated wastes from a slaughterhouse, dairy, and hog farms;
- Discharges from residential hog and cattle pens located adjacent to the river and its tributaries; and
- Discharge of geothermal wastes to the river.

In August of 1983, a United States/Mexican Agreement for protection and improvement of the environment in the border area was signed by the Presidents of Mexico and the United States. Under this agreement, responsibility for border environmental problems, including the New River pollution problem, was transferred from the International Boundary and Water Commission to the United States Environmental Protection Agency for the United States, and to the Mexican Secretarial de Desarollo Urbano y Ecologia (SDUE) for Mexico. Since this transfer of responsibility, progress has been slow and it is questionable if the agreement has served any useful purpose in controlling pollution in the New River.

In April of 1987, Minute No. 274 to the Mexican-American Water Treaty was approved by the United States and Mexico. The minute provided for a $1.2 million United States/Mexico jointly funded project to construct certain works in Mexico to reduce pollution in the New River. Although this project is just a step

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towards resolving the pollution problems of the New River, it sets a precedent for the involvement of the United States in the implementation of corrective actions within Mexicali.

According to the International Boundary and Water Commission of the United States, additional projects are needed to help reduce water pollution from Mexico. Mexico and the United States are currently negotiating measures to solve the problem. Upon agreement between both governments, a new Minute will be approved and added to the Mexican-American Treaty to supersede Minute No. 274. The main goal of the new Minute would be to establish a long-term solution to the water pollution problem.

The Alamo River is also polluted with contaminants. A small amount of groundwater seepage from agricultural fields crosses into Imperial Valley from Mexico to the Alamo River and has low pollutant concentrations. It is noteworthy to address that seepage from portions of the All-American Canal and East Highline Canal are pumped back into the respective canals.

The main pollutants in the water are pesticides which get drained into the Alamo River during irrigation. However, the potential for polluting the Alamo River could increase not only from the pesticides contained in the water but from potential development at or near the Alamo River at the International Boundary, such as the new border crossing that has been constructed near the Alamo River as it crosses into the United States.

This new border crossing could create an urban sprawl effect in this area of Imperial Valley, which would increase drainage into the Alamo River. The Alamo River currently has a small concrete culvert that passes underneath the All-American Canal which drains seepage water coming from Mexico. Additional flows could impact the river and present a financial burden to Imperial Valley and lead to environmental health problems.

An option proposed by the California Regional Water Quality Control Board has been to shunt the Alamo River into a drainage system which would eventually drain into the New River before it crosses into the United States. In order for this to happen, both governments must agree. Presently, nothing has been settled but further negotiations are currently being reviewed between the United States and Mexico, in hopes to minimize potential problems that could result from the development of the new border crossing.

6.4.5 Surface Water from the Colorado River

Water is supplied to the City from the All-American Canal through the Central Main Canal. The supply point for the water plant is the South Date Canal and the Dahlia Lateral Number 1. Both of these canals flow north from the Central Main Canal. The South Date Canal runs immediately east of the treatment facility and has capacity to deliver 22.6 million gallons per day (MGD) of untreated water to the plant.

The Dahlia Lateral Number 1, located west of the plant, is capable of supplying the plant with an additional 9.0 mgd. The Dahlia Lateral has been used as a water source more during the last few years. This is because it has fewer services drawing water from it than the South Date Canal. It maintains a steadier flow and is a more reliable source. The capacity of water delivery from the Dahlia Lateral is limited due to the size of gate 18A and the back pressure of the Lateral. The total amount of raw water that can currently be supplied to the City is 31.6 mgd (35,755 acre-feet per year).

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Municipal water is not a large portion of the total water delivered by the IID. It represents only approximately three percent (3%) of the total water delivered. The total municipal use has not significantly changed since 2006. **Figure 38** below shows the total water delivered. Since the portion of water used by the municipalities is low compared to the overall use, it is not anticipated that there will be any shortage of raw water from the IID. The city's main constraint of raw water availability is in the raw water inlet piping capacity. As was mentioned earlier, the total amount of raw water that can currently be supplied by the IID to the City is 31.6 MGD (35,755 acre-feet per year) which is more than enough capacity for the foreseeable future.

IID Consumptive Use Amount vs. Total Municipal Use				
Year	IID Net Consumptive Use Amount (Total Imperial Valley) (AF)	Total Municipal Use (AF)	Total Other Non-Agricultural Use (AF)	Total Agricultural Use (AF)
2010	2,363,800	50,819	54,749	2,258,232
2015	2,236,300	55,877	66,382	2,114,041
2020	2,316,300	61,397	78,015	2,176,888
2025	2,284,300	67,335	85,558	2,131,407
2030	2,279,300	71,233	93,101	2,114,966

Figure 38 - IID Consumptive Use Amount vs. Total Municipal Use

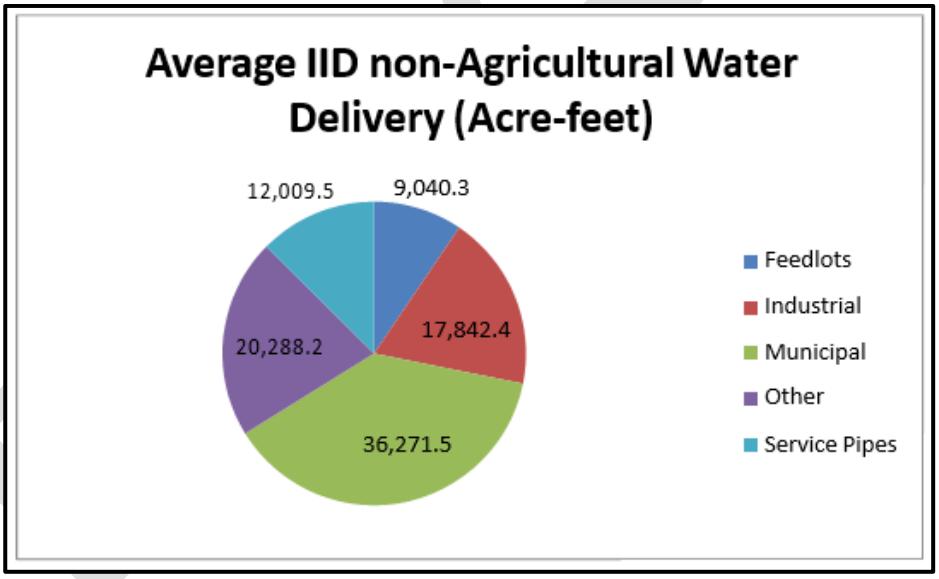

Figure 39 - Non-Agricultural Water Delivery by the IID (Acre-Feet) 2006-2009

IID Non-Agricultural Water Delivery					
IID Non-Agricultural Water Delivery (Acre-feet)					
	2006	2007	2008	2009	Average
Feedlots	5,004.6	5,222.5	11,889.1	14,045.0	9,040.3
Industrial	18,398.6	17,424.9	18,447.0	17,099.2	17,842.4
Municipal	35,942.3	36,404.6	36,236.1	36,503.1	36,271.5
Other	20,563.6	21,342.6	19,988.1	19,258.5	20,288.2
Service Pipes	12,001.3	12,001.3	12,034.2	12,001.2	12,009.5
Total	**91,910.4**	**92,395.9**	**98,594.5**	**98,907.0**	**95,452.0**

Figure 40 - IID Non-Agricultural Water Delivery

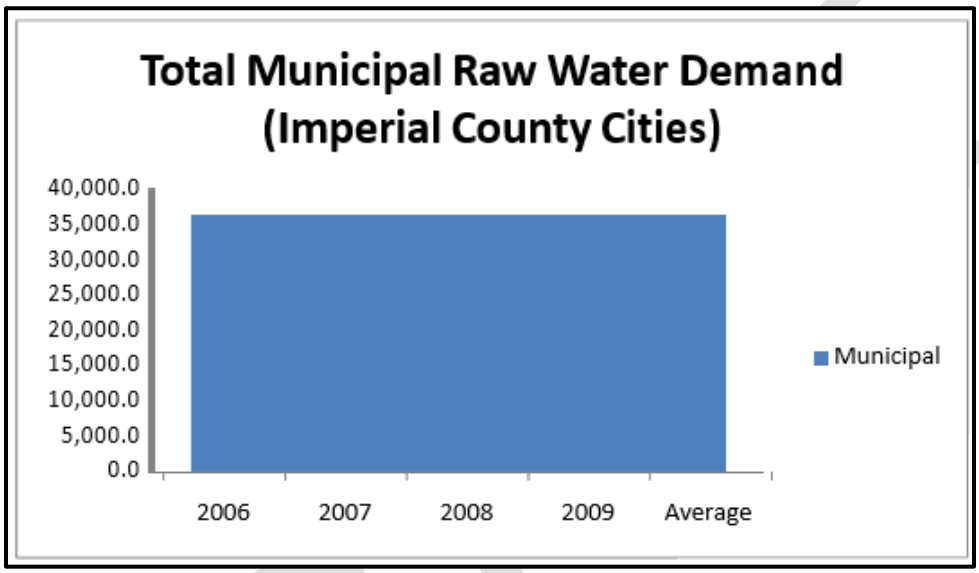

Figure 41 - Total Municipal Raw Water Demand (imperial County Cities) 2006-2009 (Acre-Feet)

Total Estimated Water Flow by the IID					
IID Water Balance Imperial Unit (Acre-feet)					
	2006	2007	2008	2009	Average
Agricultural	2,366,591.9	2,320,920.8	2,413,609.8	2,279,083.9	2,345,051.6
Non-Agricultural	91,910.4	92,395.9	98,594.5	98,907.0	95,452.0
Salton Sea Mitigation Water	0.0	22,399.7	24,793.9	28,989.3	19,045.7
Seepage (Delivery)	86,000.4	86,000.4	79,728.5	64,995.1	79,181.1
Seepage (AAC)	219,861.1	248,816.5	299,527.3	573,644.5	335,462.4
Main Canal Spill	1,638.5	2,212.9	2,422.8	2,248.2	2,130.6
Lateral Spill	118,999.0	112,567.0	117,610.9	106,496.9	113,918.5
Net Evaporation	24,518.4	24,092.3	24,147.0	24,038.1	24,199.0
Total	**2,909,519.7**	**2,909,405.5**	**3,060,434.7**	**3,178,403.0**	**3,014,440.9**

Figure 42 - Total Estimated Water Flow by the IID

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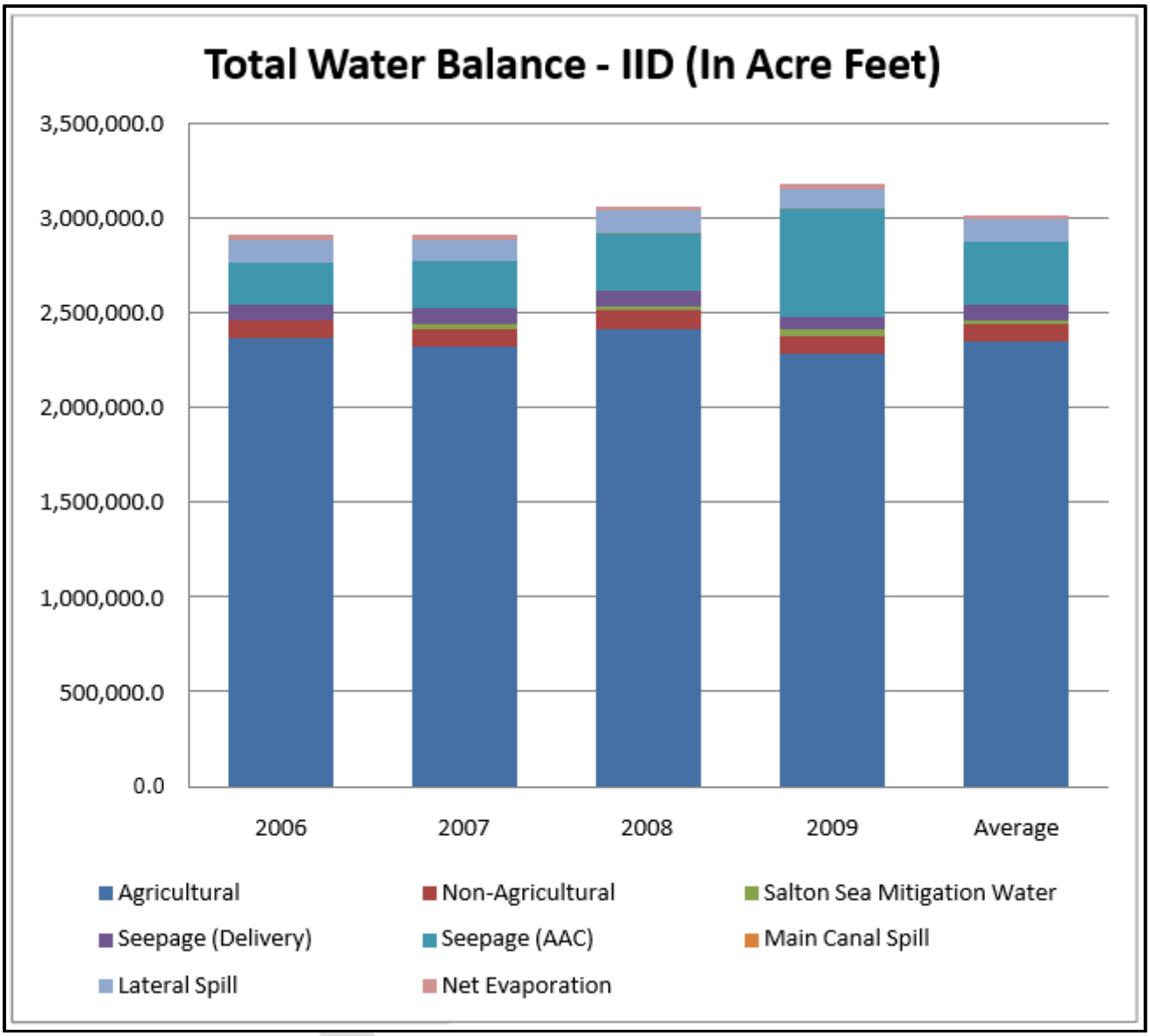


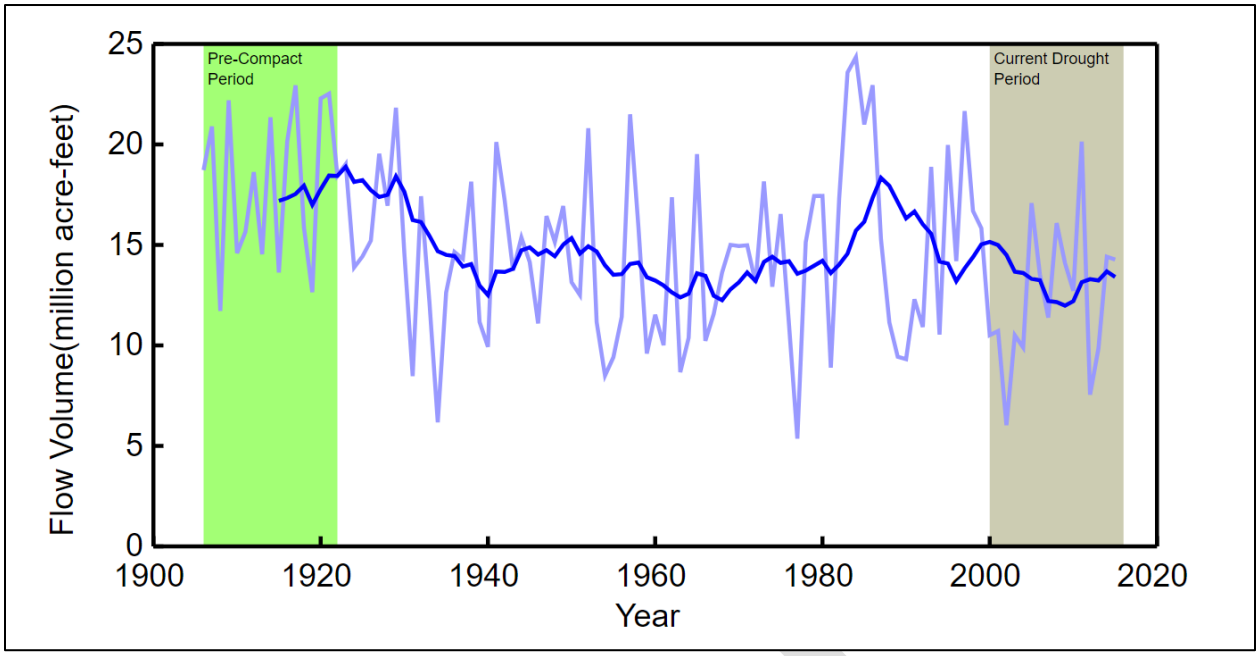
Figure 43 - Graphical Representation of the Total Water Balance IID Water Use

6.4.4 Colorado River Reliability

Under the Law of the River, IID has significant historical legal protections in place to maintain its 3.1 MAF Priority 3a water right to consumptive use of Colorado River water even during lower Colorado River flow periods. The current average annual natural flow volume of the Colorado River in the Upper Basin is about 14.8 maf (1906-2015.

The Colorado River flow at Lees Ferry has been gauged since 1921. By removing reservoir and diversion effects, the USBR has created a “natural flow” record for this site. Colorado River’s current annual flow average is estimated to be about 14.8 MAF based on the gage record. **Figure 44** below shows the annual natural flow volume of the Colorado River at the Lees Ferry monitoring point. The light blue represents the annual flows while the darker blue trend line represents the 10-year running average. Natural flow at this stream gage location is used as a proxy for the hydrologic conditions in the Upper Basin and the overall

hydrologic health of the Basin. Natural flow is defined as the streamflow that would have otherwise occurred without the effects of human activities such as reservoir regulation and river diversions



Source: https://www.doi.gov/water/owdi.cr.drought/en/

Figure 44 - Colorado River Annual Flow

Per the US Department of the Interior (DOI), the 10-year average natural flow at Lees Ferry shows periods of below and above average annual flow (approximately 14.8 million acre-feet [maf]). The most recent drought for the 2000-2015 period (indicated by the brown shaded area) was the driest 16-year period in the past 100 years and one of the driest 16-year periods in the past 1,200 years. The graphic also depicts how the early part of the 1900s, which corresponds to the period of reference used to set the apportionments for the Upper and Lower Basins in the 1922 Colorado River Compact, was an unusually wet period (indicated by the green shaded area). At the time the 1922 Colorado River Compact was signed, the average annual inflow at Lees Ferry during the pre-Compact period (1906-1921) was approximately 18.0 maf.

A few important points should be noted from the natural flow record:

- The period 1906-1930 and prior was the available gauge record when many of the Colorado River compacts were drafted. This period had a 10-year running average flow of about 17.0 MAF, which is higher than almost any other period in the gage record.
- The 10-year running average from 1934 to 1984 was almost always less than 15 MAF, meaning that the 1922 Compact apportioning 7.5 MAF to the Upper and Lower Basins could not have been fully satisfied for most of this 50-year period.
- Allocations from the Colorado River total 16.5 MAF, divided as 7.5 MAF each to the Upper and Lower Basins, and 1.5 MAF to Mexico. The long-term average natural flows from the gauge record are less than these total allocations.

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IID has a longstanding right to import Colorado River water and holds legal title to all its water and water rights in trust for landowners and water users within the District (California Water Code §§20529 and 22437; Bryant v. Yellen, 447 U.S. 352, 371 (1980), fn.23.). These date from as early as 1885, when a number of individuals, as well as the California Development Company, made a series of appropriations of Colorado River water pursuant to stipulations of California law for use in the Imperial Valley.

6.4.1.1 Water Quality

The Safe Drinking Water Act ("SDWA") was amended on August 6, 1998 to include "systems providing water for human consumption that deliver water by constructed conveyances such as irrigation canals." On October 27, 1998 the IID signed a Compliance Agreement with the California Department of Public Health ("CDPH") requiring that all domestic users with service pipes to the IID's canal system must receive an alternate supply of water for drinking and cooking. The alternate supply must be of sufficient quality to achieve an equivalent level of public health protection as provided by the SDWA. On May 19, 2000, CDPH provided written notice that the IID had met the requirements of the Compliance Agreement and that the IID faced no further enforcement actions. The IID continues to meet the conditions of the Compliance Agreement.

To comply with US Environmental Protection Agency (EPA) requirements and avoid termination of canal water service, residents in the IID service area who do not receive treated water service must obtain alternative water service for drinking and cooking from a state-approved provider. To avoid penalties that could exceed $25,000 a day, IID strictly enforces this rule. The section tracks nearly 4,000 raw water service accounts required by the California Department of Public Health (CDPH) to have alternate drinking water service. The section maintains a small- acreage pipe and drinking water database, and provides an annual compliance update to CDPH (Rules and Regulations Governing the Distribution and Use of Water, Jan 2016).

It is not anticipated that there will be any major raw water quality disruptions. The following describe the water quality concerns that were discussed in the Sanitary Survey completed in 2010:

6.4.1.2 Water Pollution

The City participated in the Sanitary Survey Update 2010. The sanitary survey update provides the most recent information on the potential contaminant sources of the raw water supply. The main concern identified in the Sanitary Survey is the variable Microbial Character of the raw water.

The source water was tested as required by Title 22 California code by the IID. The Results of the bacteria testing showed wide fluctuations in the total coliform, fecal coliform, and E.coli. While some results can be attributed to a passing slug of contaminated water or the testing method, it appears that there is some correlation between the season and high concentrations of bacteria. See **Figure 45** for a graph of the variable total coliforms.

The variable microbial character of the raw water is due in part to:

- Storm Water Runoff and First Flush Events;
- IID routine inspection and maintenance procedures;
- Spills into the IID canal system;

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- Drowning deaths in the IID canal system and associated response plans;
- Failing Septic Systems along the Colorado River;
- Recreational Activity;
- Agricultural activity.

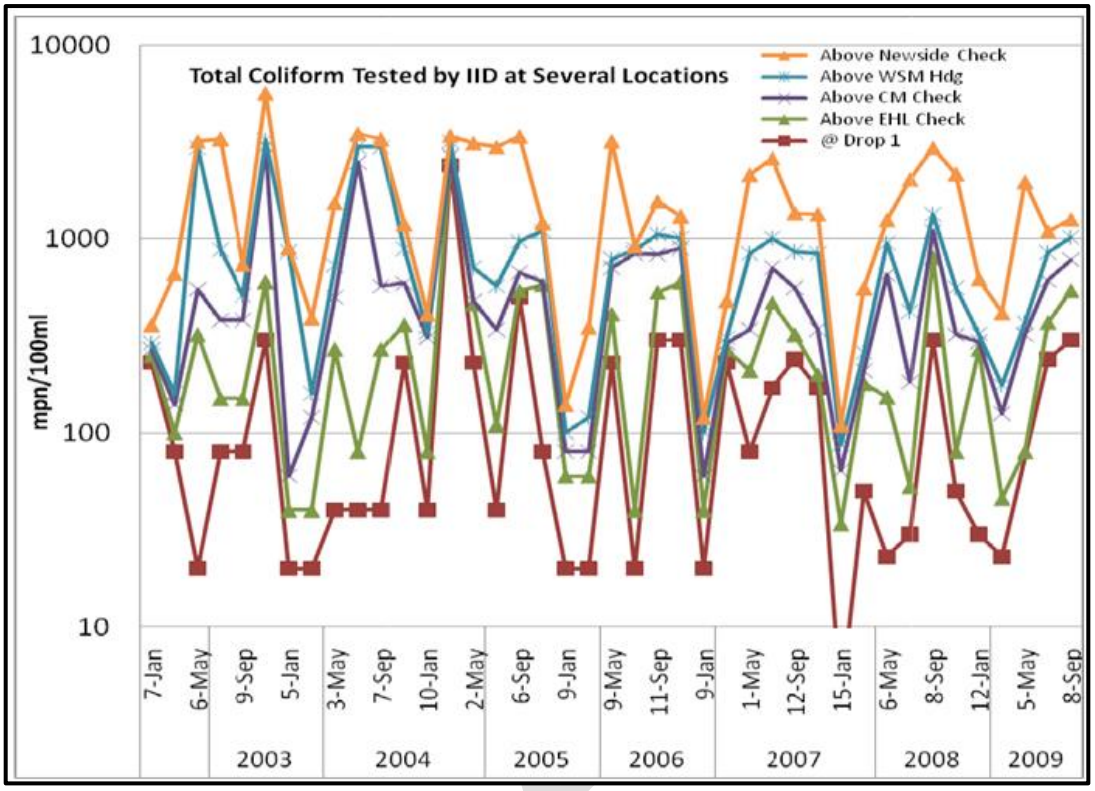

Figure 45 - Total Coliform Variations in the IID Canal Delivery System

According to the Sanitary Survey Update of 2010, it appears that there is some correlation of high total coliform between the various locations. It also appears that the longer the water is in the IID canal system, the higher the Total Coliform counts. It appears that there is an additional coliform source or that the conditions support bacteria growth within the IID canal system.

Temperature is widely recognized as an important controlling factor in influencing bacterial growth. In climates where water temperatures are warm such as the Imperial Valley, bacterial growth may be very rapid. Most bacteria thrive at temperatures at or around that of the human body 98.6°F (37°C), and some, such as Escherichia coli (E. coli), are normal parts of the human intestinal flora. These organisms are mesophilic (moderate-temperature-loving), with an optimum growth temperature between 77°F (25°C) and 104°F (40°C).

The Sanitary Survey included recommendations for the City to reduce the impact of possible contaminants for the next five years. The City plans to implement the recommendations in the survey.

6.4.1.3 Source Water General Minerals

The bicarbonate alkalinity of the Colorado River raw water ranges from 160 to 200 mg/L. The hardness ranged from 190 to 240 mg/L. TDS ranged from 720 mg/L to 840 mg/L. The following summarizes the monitoring results for alkalinity, hardness and total dissolved solids (TDS) for samples collected from the IID system since 2003.

Raw Colorado River Water General Tested Mineral Quality (in IID Delivery System)				
Sample Location	Date	TDS (mg/L)	Bicarbonate Alkalinity (mg/L)	Hardness as CaCO3 (mg/L)
Drop 1	10/15/04	770	190	350
Drop 1	10/14/05	800	190	360
Drop 1	10/27/06	830	200	380
Drop 1	10/26/07	820	200	350
Drop 1	10/24/08	820	190	360
East High Line	10/15/04	770	190	350
East High Line	10/14/05	800	190	360
East High Line	10/27/06	830	200	350
East High Line	10/26/07	860	240	370
East High Line	10/24/08	850	190	360
Central Main	10/15/04	790	190	350
Central Main	10/14/05	790	190	360
Central Main	10/27/06	780	190	350
Central Main	10/26/07	840	200	370
Central Main	10/24/08	720	190	370
Westside Main	10/15/04	820	190	350
Westside Main	10/14/05	810	190	360
Westside Main	10/27/06	790	190	370
Westside Main	10/26/07	800	200	360
Westside Main	10/24/08	820	190	360

Figure 46 - Raw Colorado River Water General Tested Mineral Quality (in IID Delivery System)

6.4.5 Historical Data on the Colorado River Water Supply

The right to water from the Colorado River is governed by numerous compacts, state and federal laws, court decisions and decrees, contracts, and regulatory guidelines collectively known as the "Law of the River." These documents apportion the water and regulate the use and management of the Colorado River among the seven basin states and Mexico. Of all regulatory literature that governs Colorado River water rights, the following are the specifics that impact IID:

- Colorado River Compact (1922)
- Boulder Canyon Project Act (1928)
- California Seven-Party Agreement (1931)
- Arizona v. California US Supreme Court Decision (1964, 1979)

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- Colorado River Basin Project Act (1968)
- Quantification Settlement Agreement and Related Agreements (2003)
- 2003 Colorado River Water Delivery Agreement: Federal QSA for purposes of Section 5(b) Interim Surplus Guidelines (CRWDA)
- 1970 Criteria for Coordinated Long-Range Operation of Colorado River Reservoirs
- Annual Operating Plan (AOP) for Colorado River Reservoirs
- 2007 Colorado River Interim Guidelines for Lower Basin Shortages and Coordinated Operations for Lakes Powell and Mead (2007 Interim Guidelines)

6.4.5.1 Colorado River Compact (1921)

In 1921, representatives from the seven Colorado River basin states, with the authorization of their legislatures and at the urging of the federal government, began negotiations regarding the distribution of water from the Colorado River. In November of 1922, the representatives from the upper basin states (Colorado, New Mexico, Utah and Wyoming) and lower (Arizona, California, and Nevada) signed the Colorado River Compact (Compact), an interstate agreement giving each basin perpetual rights to annual apportionments of 7.5 million acre-feet (MAF) of Colorado River water.

6.4.5.2 Boulder Canyon Project Act (1928)

The Compact was made effective by provisions in the 1928 Boulder Canyon Project Act, which authorized construction of Hoover Dam and the All-American Canal, and served as the United States' consent to accept the Compact. Officially enacted on June 25, 1929, through a Presidential Proclamation, this act resulted in ratification of the Compact by six of the basin states and required California to limit its annual consumptive use to 4.4 MAF of the lower basin's apportionment plus not less than half of any excess or surplus water unapportioned by the Compact. Arizona refused to sign and subsequently filed a lawsuit. California abided by this federal mandate through the implementation of its 1929 Limitation Act. The Boulder Canyon Project Act further authorized the Secretary to "contract for the storage of water... and for the delivery thereof for irrigation and domestic uses," and further defined the lower basin's 7.5 MAF apportionment split, with an annual allocation of 0.3 MAF to Nevada and 2.8 MAF to Arizona. While the three states never formally accepted or agreed to these terms, a 1964 Supreme Court decision (Arizona v. California, 373 U.S. 546) declared their consent to be inconsequential since the Boulder Canyon Project Act was authorized by the Secretary.

6.4.5.3 California Seven-Party Agreement (1931)

Following implementation of the Boulder Canyon Project Act, the Secretary requested that California make recommendations regarding distribution of its allocation of Colorado River water. In August 1931, under chairmanship of the State Engineer, the California Seven-Party Agreement was developed and authorized by the affected parties to prioritize California water rights. The Secretary accepted this agreement and established these priorities through General Regulations issued in September of 1931.

The first four priority allocations account for California's annual apportionment of 4.4 MAF, with agricultural entities using 3.85 MAF of that total. The remaining priorities are defined for years in which the Secretary declares that excess waters are available.

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6.4.5.4 Arizona v. California US Supreme Court Decision (1964,1979)

In 1963, the Supreme Court issued a decision settling a 25-year-old dispute between Arizona and California, which stemmed from Arizona's desire to build the Central Arizona Project to enable use of its full apportionment. California argued that Arizona's use of water from the Gila River, a Colorado River tributary, constituted use of its Colorado River apportionment, and that California had developed a historical use of some of Arizona's apportionment, which, under the doctrine of prior appropriation, precluded Arizona from developing the project.

The Supreme Court rejected California's arguments, enjoined the Secretary from delivering water outside the framework of apportionments defined by the law, and mandated the preparation of annual reports documenting the consumptive use of water in the three lower basin states. In 1979, the Supreme Court issued a Supplemental Decree which addressed Present Perfected Rights (PPRs) referred to in the Colorado River Compact and in the Boulder Canyon Project Act. These rights are entitlements essentially established under state law and have priority over later contract entitlements.

On March 27, 2006, the Supreme Court issued a Consolidated Decree to provide a single reference to the provisions of the original 1964 decrees and several subsequent decrees (1966, 1979, 1984, and 2000) that stemmed from the original ruling. This decree also reflects the settlements of the federal reserved water rights claim for the Fort Yuma Indian Reservation.

6.4.5.5 Colorado River Basin Project Act (1968)

Congress authorized construction of a number of water development projects in both the upper and lower basins, including the Central Arizona Project (CAP) in 1968. The act made the priority of the CAP water supply subordinate to California's apportionment in times of shortage, and directed the Secretary to prepare, in consultation with the Colorado River Basin states, long-range operating criteria for the Colorado River reservoir system.

6.4.5.6 Quantification Settlement Agreement (QSA) and Related Agreements (2003)

The Quantification Settlement Agreement (QSA) and Related Agreements that became effective in October 2003 are a set of inter-related contracts that settle certain disputes among the United States, the State of California, Imperial Irrigation District (IID), Metropolitan Water District (MWD), Coachella Valley Water District (CVWD) and the San Diego County Water Authority (SDCWA) that became effective in October 2003. The agreements resolve, for a period of 35 to 75 years, issues regarding the reasonable and beneficial use of Colorado River water; the ability to conserve, transfer and acquire conserved Colorado River water; the quantification of Priorities 3 and 6 within California for the use of Colorado River water; and the obligation to implement and fund environmental impact mitigation related to the above.

Conserved water transfer agreements between IID and SDCWA, IID and CVWD and IID and MWD are all part of the QSA and Related Agreements. These contracts identify the conserved water volumes and transfer schedules for IID along with price and payment terms. As specified in the agreements, IID will transfer to SDCWA up to 200,000 AFY, and to CVWD up to 103 AFY, and MWD 105,000 Acre

AFY of water conserved from delivery system improvements and on-farm efficiency improvements, all in return for payments totaling billions of dollars. In addition, IID will transfer up to 67,000 AFY of conserved water from the lining of the All- American Canal to SDCWA and certain San Luis Rey Indian Tribes 16,500

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AFY in exchange for the payment of all lining project costs and a grant to IID of certain rights to use the conserved water.

As a result of the QSA and Related Agreements, IID will be able to more efficiently deliver Colorado River water to the Imperial Valley. Imperial Valley water users will be able to more effectively irrigate their farms, thus preserving Imperial Valley water rights and agricultural output, with costs and impacts compensated by the payments to IID for the conserved water. IID will face minimum future risk from challenges to the purpose or reasonableness of IID's water use, and thus enable the Imperial Valley to rely upon the large senior Colorado River water rights IID possesses.

In short, the QSA and Related Agreements provide the methods and the means to allow IID to elevate its Colorado River water use to efficient 21st Century standards and ensure the continued availability.

In October 2003, all the water districts, the State and the Interior reached agreement on the final terms of the QSA and related agreements. For closure among State interests, three elements proved critical. First, the IID, SDCWA, CVWD and MWD agreed to provide four sources of economic support for Salton Sea restoration: (1) conditional new transfers between the IID/CDWR and CDWR/MWD as described in the succeeding paragraph; (2) conditional reassignment of mitigation water to CDWR for resale to MWD at a price of $250/AF (in 2003 dollars) per acre-foot delivered to the Salton Sea, provided that the reassignment is consistent with the restoration of the Salton Sea and satisfies other conditions; (3) a joint contribution by the IID, CVWD, and SDCWA to the Salton Sea Restoration Fund established by the California Legislature with payments totaling a present value of $30 million; and (4) payment by MWD to a Salton Sea Restoration Fund of $20 (in 2003 dollars) per acre-foot for all special surplus water MWD receives from the reinstatement of the Interim Surplus Guidelines.

As part of the final negotiations, the IID and CDWR entered into a conditional agreement for the IID to sell CDWR an aggregate of 800,000 acre-feet of conserved water, through the year 2017 for delivery to the Salton Sea as mitigation for impacts of the SDCWA transfer. CDWR is responsible for all mitigation costs, including environmental and any socioeconomic impacts from land fallowing used to make water available to CDWR. The water will be sold to CDWR at a price of $175/acre foot (in 2003 dollars). Therefore, the price received by the IID in any year equals $175/acre foot adjusted by changes in a contractually defined price index from 2003 to the year of delivery.

6.4.7 Canal Lining Projects

The shallow aquifers beneath the Imperial Valley are affected by canal seepage and deep percolation of applied irrigation water (raw Colorado River water) from agricultural fields. Percolation from agricultural fields has resulted in local salinities higher than Colorado River water because of the leaching of salts from these fields. In other areas, mounds of good quality fresh water have resulted from seepage from irrigation canals. This has occurred significantly in the unlined major canals and the All-American, East Highline, and Coachella canals.

In 1986, Congress passed Public Law 100-675 that governs the allocation of water conserved by the lining of the All-American and Coachella canals and assigns responsibility for the repayment of costs. Water conserved by these projects was to be made available to the IID, CVWD, and MWD in accordance with the priorities established under the Seven-Party Agreement. Parties who use the conserved water were to

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reimburse the party constructing the project for an apportioned share the amortized capital costs, plus an apportioned share of the costs of operation, maintenance, and any net costs the lining projects impose on IID. In 1988, Congress authorized the Secretary of the Interior to develop a well field or construct a new lined canal or line previously unlined portions of the All-American Canal in southeastern California, and to enter into an agreement with the MWD and/or certain other California water agencies to fund the lining project. The canal is owned by the United States. An estimated 67,700 acre-feet of water a year that was lost by seepage into groundwater from unlined portions of the canal is expected to be saved by this project and made available for use according to the terms of the QSA and related agreements.

On September 25, 1998, the California Legislature passed Senate Bill 1765 authorizing the sum of $200 million be used by the Director of CDWR to finance and arrange for lining portions of the All-American and Coachella Canals. The “Agreement for the Funding of the All-American Canal Lining Project” was developed by the IID and CDWR, and approved by the Board of Directors of the IID on July 24, 2001. Pursuant to the agreement with CDWR, CDWR will reimburse the IID for all costs up to $126 million associated with the canal lining project. The project also qualifies for an additional $9.5 million of Proposition 50 funding approved in the November 2002 general election. The total amount of funding reserved for the canal lining project from the State of California is $135.5 million.

6.4.8 All-American Canal

The All-American Canal (AAC) is the Imperial Valley's lifeline from the Colorado River. In 2008, 2,878,320 acre-feet of Colorado River water was accounted for by water balance through the All-American Canal to nine cities and 475,000 acres of farmable lands throughout the Imperial Valley.

Considered an engineering marvel, even by today's standards, the 80-mile gravity flow All-American Canal begins at Imperial Dam on the Colorado River about 20 miles northeast of Yuma, Arizona. Dropping a total of 175 feet between Imperial Dam and IID’s Westside Main Canal, the All-American Canal extends south and then west, parallel to the Mexican/American border much of the way.

Crossing 14 miles of sand dunes on the east side of the Imperial Valley, the All-American Canal ends in the southwest corner of the Imperial Irrigation District's delivery area. The AAC until 2009 was unlined, resulting in an estimated 67,700AFY in seepage. The All-American Canal Lining Project included 23 miles of concrete lining parallel to the existing earthen canal, from one mile west of Pilot Knob to Drop 3. The new concrete lined section of the AAC is expected to conserve 67,700 acre-feet per year of Colorado River water that was historically lost to seepage, mainly into Mexico. **Figure 47** below sows IID’s canal network in the Imperial Unit.

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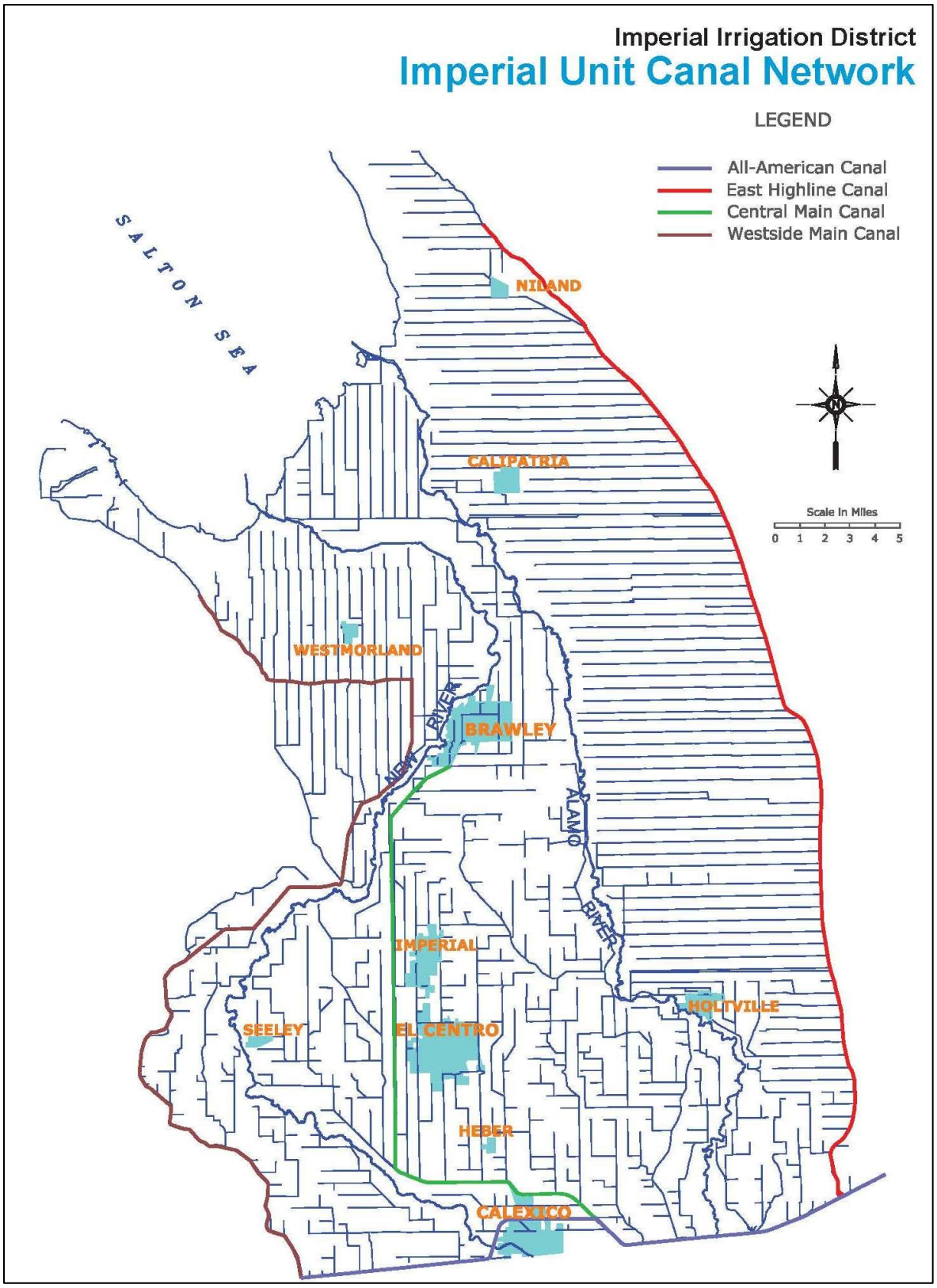

Figure 47 - Imperial Unit Canal Network

6.4.9 Colorado River Environmental Considerations

Several fish species and other wildlife species either directly or indirectly have the potential to affect Colorado River options, thus changing power operations and the amount of water deliveries to the lower basin. A number of species that are on either endangered or threatened lists under the Endangered Species Act are present in the area of the Lower Colorado River, including among others, the bonytail chub, razorback sucker, southwestern willow flycatcher and Yuma clapper rail. To address this issue, a broad-based State/Federal/tribal/private regional partnership has been formed, which includes water, hydroelectric power and wildlife management agencies in Arizona, California and Nevada. The objective is to accommodate current water diversions and power production and optimize opportunities for future water and power development while working toward the conservation of habitat and toward recovery of the endangered species. These efforts also have the objective of reducing the likelihood of additional "threatened/endangered" species listings.

6.4.10 Operations of the Water System

The Water Control Section of the IID's Water Department is responsible for the transmission of water through the main canal system and its diversion to the laterals for distribution to the users. Water distribution is a complicated task that involves adjusting the appropriate check, delivery and other structures. There are approximately 3,400 check structures and 5,600 irrigation delivery structures within the system. A coordinated procedure has evolved to handle this complex distribution process.

Operation of IID's main canal system has evolved extensively over the years. Initially, field personnel manually controlled the system, routing water on-site by electric powered gates or manual gate lifts. Since then, IID has implemented the construction of a modern, automated Water Control Center (a provision called for in the 1988 IID/MWD Water Conservation Agreement). This centralized facility, in concert with modernization of system automation facilities, improvements to water control sites and development of a comprehensive supervisory control and data acquisition communications system to monitor and operate the AAC and main canal transmission system, has greatly improved control of IID's water delivery system.

The operational procedures described above constitute a supply-control process, where flows to meet scheduled water deliveries are released into canals and routed from upstream to downstream according to the operations schedule. The objective at flow control locations, such as main canal and lateral headings, is to maintain scheduled deliveries. Between flow control locations, the objective is to use check structures to maintain a targeted water level.

6.5 Stormwater

The City does not treat and reuse stormwater.

6.6 Wastewater and Recycled Water

The City owns and operates the Brawley Wastewater Treatment Plant (WWTP) but does not produce or use recycled water.

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6.6.2 Wastewater Collection, Treatment, and Disposal

The city owns and operates a wastewater collection, treatment and disposal system and provides sewerage service to the City of Brawley. The wastewater treatment plant is located at 5015 Best Road, Brawley, CA 92227 which produces secondary (includes de-nitrification) treatment level wastewater. Treated wastewater is discharged to percolation ponds. The wastewater flows through the Dolson Drain, Lilac Drain, Rose Drain, Alamo River and then enters the Salton Sea.

The existing WWTP has a 5.9 MGD average daily flow (ADF) capacity and has an equalization basin which allows it to handle peak wet weather flows up to 16 MGD. Per the CIty's Wastewater Master Plan's projected flows and populations, it has been anticipated that the existing WWTP will meet capacity between 2020 and 2025.

As shown in **Figure 48** below, the wastewater treatment plant currently treats an average daily flow of 2.84 mgd and a peak daily flow (PDF) of 6.33 mgd. The wastewater treatment plant consists of an influent pumping station, grit chamber, two parallel oxidation ditches, two secondary clarifiers, an ultraviolet disinfection system, and sludge drying beds.

The City previously upgraded the facility in the following ways: 1) installed a new screening mechanism. Retrofitted the existing headworks channel with a screening dewatering system; 2) Installed a packaged lift station, wet well, and appurtenant piping to deliver water from the existing splitter box to the extended aeration/activated sludge basin; 3) Installed an extended aeration/activated sludge basin with integral clarifier treatment system with separate building to house the blowers; 4) Removed the existing ultraviolet disinfection system and replaced with a higher output capacity UV system; 5) Constructed 10 additional sludge drying beds; 6) Upgraded the existing electrical to accommodate the proposed facilities.

Wastewater Treatment Plant Summary					
WWTP Name	**Location (City)**	**Average Daily (2020)**	**Maximum Daily (2020)**	**Year of Planned Build-out**	**WWTP Capacity**
WWTP	Brawley	2.84 MGD	6.33 MGD	N/A	16 MGD

Figure 48 - Wastewater Treatment Plant Summary

No wastewater is currently recycled within the City's service boundary. The WWTP discharges the treated wastewater to IID drainage canals, where it eventually enters the Salton Sea. Treated wastewater in the City of Brawley does not currently meet Title 22 Standards.

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Table 6-2: Wastewater Collected Within Service Area in 2020						
☐	There is no wastewater collection system. The supplier will not complete the table below.					
	Percentage of 2015 service area covered by wastewater collection system *(optional)*					
	Percentage of 2015 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 from UWMP Service Area 2020***	**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)***
Add additional rows as needed						
City of Brawley	Metered	1,036	City of Brawley WWTP	Brawley WWTP	Yes	No
Total Wastewater Collected from Service Area in 2020:		1,036				
NOTES:						

Figure 49 - Table 6-2 Retail: Wastewater Collected Within Service Area in 2020

Table 6-3 Retail: Wastewater Treatment and Discharge within Service Area in 2020										
☐	No wastewater is treated or disposed of within the UWMP service area. The supplier will not complete the table below.									
Wastewater Treatment Plant Name	Discharge Location Name or Identifier	Discharge Location Description	Wastewater Discharge ID Number *(optional)*	Method of Disposal *Drop down list*	Does This Plant Treat Wastewater Generated Outside the Service Area?	Treatment Level *Drop down list*	2020 volumes			
							Wastewater Treated	Discharged Treated Wastewater	Recycled Within Service Area	Recycled Outside of Service Area
Add additional rows as needed										
Brawley WWTP	1	OUTFALL	7A13 0100 011	River or creek outfall	No	Secondary, Disinfected - 23	1,036	1,036	0	0
						Total	1,036	1,036	0	0
NOTES:										

Figure 50 - Table 6-3 Retail: Wastewater Treatment and Discharge Within Service Area in 2020

6.6.3 Recycled Water System

(Describe) the recycled water currently being used in the supplier's service area, including, but not limited to, the type, place, and quantity of use (10633(c)).

The City of Brawley does not currently use recycled water nor does the city have future plans for recycled water.

6.6.4 Recycled Water Beneficial Uses

(Describe and quantify) the potential uses of recycled water, including, but not limited to, agricultural irrigation, landscape irrigation, wildlife habitat enhancement, wetlands, industrial reuse, groundwater recharge, indirect potable reuse, and other appropriate uses, and a determination with regard to the technical and economic feasibility of serving those uses (10633(d)).

There are potential uses for recycled water that include: landscape irrigation, industrial reuse, wetlands, some agricultural uses (consistent with State regulations) and wildlife habitat enhancement. There are some recycled water projects that have been proposed in the Imperial Valley for use in Solar and Geothermal plants. However, no plans have yet been confirmed.

In February of 2006, the County of Imperial approved the Mesquite Lake Specific Plan Area (MLSPA), defining land use and development standards for approximately 5,100 acres. Located within the central Imperial County area, between the Cities of Brawley and Imperial, the area has seen many proposed projects and generated considerable interest. However, the high cost of initial infrastructure – specifically, a reliable wastewater treatment facility to generate recycled water at a reasonable cost-benefit ratio – has presented an obstacle to progress.

As mentioned in the previous UWMP, the City of Brawley was working with the City of Imperial to seek funding to build the proposed recycled water facility. Unfortunately, this goal was not realized and it is expected the project will not be constructed within the foreseeable future. The City has indicated this is partially due to the impoverished nature of the area and lack of resources to achieve the required funding goals. Currently the project has been shelved and the plans will remain in the City's possession should the funds become available for a future project. Construction of the Keystone Regional Water Reclamation Facility and Wastewater Collection System, if the funding should become available to construct such a facility, would increase the City's capacity to treat wastewater by 5.0 MGD.

The following **Figure 51** shows the current and projected Recycled Water benefits. However, the City of Brawley currently does not use recycled water nor does the city have future plans for recycled water.

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Table 6-4 Retail: Recycled Water Direct Beneficial Uses within Service Area									
☑	Recycled water is not used and is not planned for use within the service area of the supplier. The supplier will not complete the table below.								
Name of Supplier Producing (Treating) the Recycled Water:									
Name of Supplier Operating the Recycled Water Distribution System:									
Supplemental Water Added in 2020 (volume)									
Source of 2020 Supplemental Water									
Beneficial Use Type *These are the only Use Types that will be recognized by the DWR online submittal tool*	**Amount of Potential Use of Recycled Water**	**General Description of 2020 Uses**	**Level of Treatment**	**2020**	**2025**	**2030**	**2035**	**2040**	**2045 (opt)**
Agricultural irrigation									
Landscape irrigation (excludes golf courses)									
Golf course irrigation									
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:	0	0	0	0	0	0
			2020 Internal Reuse						
NOTES: The City does not use recycled water									

Figure 51 - Table 6-4 Retail: Recycled Water Direct Beneficial Uses within Service Area

(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 pursuant to this subdivision (10633(e)).

As shown on **Figure 52**, Recycled water was not used in 2020 nor was it projected for use in the previous UWMP. The Integrated Regional Water Management Plan (IRWMP) that is currently being developed will evaluate regional recycling opportunities and potential grant funding for projects consistent with the Imperial regional goal and objectives, and the State's preferences and priorities.

Table 6-5 Retail: 2015 UWMP Recycled Water Use Projection Compared to 2020 Actual		
☑	Recycled water was not used in 2015 nor projected for use in 2020. The supplier will not complete the table below.	
Use Type *These are the only Use Types that will be recognized by the WUEdata online submittal tool*	**2015 Projection for 2020**	**2020 Actual Use**
Agricultural irrigation		
Landscape irrigation (excludes golf courses)		
Golf course irrigation		
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	0	0
NOTES: The City does not use recycled water		

Figure 52 - Table 6-5 Retail: 2015 UWMP Recycled Water Use Projection Compared to 2020 Actual

6.6.5 Actions to Encourage and Optimize Future Recycled Water Use

(Provide a) plan for optimizing the use of recycled water in the supplier's service area, including actions to facilitate the installation of dual distribution systems, to promote recirculating uses, to facilitate the increased use of treated wastewater that meets recycled water standards, and to overcome any obstacles to achieving that increased use (10633(g)).

The plans and specifications for the Keystone Regional Water Reclamation Facility & Wastewater Collection System have been prepared and are ready for construction. However, the City has been seeking funding sources for the recycled water treatment facility and installing a dual distribution system since

2015. It is currently beyond the City's resources to realize the construction of this facility. A summary of plans are shown on **Figure 53** below.

Table 6-6 Retail: Methods to Expand Future Recycled Water Use			
☑	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**
Add additional rows as needed			
		Total	0
NOTES: City does not have the infrastructure to recycle water			

Figure 53 - Table 6-6 Retail: Methods to Expand Future Recycled Water Use

6.7 Desalinated Water Opportunities

Describe the opportunities for development of desalinated water, including, but not limited to, ocean water, brackish water, and groundwater, as a long-term supply (10631(g)).

There are no plans to use and treat the brackish groundwater as a long-term supply in the Imperial Valley.

There are no plans for the City of Brawley to use and treat the brackish groundwater as a long-term supply in the Imperial Valley. There are no feasible opportunities for the City of Brawley to independently development of desalinated water sources within the planning horizon of this 2020 UWMP, because of the supply availability and cost effectiveness of treating surface water from the Colorado River. If it becomes financially feasible in the future, there may be consideration for desalination of brackish groundwater and drain water on a regional basis.

6.8 Exchanges or Transfers

Describe the opportunities for exchanges or transfers of water on a short-term or long-term basis (10631(c))

The City does not have plans to exchange or transfer water. All agencies within the Imperial Valley utilize the same raw source water from IID. However, if connected to another water system there would be the benefit of an emergency water supply. The City will continue to evaluate the potential for long term possibilities. The City remains working in cooperation with the City of Imperial for the future construction of a regional reclaim facility to divert some untreated wastewater from its collection system.

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6.9 Future Water Projects

…The urban water supplier shall include a detailed description of expected future projects and programs… that the urban water supplier may implement to increase the amount of the water supply available to the urban water supplier in average, single-dry, and multiple-dry water years. The description shall identify specific projects and include a description of the increase in water supply that is expected to be available from each project. The description shall include an estimate with regard to the implementation timeline for each project or program. (10631(f)).

The City of Brawley does not have any planned future projects at this time.

Table 6-7: Expected Future Water Supply Projects or Programs						
☑	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.					
	Provide page location of narrative in the UWMP					
Name of Future Projects or Programs	**Joint Project with other agencies?**		**Description (if needed)**	**Planned Implementation Year**	**Planned for Use in Year Type** *Drop Down List*	**Expected Increase in Water Supply to Agency**
	Drop Down List (y/n)	*If Yes, Agency Name*				
Add additional rows as needed						
NOTES: No planned future projects at this time.						

Figure 54 - Table 6-7 Retail: Expected Future Water Supply Projects or Programs

Although the City does not have any future water supply projects planned to increase the amount of the water supply available, the City of Brawley is a participant in the Imperial Water Forum. The Imperial IRWMP being developed by the Water Forum includes evaluation of potential future projects and programs that may be implemented to increase the amount of the water supply available in all types of years. The Imperial IRWMP will contain an implementation plan and listing of projects to be implemented to increase the water supply portfolio. As a participant in the IRWMP, the City is working within the larger Region through the collaborative IRWM effort to increase the amount of supply within the Region.

6.10 Summary of Existing and Planned Sources of Water

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

As the City receives all of its water from IID, the summary below of existing and planned sources of water is based on volumes of water that IID provided in 2020 and the volume IID is expected to provide to the City based on proportional City growth estimates determined in this document. **Figure 55** shows the actual real water supplied in 2020 within the City's service area, 100% of which the City has a right to.

Table 6-8 Retail: Water Supplies — Actual				
Water Supply		2020		
Drop down list *May use each category multiple times. These are the only water supply categories that will be recognized by the WUEdata online submittal tool*	**Additional Detail on Water Supply**	**Actual Volume**	**Water Quality** ***Drop Down List***	**Total Right or Safe Yield *(optional)***
Add additional rows as needed				
Purchased or Imported Water	IID	2,302	Other Non-Potable Water	2,302
	Total	2,302		2,302
NOTES:				

Figure 55 - Table 6-8 Retail: Water Supplies — Actual

As discussed, the City operates on a real time supply and demand basis. WTP operators order water from IID daily in accordance with the raw water storage levels. The raw water reservoirs act as the City's WTP holding tank as opposed to an emergency supply source in that the water in the reservoir is constantly being fed by IID while also feeding the City's WTP. In this way, the City ensures adequate supply is available at all times.

Actual supply available is much higher and capable of being augmented to match the WTP's capacity of 15MG per day or approximately 5,475 MG per year. However, it is unlikely the City will be requiring to run the WTP at full capacity at any time in the next 20 years. Due to this, the supply volume of 2,302 MG above is used as a basis for quantifying similar supply volumes anticipated in proportion to the City's growth to meet customer demands.

To that end, the City's retail water supply and project water supply details shown below in **Figure 56** are based on supply projection in accordance with the volume supplied in 2020. For consistency throughout this 2020 UWMP, the difference between the max daily WTP capacity and the normal projected supply anticipated is categorized as reserves and used for augmentation purposes, if needed.

Table 6-9 Retail: Water Supplies — Projected									
Water Supply	Additional Detail on Water Supply	Projected Water Supply *Report to the Extent Practicable*							
Drop down list *May use each category multiple times. These are the only water supply categories that will be recognized by the WUEdata online submittal tool*		2025		2030		2035		2040	
		Reasonably Available Volume	Total Right or Safe Yield *(optional)*	Reasonably Available Volume	Total Right or Safe Yield *(optional)*	Reasonably Available Volume	Total Right or Safe Yield *(optional)*	Reasonably Available Volume	Total Right or Safe Yield *(optional)*
Add additional rows as needed									
Purchased or Imported Water[1]		2,376	2,376	2,452	2,452	2,530	2,530	2,611	2,611
Supply from Storage[2]	Volume still available to match WTP's capacity	2,552	2,552	2,476	2,476	2,397	2,397	2,317	2,317
Groundwater	0								
Surface water	0								
Recycled Water	0								
Desalinated Water	0								
Stormwater Use	0								
Groundwater	0								
Exchanges	0								
Other	0								
	Total[2]	4,928	4,928	4,928	4,928	4,928	4,928	4,928	4,928

NOTES: [1]Purchased water projection was calculated based off IID water supplied for the previous five years.
[2]4,928 MG Volume based on assumption that 90% of total WTP permitted capacity is reasonably available at any time.

Figure 56 - Table 6-9 Retail: Water Supplies — Projected

6.11 Climate Change Effects

Climate change effects have been considered herein for potential impacts to water supply sources and water use trends. However, per this analysis, climate change impacts have been determined negligible as the City's water demands are significantly lower than their available supply.

Climate change is not viewed as an impacting factor in water source reliability for the City of Brawley. The IID, whom supplies the City with raw water, places the highest priority on drinking water supply, the quantity of which makes up a very small percentage of the IID's total water rights. The City's water demands are significantly lower than their available supply. As such, for the foreseeable future, water supply impacts due to climate change are not at risk. Nonetheless

6.12 Energy Use

This section is intended to report energy use information including the methodology used to calculate the energy intensity of the City of Brawley's water services. For purposes of this 2020 UWMP, only the energy use information associated with the City's water management processes and operational control are included. The energy embedded in water supplies by an upstream water supplier (such as IID) is not included in the energy intensity reported herein.

Figure 57 below shows the amount of energy used to treat and convey water supplies from the WTP and through the distribution systems in 2020. The data was obtained from the City's finance department. The record information does not currently separate or breakdown the energy used to determine the energy used solely from the WTP or the energy used to distribute the water supplies through its water distribution system. The City will continue to identify energy saving opportunities with the department, as energy consumption is a large portion of the cost of delivering water.

Table O-1B: Recommended Energy Reporting - Total Utility Approach				
Enter Start Date for Reporting Period	1/1/2020	**Urban Water Supplier Operational Control**		
End Date	12/31/2020			
Is Upstream embedded in the values reported?	No	**Sum of All Water Management Processes**	**Non-Consequential Hydropower**	
Water Volume Units Used	*MG*	Total Utility	Hydropower	Net Utility
Volume of Water Entering Process (volume unit)		*2171*	*0*	*2171*
Energy Consumed (kWh)		*2947550*	*0*	*2947550*
Energy Intensity (kWh/volume)		*1357.7*	*0.0*	*1357.7*
Quantity of Self-Generated Renewable Energy				
0	kWh			
Data Quality *(Estimate, Metered Data, Combination of Estimates and Metered Data)*				

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Metered Data	
Data Quality Narrative:	
Finance Department provided Electric Bills	

Figure 57 - Brawley Energy Consumption Summary

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Chapter 7 – Water Service Reliability and Drought Risk Assessment

This chapter serves to describe the City of Brawley's water system reliability through at least a 20-year planning horizon. This water service reliability includes the ability to maintain adequate service during various conditions including normal, single dry year, and five consecutive dry years. Included in this chapter is the Drought Risk Assessment required for this 2020 UWMP.

7.1 Water Service Reliability Assessment

Every urban water supplier shall include, as part of its urban water management plan, an assessment of the reliability of its water service to its customers during normal, dry, and multiple dry water years. This water supply and demand assessment shall compare the total water supply sources available to the water supplier with the total projected water use over the next 20 years, in five-year increments, for a normal water year, a single dry water year, and multiple dry water years. The water service reliability assessment shall be based upon the information compiled pursuant to Section 10631, including available data from state, regional, or local agency population projections within the service area of the urban water supplier (10635(a)).

This section builds on Chapter 6 and serves to reflect the City's ability to meet the water needs of its customers based on its water sources during varying conditions. Within the City's service area, demand is significantly lower than the City's day to day storage volumes and production capacity. Outside of the City's production is the amount provided by IID from whom the City receives all of its raw water. Although it has been determined that IID's water supply is significant compared to the needs of the City, this reliability assessment focuses on IID's supply to the City to document and identify whether there are any potential disruptions to the City in the near future.

7.2.1 Constraints on Water Source

A detailed discussion of anticipated supply availability under a normal water year, single dry year, and droughts lasting at least five years, as well as more frequent and severe periods of drought, as described in the drought risk assessment. For each source of water supply, consider any information pertinent to the reliability analysis conducted pursuant to Section 10635, including changes in supply due to climate change (10631(b)(1)).

New to the 2020 UWMP is an analysis of plausible hydrological conditions including a normal, single dry, and multiple dry water years that may pose a plausible constraint on the City's water source. The analysis performed in this section is to show that adequate water supply remains available in various climate scenarios. Through coordination with IID staff in preparing this 2020 UWMP and per IID's most recent base Water Supply Assessment Document, the Water availability for IID in a normal year is no different from water availability during a single-dry and multiple-dry year scenarios. This is due to the small effect rainfall has on water availability in IID's arid environment along with IID's strong entitlements to the Colorado River water supply. Local rainfall does have some impact on how much water is consumed (i.e. if rain falls on agricultural lands, those lands will not demand as much irrigation), but does not impact the definition of a normal year, a single-dry year or a multiple-dry year scenario.

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The main factors that can cause water supply shortages for the City are water pollution, earthquakes and long term energy outages at the treatment and pumping facilities. Since IID is the only supplier of water to the City, there is no alternative source water. The water quality of the agricultural drains, New River and Alamo River are high in total dissolved solids and other contaminants and are as such unusable as a potable or irrigation water source.

The City receives water from the All-American and Central Main Canals. If either the All-American Canal or Central Main Canal were shut down, water could not be delivered to the treatment plant. Potential shutdown causes include scheduled maintenance or as a result of an emergency, such as an earthquake. In October 1979, an earthquake caused levee and slope failures along the All-American Canal east of El Centro, severely limiting water flow. This is the only time during the last 45 years that the All-American Canal was shut down.

Maintenance is scheduled to be performed monthly on the South Date Canal and Dahlia Lateral. Typically, the South Date Canal and the Dahlia Lateral are shut down about three times annually, usually lasting approximately three days each time. The Central Main Canal and the All-American Canal are seldom shut down. To perform maintenance on the Central Main Canal, the water level is lowered but service is not completely interrupted. According to plant operators, this is done every five to ten years.

There are no known upcoming factors that will result in inconsistency of supply.

7.2.1.1 IID Supply Shortage Measures

In the event that there is a water shortage in the Lower Colorado River Basin, the Imperial Irrigation District/San Diego County Water Authority water transfer agreement states that both agencies will share, on a pro-rata basis, any reductions in water to IID should a shortage declaration by the Secretary of the Interior for the Lower Colorado River Basin affect IID's water conservation and transfer programs. When the amount of water in usable storage in Lake Mead is less than 15 million acre-feet and the unregulated inflow into Lake Powell is forecasted to be less than 8.8 million acre-feet, the IID and the San Diego County Water Authority have agreed to meet and confer to discuss a supplemental water transfer agreement in anticipation of the shortage.

Should operating conditions on the Colorado River indicate IID may be impacted by reductions in water deliveries; IID will notify all of its water users by mail and will conduct an educational outreach program in conjunction with the local media and municipal water systems. The notice will request all water suppliers, and in particular residential, industrial, and commercial water users, to conserve water on a voluntary basis. Urban water suppliers will be responsible for notifying their customers and implementing their own voluntary water conservation measures and programs.

However, it is unlikely that IID’s urban water supply would ever be affected, even under shortage or drought conditions on the Colorado River. Urban water use in the Imperial Unit makes up less than three percent of the total water delivered by IID. Under a worst-case water supply scenario, the IID would still meet the demands of urban water users. Due to the high priority of IID’s water rights, Colorado River

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flows, and the storage facilities on the Colorado River it is highly unlikely that IID's water supply will be affected, even in dry years.

7.2.1.1 IID Supply Priorities

IID has established an Equitable Distribution Plan (EDP) and implementing regulations, together referred to as the Equitable Distribution Program, that are designed to provide for the distribution of water in any year when expected demand for water is likely to exceed expected supply. Under the Equitable Distribution Program, when a supply/demand imbalance is declared, IID apportions the estimated supply among the various types of water users as follows:

a) Municipal and Commercial Users – Municipal and Commercial water users will receive the first allocation, the base amount of 2006 usage plus current District wide average use per capita multiplied by the increase in population since 2006.
b) Industrial Users – For existing contracts, estimated based on past use, not to exceed contracted amount and contract terms. For new contracts, estimated based on anticipated use, not to exceed contract amount and contract terms, taking into consideration the Interim Water Supply Policy dated 09/29/09.
c) Feedlots and Dairies – Estimate based upon past use and consideration of future changes;
d) Environmental Resources Water – Estimated based upon the amount reasonably necessary to achieve the purposes of IID's commitments, taking past use into account; and
e) Agricultural Lands – Straight Line Apportionment. Subtract the estimated demand for categories a through d above from Available Water Supply, and then divide the remaining supply by the total number of Eligible Agricultural Acres. The amount of water apportioned to acreage that does not comply with Eligible Agricultural Acres will be placed in the District Water Exchange.

As part of the EDP, a District Water Exchange is established so that agricultural water users can sell and buy water. This provides flexibility for some agricultural water users to obtain water in addition to their straight-line apportionment.

7.2.2 Types of Years

As was mentioned at the beginning of the section, new to the 2020 UWMP is an analysis of plausible hydrological conditions (types of years) including normal, single dry, and multiple dry water years that may pose a plausible constraint on the City's water source.

The types of year are defined below:

"Average Water Year" means the average year of net consumptive use as compared to the consumptive use right.

"Single-Dry Water Year" in this plan signifies a year that the net consumptive use exceeded the consumptive use right.

"Five-Consecutive-Year Drought" in this plan signifies a stretch of five years that the net consumptive use exceeded the consumptive use right.

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Table 7-1 Retail: Basis of Water Year Data			
Year Type	Base Year	Available Supplies if Year Type Repeats	
			Quantification of available supplies is not compatible with this table and is provided elsewhere in the UWMP. Location_____
			Quantification of available supplies is provided in this table as either volume only, percent only, or both.
		Volume Available	% of Average Supply
Average Year	2015	4,928	100%
Single-Dry Year	2015	4,928	100%
Consecutive Dry Years 1st Year	2013	4,928	100%
Consecutive Dry Years 2nd Year	2014	4,928	100%
Consecutive Dry Years 3rd Year	2015	4,928	100%
Consecutive Dry Years 4th Year	2016	4,928	100%
Consecutive Dry Years 5th Year	2017	4,928	100%
Supplier may use multiple versions of Table 7-1 if different water sources have different base years and the supplier chooses to report the base years for each water source separately. If an agency uses multiple versions of Table 7-1, in the "Note" section of each table, state that multiple versions of Table 7-1 are being used and identify the particular water source that is being reported in each table.			
NOTES: Volume based on 90% of WTP's permitted daily capacity. The City receives its water supply from IID with no restrictions on the amount needed. As such, dry years do not impact the City's supply. Volume based on City's WTP capacity.			

Figure 58 - Table 7-1 Retail: Basis of Water Year Data

As the City receives its water supply from IID with no restrictions on the amount needed, dry years do not impact the City's supply.

7.2.3 IID Single Dry Year and Multiple Dry Years

Similarly, an analysis of a normal, single dry, and multiple dry water years was performed by IID to determine that adequate water is available in various climate scenarios. When drought conditions exist within the IID water service area, as has been the case for the past decade or so, the water supply available to meet agricultural and non-agricultural water demands remains the same as normal year water supply because IID continues to rely solely on its entitlement for Colorado River water. Due to the priority of IID water rights and other agreements, drought conditions affecting Colorado River water supplies cause shortages for Arizona, Nevada and Mexico, before impacting California and IID. Accordingly, the Net

Available for Consumptive Use volumes shown in Section 6.1 represent the water supply at Imperial Dam available for diversion by IID in single-dry year and multiple-dry year scenarios.

7.2 Supply and Demand Assessment

In accordance with the type of year scenarios discussed above, this section includes supply demand assessments during those variable scenarios to further demonstrate the City is not currently affected nor is it anticipated to be affected within the next 20 years. The City forecasts no supply shortage at any point in the future. Since the City of Brawley uses surface water supplied by IID that can supply the City with sufficient water to meet all projected demands as discussed throughout this 2020 UWMP, the City is not affected by climatic related supply shortages.

The City's projected average use over the next 20 years during normal and dry years are shown on **Figure 59** through **Figure 61**. For consistency, the supply projections below build on Table 6-9 from Chapter 6 and are based on the total volume reasonably available from the WTP at any time. It is assumed that 90% of the WTP's permitted daily capacity is reasonably available due to IID's unrestricted supply to the City. Existing WTP permitted capacity is 15 MGD or 5,475 Million Gallons per year (46 acre-feet per day and 16,800 AFY). For consistency throughout this 2020 UWMP, the difference between the max daily WTP capacity and the normal projected supply anticipated by IID is categorized as reserves and used for augmentation purposes, if needed.

Table 7-2 Retail: Normal Year Supply and Demand Comparison					
	2025	**2030**	**2035**	**2040**	**2045 *(Opt)***
Supply totals *(autofill from Table 6-9)*	4,928	4,928	4,928	4,928	4,928
Demand totals *(autofill from Table 4-3)*	2,251	2,335	2,421	2,511	2,606
Difference	2,676	2,593	2,506	2,416	2,322
NOTES: Supply data based on 90% Volume of WTP's capacity					

Figure 59 - Table 7-2 Retail: Normal Year Supply and Demand Comparison

Table 7-3: Single Dry Year Supply and Demand Comparison					
	2025	**2030**	**2035**	**2040**	**2045 (Opt)**
Supply totals	4,928	4,928	4,928	4,928	4,928
Demand totals	2,364	2,451	2,542	2,637	2,736
Difference	2,563	2,476	2,385	2,290	2,192
NOTES: A 5% increase in demand was assumed for a single dry year factor					

Figure 60 - Table 7-3 Retail: Single Dry Year Supply and Demand Comparison

For purposes of this UWMP, a 5 percent increase to anticipated customer demands during a single dry year was applied as shown in **Figure 60** to show the City's availability to meet demands even if dry years were to impact supply-demand usage. However, IID's significant supply results in no changes to the City's supply during a dry year.

Table 7-4 Retail: Multiple Dry Years Supply and Demand Comparison						
		2025	2030	2035	2040	2045 (Opt)
First year	Supply totals	4,928	4,928	4,928	4,928	4,928
	Demand totals	2,364	2,451	2,542	2,637	2,736
	Difference	2,563	2,476	2,385	2,290	2,192
Second year	Supply totals	4,928	4,928	4,928	4,928	4,928
	Demand totals	2,364	2,451	2,542	2,637	2,736
	Difference	2,563	2,476	2,385	2,290	2,192
Third year	Supply totals	4,928	4,928	4,928	4,928	4,928
	Demand totals	2,364	2,451	2,542	2,637	2,736
	Difference	2,563	2,476	2,385	2,290	2,192
Fourth year *(optional)*	Supply totals	4,928	4,928	4,928	4,928	4,928
	Demand totals	2,364	2,451	2,542	2,637	2,736
	Difference	2,563	2,476	2,385	2,290	2,192
Fifth year *(optional)*	Supply totals	4,928	4,928	4,928	4,928	4,928
	Demand totals	2,364	2,451	2,542	2,637	2,736
	Difference	2,563	2,476	2,385	2,290	2,192
Sixth year *(optional)*	Supply totals	4,928	4,928	4,928	4,928	4,928
	Demand totals	2,364	2,451	2,542	2,637	2,736
	Difference	2,563	2,476	2,385	2,290	2,192
NOTES: A 5% increase in demand was assumed for a single dry year factor						

Figure 61 - Table 7-4 Retail: Multiple Dry Years Supply and Demand Comparison

As shown, there is no foreseeable water shortage in the City of Brawley for the next 20 years. Additionally, the Equitable Distribution Program will provide for the distribution of water in any year when expected demand for IID water is likely to exceed expected IID supply. Under the Equitable Distribution Program, when a supply/demand imbalance is declared, IID apportions the estimated supply among the various types of water users with municipal and commercial water users receiving the first allocation.

As mentioned previously, it is unlikely that the IID urban water supply would ever be affected, even under shortage or drought conditions on the Colorado River. Urban water use in the Imperial Unit makes up less than four percent of the total water delivered by the IID. Even under a worst-case water supply scenario, the IID could meet the demands of urban water users. Due to the high priority of the IID's water rights, Colorado River flows, and the storage facilities on the Colorado River it is highly unlikely that IID's water supply will be affected, even in dry years.

California experienced a prolonged drought from 1987 through 1992 and 2007 to 2009 and in 2010 below normal runoff. The Governor declared a statewide drought and proclaimed a state of emergency in nine counties on June 4, 2008 and a statewide emergency due to the drought on February 27, 2009. The droughts, however, did not affect the City's water supply.

7.3 Drought Risk Assessment

Every urban water supplier shall include, as part of its urban water management plan, a drought risk assessment for its water service to its customers as part of information considered in developing the demand management measures and water supply projects and programs to be included in the urban water management plan. The urban water supplier may conduct an interim update or updates to this drought risk assessment within the five-year cycle of its urban water management plan update. The drought risk assessment shall include each of the following: (1) 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 five consecutive water years, starting from the year following when the assessment is conducted. (2) A determination of the reliability of each source of supply under a variety of water shortage conditions. This may include a determination that a particular source of water supply is fully reliable under most, if not all, conditions. (3) A comparison of the total water supply sources available to the water supplier with the total projected water use for the drought period. (4) 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. (10635(b).

As discussed throughout this 2020 UWMP, under the *Law of the River*, IID retains a legal right to annual net consumptive use of 3.1 MAF from the Colorado River. Under the terms of various agreements and laws, the annual Colorado River flows would have to be reduced to less than 5.0 MAF (one-third of historic average) before the water supply to IID would be impacted. IID's supply has been determined to be reasonably reliable for the next 20 years per the analysis and assessments throughout this UWMP. Thus, the City's supply is also considered reliable and will not be affected by periods of drought.

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Nonetheless, a detailed five-year drought risk assessment (DRA) was performed herein to demonstrate the City has sufficient capacity to meet its projected demands for the next 20 years.

7.3.1 Data, Methods, and Basis for Water Shortage Conditions

All of the data used herein was based on City records and customer billing, and historical trends from the City. The future projections in the DRA are in accordance with the estimates made throughout this UWMP. The City of Brawley received all of its water from IID and is capable of distributing it to its customers in accordance with its WTP's daily capacity.

Per the reliability findings throughout this 2020 UWMP, the City will not be affected by water shortage conditions. Thus, no changes to supply or differentiation in supply between normal or dry year were used.

7.3.2 DRA Individual Water Source Reliability

Although, the City only has one water source, the source has been determined to be significant and the City's supply reliability has been determined to not be affected for the next 20 years.

7.3.3 DRA Total Water Supply and Use Comparison

A five-year DRA was performed to further demonstrate the City's ability to meet demands in during a five-year drought and is shown in **Figure 62**. This table is provided as a summary to demonstrate the total water supplies and uses during the drought. For purposes of this analysis, the supply data provided and projected herein analyzes the amount of water that IID provided in 2020 and is expected to provide to the City based on proportional City growth estimates determined in this document.

In this manner, the City will be able to determine whether additional IID supply from what is normally projected will be anticipated to be required during these years. For purposes of this 2020 UWMP and this DRA, the difference between the max daily WTP capacity and the normal projected supply anticipated will be reserved and used for augmentation purposes as mentioned throughout this UWMP.

Table 7-5: Five-Year Drought Risk Assessment Tables to Address Water Code Section 10635(b)

2021	Total
Total Water Use	2,186
Total Supplies	2,359
Surplus/Shortfall w/o WSCP Action	173
Planned WSCP Actions (use reduction and supply augmentation)	
WSCP – supply augmentation benefit	
WSCP – use reduction savings benefit	
Revised Surplus/(shortfall)	173
Resulting % Use Reduction from WSCP action	0%
2022	**Total**
Total Water Use	2,202
Total Supplies	2,547

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Surplus/Shortfall w/o WSCP Action	345
Planned WSCP Actions (use reduction and supply augmentation)	
WSCP – supply augmentation benefit	
WSCP – use reduction savings benefit	
Revised Surplus/(shortfall)	345
Resulting % Use Reduction from WSCP action	0%
2023	**Total**
Total Water Use	2,218
Total Supplies	2,734
Surplus/Shortfall w/o WSCP Action	516
Planned WSCP Actions (use reduction and supply augmentation)	
WSCP – supply augmentation benefit	
WSCP – use reduction savings benefit	
Revised Surplus/(shortfall)	516
Resulting % Use Reduction from WSCP action	0%
2024	**Total**
Total Water Use	2,234
Total Supplies	2,922
Surplus/Shortfall w/o WSCP Action	688
Planned WSCP Actions (use reduction and supply augmentation)	
WSCP – supply augmentation benefit	
WSCP – use reduction savings benefit	
Revised Surplus/(shortfall)	688
Resulting % Use Reduction from WSCP action	0%
2025	**Total**
Total Water Use	2,251
Total Supplies	3,110
Surplus/Shortfall w/o WSCP Action	859
Planned WSCP Actions (use reduction and supply augmentation)	
WSCP – supply augmentation benefit	
WSCP – use reduction savings benefit	
Revised Surplus/(shortfall)	859
Resulting % Use Reduction from WSCP action	0%
Notes: Volume in MG	

Figure 62 - Table 7-5 Retail: Five-Year Drought Risk Assessment Summary

As observed above, the City's normally projected volume from IID will be sufficient during an extended five-year drought. However, a detailed five-year DRA in monthly increments was also performed to provide a more granular look for each year. Monthly data was recommended by DWR because using an annual total may give Supplier's an unrealistic indication of reliability if the annual totals look fine but during summer months there occurs a water shortage. Additionally, for some suppliers monthly supply sources may have restrictions on availability, However, this is not the case for the City of Brawley.

The monthly 5-year drought planning tool breakdown provided in **Figure 63** below shows that although the overall yearly supply is adequate, there are months where additional supply will be required within the next 5 years. Those summer months indicated by the negative values below will require additional supply to meet the demand for that month. That amount shortfall will be easily augmented by the City's WTP capacity and ultimately supplanted by IID. The total corrected supply required is still well within the WTP's capacity and will not be an issue.

The available storage remaining assumes 90% of total WTP capacity is reasonably available at any given time. That amount will be used as augmented source available during those months that the dry year assessment has identified may be lacking due to normally projected IID supply purchase needs.

This detailed DRA provides the City with an opportunity to contemplate management of its water supplies during those summer months and track trends in relation to variations in customer water use. The City's WSCP may be implemented during those stressed months to provide an opportunity to evaluate the effectiveness of its WSCP shortage response actions and understand the degree of response that may be necessary as it relates to managing water supplies. This evaluation can help identify undesired risks and allow proactive steps to be taken prior to the next actual drought period lasting at least five consecutive years.

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5-year Drought Risk Assessment Tables to address §10635(b)													
2021	**M1**	**M2**	**M3**	**M4**	**M5**	**M6**	**M7**	**M8**	**M9**	**M10**	**M11**	**M12**	**Total**
Total Potable Water Use [Use Worksheet]	115	140	144	160	187	239	269	230	223	196	156	110	2,171
Total Potable Supplies [Supply Worksheet]	193	193	193	193	193	193	193	193	193	193	193	193	2,317
Surplus/Shortfall w/o WSCP Action	78	53	49	33	6	-46	-76	-37	-30	-3	37	83	146
Planned WSCP Actions (use reduction and supply augmentation)													
WSCP - supply augmentation benefit						46	76	37	30	3			192
WSCP - use reduction savings benefit													0
Revised Surplus/(shortfall)	78	53	49	33	6	0	0	0	0	0	37	83	338
Resulting % Use Reductio from action	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
2022	**M1**	**M2**	**M3**	**M4**	**M5**	**M6**	**M7**	**M8**	**M9**	**M10**	**M11**	**M12**	**Total**
Total Potable Water Use [Use Worksheet]	115	140	144	160	187	239	269	230	223	196	156	110	2,171
Total Potable Supplies [Supply Worksheet]	194	194	194	194	194	194	194	194	194	194	194	194	2,332
Surplus/Shortfall w/o WSCP Action	79	54	51	34	7	-45	-75	-36	-29	-2	38	84	161
Planned WSCP Actions (use reduction and supply augmentation)													
WSCP - supply augmentation benefit						45	75	36	29	2			187
WSCP - use reduction savings benefit													0
Revised Surplus/(shortfall)	79	54	51	34	7	0	0	0	0	0	38	84	348
Resulting % Use Reduction from action	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
2023	**M1**	**M2**	**M3**	**M4**	**M5**	**M6**	**M7**	**M8**	**M9**	**M10**	**M11**	**M12**	**Total**
Total Potable Water Use [Use Worksheet]	115	140	144	160	187	239	269	230	223	196	156	110	2,171
Total Potable Supplies [Supply Worksheet]	196	196	196	196	196	196	196	196	196	196	196	196	2,346
Surplus/Shortfall w/o WSCP Action	81	55	52	35	8	-44	-74	-35	-28	-1	39	86	175
Planned WSCP Actions (use reduction and supply augmentation)													

WSCP - supply augmentation benefit						44	74	35	28	1			182
WSCP - use reduction savings benefit													0
Revised Surplus/(shortfall)	81	55	52	35	8	0	0	0	0	0	39	86	357
Resulting % Use Reduction from action	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
2024	**M1**	**M2**	**M3**	**M4**	**M5**	**M6**	**M7**	**M8**	**M9**	**M10**	**M11**	**M12**	**Total**
Total Potable Water Use [Use Worksheet]	115	140	144	160	187	239	269	230	223	196	156	110	2,171
Total Potable Supplies [Supply Worksheet]	197	197	197	197	197	197	197	197	197	197	197	197	2,361
Surplus/Shortfall w/o WSCP Action	82	57	53	36	10	-42	-73	-33	-27	1	40	87	190
Planned WSCP Actions (use reduction and supply augmentation)													
WSCP - supply augmentation benefit						42	73	33	27				175
WSCP - use reduction savings benefit													0
Revised Surplus/(shortfall)	82	57	53	36	10	0	0	0	0	1	40	87	365
Resulting % Use Reduction from action	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
2025	**M1**	**M2**	**M3**	**M4**	**M5**	**M6**	**M7**	**M8**	**M9**	**M10**	**M11**	**M12**	**Total**
Total Potable Water Use [Use Worksheet]	115	140	144	160	187	239	269	230	223	196	156	110	2,171
Total Potable Supplies [Supply Worksheet]	198	198	198	198	198	198	198	198	198	198	198	198	2,376
Surplus/Shortfall w/o WSCP Action	83	58	54	38	11	-41	-71	-32	-25	2	42	88	205
Planned WSCP Actions (use reduction and supply augmentation)													
WSCP - supply augmentation benefit						41	71	32	25				144
WSCP - use reduction savings benefit													0
Revised Surplus/(shortfall)	83	58	54	38	11	0	0	0	0	2	42	88	349
Resulting % Use Reduction from action	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%

Figure 63 – Five-Year Drought Risk Assessment Detailed Summary

Chapter 8 – Water Shortage Contingency Plan

This chapter serves to provide a structured plan for dealing with water shortages, incorporating prescriptive information and standardized action levels, along with implementation actions in the event of a catastrophic supply interruption. A separate stand alone Water Shortage Contingency Plan (WSCP) in accordance with this section is provided in **Appendix G** to accompany this 2020 UWMP.

8.1 Water Supply Reliability Analysis

The analysis of water supply reliability conducted pursuant to Section 10635 (10632(a)(1)).

Per Chapter 7, the City of Brawley's Water Supply Reliability analysis and the drought risk assessment, it has been determined that the City of Brawley is not likely to experience a water supply shortage in the next 20 years. To summarize the findings of the previous chapters, the City of Brawley uses surface water supplied by the Colorado River that can supply the City with sufficient water to meet all projected demand. Moreover, the City itself maintains enough daily storage that is significantly higher than the current projected demands through 2045. Thus, the City is not affected by climate related supply shortages. California experienced a prolonged drought from 1987 through 1992 and 2007 to 2009 and in 2010 below normal runoff. The Governor declared a statewide drought and proclaimed a state of emergency in nine counties on June 4, 2008 and a statewide emergency due to the drought on February 27, 2009. The droughts, however, did not affect the City's water supply.

Nonetheless, the City will still implement a WSCP detailing water conservation measures to ease the burden on IID and the Colorado River during water shortage events. Additionally, the City is still susceptible to catastrophic events such as earthquakes and the following WSCP will be used to document the procedures and protocols to be taken by the City if such an event were to occur.

8.2 Annual Water Supply and Demand Assessment Procedures

The procedures used in conducting an annual water supply and demand assessment that include, at a minimum, both of the following: (A) The written decision-making process that an urban water supplier will use each year to determine its water supply reliability. (B) The key data inputs and assessment methodology used to evaluate the urban water supplier's water supply reliability for the current year and one dry year, including all of the following: (i) 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. (ii) Current year available supply, considering hydrological and regulatory conditions in the current year and one dry year. The annual supply and demand assessment may consider more than one dry year solely at the discretion of the urban water supplier. (iii) Existing infrastructure capabilities and plausible constraints. (iv) A defined set of locally applicable evaluation criteria that are consistently relied upon for each annual water supply and demand assessment. (v) A description and quantification of each source of water supply (10632(a)(2)).

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The City of Brawley currently does not perform an annual water supply and demand assessment since the City operates on a daily supply-demand basis. The City receives water from IID in accordance with the demand used each day. Demand is determined by daily monitoring of the City's storage levels to which the City Staff communicate with IID to either increase or decrease their daily supply to maintain the City's desired storage levels.

However, as set forth by updates to the CWC, the City of Brawley staff shall prepare annal water supply and demand assessment and submit an Annual Water Shortage Assessment Report to DWR beginning July 1, 2022.

DWR is developing a stand-alone guidance document that will recommend practical procedures and analytical methods that may be used, at the Supplier's discretion, to comply with the Annual Assessment requirement effectively and efficiently

8.3 Six Standard Water Shortage Levels

Six standard water shortage levels corresponding to progressive ranges of up to 10, 20, 30, 40, and 50 percent shortages and greater than 50 percent shortage. Urban water suppliers shall define these shortage levels based on the suppliers' water supply conditions, including percentage reductions in water supply, changes in groundwater levels, changes in surface elevation or level of subsidence, or other changes in hydrological or other local conditions indicative of the water supply available for use. Shortage levels shall also apply to catastrophic interruption of water supplies, including, but not limited to, a regional power outage, an earthquake, and other potential emergency events (10632(a)(3)).

Stages of water shortage contingency is summarized on **Figure 54** below.

Table 8-1: Water Shortage Contingency Plan Levels		
Shortage Level	**Percent Shortage Range**	**Shortage Response Actions** (***Narrative description***)
1	Up to 10%	Water Alert – Slightly Restricted
2	Up to 20%	Water Warning – Moderately Restricted
3	Up to 30%	Water Criteria – Significantly Restricted
4	Up to 40%	Water Criteria – Severely Restricted
5	Up to 50%	Water Emergency – Extremely Restricted
6	>50%	Water for Essential Use Only
Notes:		

Figure 63 - Table 8-1 Retail: Water Shortage Contingency Plan Levels

These Shortage levels shall also apply to catastrophic interruption of water supplies, including, but not limited to, a regional power outage, an earthquake, and other potential emergency events.

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8.4 Shortage Response Actions

Shortage response actions that align with the defined shortage levels and include, at a minimum, all of the following: (A) Locally appropriate supply augmentation actions. (B) Locally appropriate demand reduction actions to adequately respond to shortages. (C) Locally appropriate operational changes. (D) Additional, mandatory prohibitions against specific water use practices that are in addition to state-mandated prohibitions and appropriate to the local conditions. (E) For each action, an estimate of the extent to which the gap between supplies and demand will be reduced by implementation of the action (10632(a)(4)).

The following shortage response actions will be taken by the City to assist and due its part to lessen the State's and IID's consumptive use during regional or anticipated shortage events. As the City itself has been determined throughout this UWMP that it will not directly face water shortage of its supply, nonetheless it will still implement these measures to ease the burden on IID and the Colorado River during water shortage events. Additionally, these measures will be implemented if a major service catastrophe limits the City by the respective shortage amounts.

8.4.1 Demand Reduction

The following measures will be implemented gradually in accordance with the water shortage levels described above. In this manner, the appropriate responses in accordance with severity can be implemented. Restrictions and prohibitions on end users for each stages of water shortages are summarized below.

Table 8-2: Demand Reduction Actions

Shortage Level	Demand Reduction Actions	How much is this going to reduce the shortage gap? Include units used (volume type or percentage)	Additional Explanation or Reference	Penalty, Charge, or Other Enforcement
1	Expand Public Information Campaign	N/A	Website and newspaper bulletins	No
1	Offer Water Use Surveys	N/A		No
1	Provide Rebates for Landscape Irrigation Efficiency	N/A		No
2	Expand Public Information Campaign	N/A	Website and newspaper bulletins	No
2	Improve Customer Billing	N/A		No
2	Provide Rebates on Plumbing Fixtures and Devices	N/A		No
2	Decrease Line Flushing	N/A		No
2	Landscape - Restrict or prohibit runoff from landscape irrigation	N/A		Yes

3	Expand Public Information Campaign	N/A	Website and newspaper bulletins	No
3	Increase Frequency of Meter Reading	N/A		No
3	Provide Rebates for Turf Replacement	N/A		No
3	Reduce System Water Loss	N/A		No
3	Increase Water Waste Patrols	N/A		No
3	Pools and Spas – Require covers for pools and spas	N/A		Yes
3	Landscape – Limit landscape irrigation to specific times	N/A		Yes
4	Expand Public Information Campaign	N/A	Website and newspaper bulletins	No
4	Increase Water Waste Patrols	N/A		Yes
4	Implement or Modify Drought Rate Structure or Surcharge	N/A		Yes
4	Water Features - Restrict water use for decorative water features, such as fountains	N/A		Yes
4	Pools – Allow filling of swimming pools only when an appropriate cover in in place	N/A		Yes
4	Other - Customers must repair leaks, breaks, and malfunctions in a timely manner	N/A		Yes
4	CII - Commercial kitchens requires to use pre-rinse spray valves	N/A		Yes
4	Landscape – Limit landscape irrigation to specific days	N/A		Yes
5	Expand Public Information Campaign	N/A	Website and newspaper bulletins	No
5	Moratorium on Net-Zero Demand Increase on New Connections	N/A		Yes
5	Other - Require automatic shut of hoses	N/A		Yes
5	Other - Prohibit use of potable water for construction and dust control	N/A		Yes
5	CII – Lodging establishment must offer opt out of linen service	N/A		Yes
5	Landscape – Prohibit certain types of landscape irrigation	N/A		Yes
6	Expand Public Information Campaign	N/A	Website and newspaper bulletins	No

6	Other - Prohibit use of potable water for washing hard surfaces	N/A		Yes
6	Other - Prohibit vehicle washing except at facilities using recycled or recirculating water	N/A		Yes
6	CII – Restaurants may only serve water upon request	N/A		Yes
6	Landscape - Prohibit all landscape irrigation	N/A		Yes
NOTES:				

Figure 64 - Table 8-2 Retail: Demand Reduction Actions

8.4.2 Supply Augmentation

The IID is the only supplier of water to the City, and there is no alternative source water. The water quality of the agricultural drains, New River and Alamo River are high in total dissolved solids and other contaminants and are as such unusable as a potable or irrigation water source.

However, in terms of normal supply volumes, IID's supply to the City is significant and the City currently has no restrictions on the amount that can be supplied. Therefore, the limiting factor is the City's WTP capacity that treats the raw water received from IID and delivers it to the City's customers through its distribution system. The current supply provided by IID has been in-line with the demand required by the City's customers as the City operates on a demand-supply basis where the IID supply is increased or decreased to maintain the City's desired storage levels. Due to this, the City's total supply capacity has not been reached and the City maintains the ability to provide increased supply in accordance with its daily treatment capacity. The difference between the max daily WTP capacity and the normal volume supplied daily is considered available storage and reserved augmentation uses for purposes of this UWMP.

Table 8-3: Supply Augmentation and Other Actions			
Shortage Level	**Supply Augmentation Methods and Other Actions by Water Supplier**	**How much is this going to reduce the shortage gap? (volume type or percentage)**	**Additional Explanation or Reference (optional)**
1	Stored Emergency	100%	Remainder
Notes:			

Figure 65 - Table 8-3 Retail: Supply Augmentation and Other Actions

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8.4.3 Operational Changes

The additional volume projected to be required is well within the normal operation of the treatment plant's capacity. No operational changes are foreseen to be required. However, a number of operational changes may be utilized at various shortage levels if needed.

8.4.4 Additional Mandatory Restrictions

Aside from the demand response actions mentioned above, the City will consider additional mandatory restrictions in accordance with real time needs. These additional mandatory restrictions will be flexibly employed at the City's discretion for each water shortage level on an as-needed basis and in accordance with priority water uses to maintain basic needs.

Upon a catastrophic water supply reduction, mandatory provisions to reduce individual urban consumer water use will be placed into effect. If the water supplies are reduced by 50 percent for a single year, the City will make an allotment on a per capita basis per connection and customer type.

Additionally, the City has adopted a resolution for Restrictions during a Declared Water-Shortage Emergency. The following restrictions shall be effective during a declared Water-Shortage Emergency:

- There shall be no water used for irrigation or landscaping purposes.
- There shall be no private or commercial car washing.
- No restaurant, hotel, cafe, cafeteria or other public place where food is sold, served or offered for sale, shall serve drinking water to any customer unless requested.
- Use of potable water for construction, compaction, dust control, street or parking lot sweeping, building wash down shall be prohibited.
- Use of potable water for sewer system maintenance or fire protection training shall be prohibited without prior approval by the Mayor;
- Use of potable water for any purpose in excess of the amount allocated shall be prohibited.
- Other restrictions and prohibitions may become necessary during a declared Water Shortage Emergency, to safeguard the adequacy of the water supply for domestic, sanitation, fire protection, and environmental requirements.

These demand management and conservation measures will be enacted during regional shortage events or times of drought to facilitate the State's and IID's water burden. However, no shortage or difficulty to supply normal demands is anticipated

8.4.5 Emergency Response Plan

The City will employ the emergency response plan established per the WSCP to facilitate decision making by City personnel during times of water shortage as declared by the State of the Interior. This plan will also be used in training and preparation for new staff and as the basis for outreach programs. Refer to the WSCP provided in **Appendix G** for in-depth information and detailed steps and procedures that will be taken by the City during times of shortage.

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The City's Emergency Response Plan (ERP) will serve to ensure the continued service and restoration of water service for essential use in the event of a catastrophic supply interruption--a power outage, earthquake, or other non-dry period related emergency. This plan is not publicly available but identifies actions to be taken if there is a catastrophic supply interruption. City staff responsible for water transportation, treatment, and distribution have established the ERP to guide assessment, prioritization, and repair of facilities potentially damaged during such a disaster. The water shortage levels detailed above are not considered supply interruptions as the availability of supply from the WTP provided by IID can mitigate any shortage level forecasted for the City as demonstrated by recent drought periods.

8.4.6 Seismic Risk Assessment and Mitigation Plan

The City is currently working to finalize plans and procedures for seismic risk assessment of its water supply system and accompanying mitigation plan. This section will be updated when the information becomes available.

8.4.6 Shortage Response Action Effectiveness

The City of Brawley currently has no metric to track the effective of the developed shortage responses. Previous implementation of these measures was not recorded or tracked, but general percentages have been reasonably assumed for purposes of this UWMP. Moving forward these metrics and their effectiveness will be tracked and updated as the information becomes available.

8.5 Communication Protocols

The City is working on a communication protocol to be implemented during times of water shortage. These established protocols will facilitate staff decisions making and expedite the dissemination of information to the public. These communication protocols will be updated and provided once they have been finalized by the City.

The goals of the communication protocols are to:

- Increase the speed that response actions can be rolled out by pre-planning.
- Reduce workload by providing a blueprint for deployment of strategic actions as water shortage stages are declared.
- Provide recommendations on the optimal measures, activity levels, incentives, and services that will drive water savings according to need.
- Act as a starting point for creating a final plan of action during a water shortage event. The finalized plan will include adjustments from customer input, new technologies, grants, or other circumstances.

However, supply forecasting communication is anticipated to remain the same. As the City relies on IID delivery, it also relies on IID to notify the City of anticipated water shortages. Should operating conditions on the Colorado River indicate IID may be impacted by reductions in water deliveries; the IID will notify all of its water users by mail and will conduct an educational outreach program in conjunction with the local media and municipal water systems. The notice will request all water suppliers, and in particular: residential, industrial, and commercial water users, to conserve water on a voluntary basis. Urban water

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suppliers, such as the City, will be responsible for notifying their customers and implementing their own voluntary water conservation measures and programs.

8.6 Compliance and Enforcement

For an urban retail water supplier, customer compliance, enforcement, appeal, and exemption procedures for triggered shortage response actions as determined pursuant to Section 10632.2 (10632(a)(6)).

Enforcement of compliance will be employed to ensure measures are adhered to. Any customer violating the regulations and restrictions on water use set forth in the "No Waste" Ordinance shall receive a written warning for the first such violation. Upon a second violation, the customer shall receive a written warning and the City may cause a flow-restrictor to be installed in the service. If a flow-restrictor is placed, the violator shall pay the cost of the installation and removal. Any willful violation occurring subsequent to the issuance of the second written warning shall constitute a misdemeanor and may be referred to the Office of the City Attorney for prosecution. If water service is disconnected, it shall be restored only upon payment of the turn-on charge fixed by the City Council.

Compliance and enforcement will be assured with the following methods:

- Letters of Noncompliance will be distributed with monthly bills to indicate water use above a designated level.
- Monthly efficiency goals will be communicated on bills (e.g., 55 gpd x 4 people + Landscape, etc).
- Water shortage service area inspections (patrols).
- Sending a general letter stating the rules for drought restrictions, with notification that patrols will drive through your area on a particular week. This way compliance is encouraged prioritizing education and engagement.
- The City does not intend to utilize drought rates as a first response. However, the City may elect to implement rate increases after non-compliance.

The potential rate increases starting with a 20% rate increase at Stage II; 40% at Stage III; 60% at Stage IV; 80% at Stage V; and a 100% increase at Stage VI may be implemented after multiple defiance of non-compliance.

8.7 Legal Authorities

The City is well within its right to enforce and uphold demand reductions and restrictions as needed and as set forth in its WSCP. California Constitution article X, section 2 and California Water Code section 100 provide that water must be put to beneficial use, the waste or unreasonable use or unreasonable method of use of water shall be prevented, and the conservation of water is to be exercised with a view to the reasonable and beneficial use thereof in the interest of the people and the public welfare. In addition, Water Code Section 375 provides the City with the statutory authority to adopt and enforce water conservation restrictions, and Water Code Section 350 et seq. authorizes the City to declare a water shortage emergency and impose water conservation measures when it determines that the City may not be able to satisfy ordinary demands without depleting supplies to an insufficient level.

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8.8 Financial Consequences of WSCP Activation

The City currently has no metric to project the financial consequences of implementing the WSCP's demand reductions and outreach programs. As discussed, the City was not affected nor were there any changes to the City's water supply and demand. Additionally, previous implementation of similar measures was not recorded or tracked. Moving forward these costs and financial consequences will be tracked and updated as the information becomes available

8.9 Monitoring and Reporting

The City will continue to monitor and report water supply and demands to track trends and additional water conservation goals. Demand forecasting will continue to be provided to IID in 5 year increments to allow IID to more accurately prepare their supply availability forecasts.

As discussed above, should operating conditions on the Colorado River indicate IID may be impacted by reductions in water deliveries; the IID will notify all of its water users by mail and will conduct an educational outreach program in conjunction with the local media and municipal water systems. The notice will request all water suppliers, and in particular residential, industrial, and commercial water users, to conserve water on a voluntary basis. Urban water suppliers, such as the City, will be responsible for notifying their customers and implementing their own voluntary water conservation measures and programs.

8.10 WSCP Refinement Procedures

The WSCP will serve as the City's basis for protocols and training programs for the City moving forward. WSCP refinement procedures are used to ensure shortage risk actions are appropriate and effective, and that this WSCP has a basis to be refined and updated over the years. As such, the WSCP is anticipated to be continually refined as more information and more efficient measures become known.

The City plans to refine the WSCP at least every five years in conjunction with the UWMP updates, unless a shorter time frame is deemed appropriate by The City. The amendment process will undergo the same procedures as required by the CWC including notification, public hearing, adoption, and submittal to readopt the amended plan as done with the UWMP.

Evaluation tracking will be implemented with each future WSCP to evaluate the effectiveness of the water shortage response actions used. The evaluation will identify the City's shortage responses and compare the expected percent demand reduction against actual reductions; by this means, the shortage response actions in the WSCP will be revised using the evaluation generated evidence. The success of customer outreach and communications will also be assessed to inform the next WSCP revision.

8.11 Special Water Feature Distinction

As part of the WSCP, the City has analyzed and defined water features that are artificially supplied with water, including ponds, lakes, waterfalls, and fountains, separately from swimming pools and spas, as defined in subdivision (a) of Section 115921 of the Health and Safety Code. Non-pool or non-spa water features may use or be able to use recycled water, whereas pools and spas must use potable water for health and safety considerations.

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For these special water feature distinctions, the City will implement different compliance measures. The City has designated decorative water features and recreational water features as special water features. Different considerations have been applied to these uses during water shortage events including response actions, enforcement, and monitoring programs. These shall be formalized upon the City's final WSCP submittal.

Special Water Features of particular consequence include firefighting water supplies and other emergency supplies.

8.12 Plan Adoption, Submittal, and Availability

This WSCP will take all of the same procedures as required by the CWC including notification, public hearing, adoption, and submittal to adopt the plan and make it available to the public. Refer to Chapter 10 for details for plan adoption, submittal, and availability required by the CWC.

Similarly, if changes are necessary to the WSCP after its adoption, the City will follow each of the steps for notification, public hearing, adoption, and submittal to readopt the amended plan as the UWMP.

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Chapter 9 – Demand Management Measures

This chapter serves to communicate the City's efforts to promote conservation and to reduce demand on their water supply; specifically including a narrative describing efforts to implement several demand management measures. Demand management is an integral part of sustainably managing the State's water resources and not just during water shortage events like in Chapter 8.

9.1 Existing Demand Management Measures for Retail Suppliers

(e) Provide a description of the supplier's water demand management measures. This description shall include all of the following…(10631(e).

To better prepare for and reduce effects caused by these situations, implementing water use-DMMs that help lower demands can improve the water service reliability and help meet state and regional water conservation goals. The City's demand management measures are discussed here and in the following paragraphs. The following DMMs are discussed herein to meet CWC section 10631(B):

- Water waste prevention ordinances
- Metering
- Conservation pricing
- Public education and outreach
- Programs to assess and manage distribution system real loss
- Water conservation program coordination and staffing support
- Other DMMs that have a significant impact on water use

9.1.1 City DMMs

The UWMP Act currently requires suppliers to provide narrative descriptions of metering, public education and outreach, conservation program coordination and staffing, and other demand management measures that significantly impact water use.

9.1.1.1 Water Waste Prevention Ordinances

Water Use Reduction Plan—The City has enacted the Model Water Efficient Landscape Ordinance for the requirements found in state legislation under Assembly Bill 1881 that apply to commercial, industrial and tenant occupied residential property that require landscaping greater than 2,500 square feet and homeowner landscaping greater than 5,000 square feet. While for the most part water conservation guidelines only apply to large landscaping projects, the City encourages its application to smaller scale projects in order to conserve water.

9.1.1.2 Metering

The City has worked to install meters at all locations of direct customers receiving water. The City has successfully installed meters at all residential, commercial and industrial customer locations and is hopeful to finish installing meters at all of its parks in the near future.

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9.1.1.3 Conservation Pricing

Incentive pricing structures can assist the City achieve additional water conservation. Inclining block rates, also known as conservation pricing, are systems where the cost per unit of water increases with the quantity of water used. The City of Brawley will continue to weigh this option.

The City currently has volume-based pricing for all accounts. Customers are billed monthly for 100 percent of the volume of water used.

9.1.1.4 Public Education and Outreach

Water conservation in both urban development and agricultural activity will be promoted by the City. New development and rehabilitation projects will be required to make maximum use of water conservation techniques and the use of drought resistant plant species in ornamental landscaping will be encouraged. In addition, the City will consider using reclaimed water to replace the use of imported water for landscape irrigation; work with the County, Imperial Irrigation District, and local farmers to develop and implement conservation strategies for agricultural production; and support the Imperial Irrigation District in its efforts to maintain local water supplies and underground or cover irrigation canals for safety and conservation purposes.

9.1.1.5 Programs to assess and manage distribution system real loss

Since the previous UWMP, the City has begun conducting water loss audits to quantify the current volume of apparent and real water loss. The City annually completes the standard water audit and balance using the AWWA Water Loss software to determine their current volume of apparent and real water loss and the cost impact of these losses on utility operations.

9.1.1.6 Water Conservation Program Coordination and Staffing Support

As part of the City's water conservation program, the City has implemented water conservation policies in the City's General Plan.

The following Water Conservation policies are part of the City's General Plan, in the Resource Management Element:

- **RME Objective 4.1:** Promote city-wide water conservation to reduce the projected demand for water service and associated treatment.
- **RME Policy 4.1.1:** Protect groundwater resources from depletion and sources of pollution.
- **RME Policy 4.1.2:** Conserve imported water by requiring water conservation techniques and water conserving appliances, in rehabilitated and new projects.
- **RME Policy 4.1.3**: Require all new developments to install low-flow showers and toilets. Consider implementing a low-flow replacement program for showers and toilets in existing facilities.
- **RME Policy 4.1.4:** Encourage the replacement of existing water fixtures, toilets, and landscaping with water-conserving counterparts.
- **RME Policy 4.1.5:** Encourage the IID to promote water conservation practices and safety in agricultural activities.
- **RME Policy 4.1.6:** Implement programs to educate adults and children about the importance of water conservation and methods to reduce water use.

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- **RME Policy 4.1.7:** Support the development and usage of waste water recycling production and use wherever possible and economically feasible.
- **RME Policy 4.1.8:** Require water meters on all new construction and development and consider implementing a program to install meters on all existing water services.

The assessment of the current and proposed measures to help achieve the water use reduction requirements are analyzed and discussed in the Demand Management Measures Section.

The following **Figure 67** lists the DMMs which aid the City in maintaining the water use reductions per the Water Conservation Bill of 2009 requirements, written descriptions of each DMM follows the table.

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Implementation of the Water Conservation Bill of 2009 Requirements					
Demand Management Measures and California Urban Water Conservation Council BMP names					
CUWCC BMP Organization and Names (2009 MOU)				UWMP DMMs	
Type	Category	BMP #	BMP name	DMM #	DMM name
Foundational	Operations Practices	1.1.1	Conservation Coordinator	12	Water conservation
		1.1.2	Water Waste Prevention	13	Water waste prohibition
		1.1.3	Wholesale Agency Assistance Programs	10	Wholesale agency programs
		1.2	Water Loss Control	3	System water audits, leak detection, and repair
		1.3	Metering with Commodity Rates for All New Connections and Retrofit of Existing	4	Metering with commodity rates for all new connections and retrofit of existing connections
		1.4	Retail Conservation Pricing	11	Conservation pricing
	Education Programs	2.1	Public Information Programs	7	Public information
		2.2	School Education Programs	8	School education programs
Programmatic	Residential	3.1	Residential assistance program	1	Water survey programs for single-family residential and multifamily residential customers[1]
				2	Residential plumbing retrofit
		3.2	Landscape water survey	1	Water survey programs for single-family residential and multifamily residential customers[1]
		3.3	High-Efficiency Clothes Washing Machine Financial Incentive Programs	6	High-efficiency washing machine rebate programs
		3.4	WaterSense Specification (WSS) toilets	14	Residential ultra-low-flush toilet replacement programs
	Commercial, Industrial, and Institutional	4	Commercial, Industrial, and Institutional	9	Conservation programs for commercial, industrial, and institutional accounts
	Landscape	5	Landscape	5	Large landscape conservation programs and incentives

[1] Components of DMM 1 (Water survey programs for single-family residential and multifamily residential customers) applies to both BMP 3.1 (Residential assistance program) and BMP 3.2 (Landscape water survey)

Figure 66 - Implementation of the Water Conservation Bill of 2009 Requirements

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DMM 1 – Residential Surveys

A Residential Assistance Checklist will be developed and started by the end of Fiscal Year 2012 to customers who report high water bills. It will include on-site interior and exterior detection, a landscape water survey, and a provision of low flow showerheads, aerators and information as appropriate. The City shall advise customers whenever it appears possible that leaks exist on the customer's side of the meter.

The City will provide site-specific leak detection assistance that may include, but is not limited to, the following: a water conservation survey, water efficiency suggestions, and/or inspection. The City will recommend showerheads and faucet-aerators that meet the current water efficiency standard as stipulated in the WaterSense Specifications (WSS) as needed.

The City will perform site-specific landscape water surveys that will include, but are not limited to, the following: check irrigation system and timers for maintenance and repairs needed; estimate or measure landscaped area; develop customer irrigation schedule based on precipitation rate, local climate, irrigation system performance, and landscape conditions; review the scheduling with customer; provide information packet to customer; and provide customer with evaluation results and water savings recommendations.

The City will provide reports, disaggregated by single-family and multi-family units, identifying: the number of residential assistance/leak detection survey visits completed; number of WSS showerheads distributed.

DMM 2 – Residential Plumbing Retrofit

California Civil Code Section 1101.4 and 1101.5 requires that after January 1, 2014, all noncompliant plumbing fixtures in any single-family, multi-family residential real property and any commercial residential real property be replaced with water-conserving plumbing fixtures when a permit is taken out for building additions, alterations. Also, State law requires that after January 1, 2017, noncompliant plumbing fixtures in any single-family residential property be replaced with water-conserving plumbing fixtures and shall be verified at the time of sale or transfer.

The City's currently implements this plan by performing physical inspections by building department personnel during the building permit issuance process. During inspections non-compliant plumbing is identified and noted for replacement prior to permit approval. After replacement, a follow-up inspection is performed. This implementation will continue for the foreseeable future.

DMM 3 – System Water Audits, Leak Detection and Repair

Since the previous UWMP, the City has begun conducting water loss audits to quantify the current volume of apparent and real water loss. The City annually completes the standard water audit and balance using the AWWA Water Loss software to determine their current volume of apparent and real water loss and the cost impact of these losses on utility operations.

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The City has been using the AWWA's 3rd Edition M36 Publication, *Water Audits and Loss Control Programs* (2009) for specific methods to reduce system losses.

The City sought training in the AWWA water audit method and component analysis process (offered by CUWCC or AWWA) during the first four years of its implementation and has completed a component analysis of real losses by the end of the fourth year. The City will continue to update this analysis no less frequently than every four years.

DMM 4 – Metering with Commodity Rates for New Connections and Retrofit of Existing Customers

A water meter is defined as a devise that measures the actual volume of water delivered to an account in conformance with the guidelines of the American Water Works Association. Implementation shall consist of at least the following actions:

The City ordinances currently require meters for all service connections. The Resource Management Element (RME) Policy 4.1.8 requires water meters on all new construction and development.

Meters older than 10 years are inspected and replaced if necessary. The City reads the meters and bills customers based on volume of water used every month. The customers are billed based on the volume of water used, the size of the meter and the type of connection. The City keeps records of the historical usage, meter size and type of connection. The City recently installed residential meters throughout the city. All residential accounts now have meters; there are some existing commercial accounts, parks and public spaces that are unmetered. The City plans to install meters for these accounts within three years.

The City will keep records of when each meter was installed, repaired, tested or replaced. The meter retrofits and volumetric rates are expected to result in a 20% reduction in demand for retrofitted accounts.

DMM 5 – Large Landscape Conservation Programs and Incentives

Water demand during the summer months is much higher than during the winter. Much of the summer demand placed on the City's water distribution system is for irrigation. Water conservation in both urban development and agricultural activity will be promoted by the City. New development and rehabilitation projects will be required to make maximum use of water conservation techniques and the use of drought resistant plant species in ornamental landscaping will be encouraged. In addition, the City will continue to consider using reclaimed water to replace the use of imported water for landscape irrigation.

Landscaping located in commercial, industrial, and multifamily residential developments shall include a water efficient irrigation system in accordance with specifications provided by the department of public works. Prior to the issuance of a building permit, a landscape documentation package is submitted by the developer for review and approval that includes a water conservation concept statement, calculation of the maximum applied water and estimated water use, irrigation design plan

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and landscape irrigation audit schedule. The City will provide a statement designating those portions of the landscape to be used for such purposes and specifying water needed for the water use budget, which may not exceed 100% on an annual basis.

The City shall preserve water use records and budgets for customers with dedicated landscape irrigation accounts for at least four years.

- Number of dedicated irrigation meter accounts.
- Number of dedicated irrigation meter accounts with water budgets.
- Aggregate water use for dedicated non-recreational landscape accounts with budgets.
- Aggregate acreage assigned water budgets and average ET for dedicated non-recreational landscape accounts with budgets.
- Number of Accounts 20% over-budget.
- Number of accounts 20% over-budget offered technical assistance.
- Number of accounts 20% over-budget accepting technical assistance
- Aggregate acreage of recreational areas assigned water budgets and average ET for dedicated recreational landscape accounts with budgets.

The California Irrigation Management Information System (CIMIS) provides real time weather information to assist in irrigation scheduling. Although CIMIS was initially designed to help agricultural growers and turf managers administering parks, golf courses and other landscapes to develop water budgets for determining when to irrigate and how much water to apply, the user base has expanded over the years.

DMM 6 – High Efficiency Washing Machine Rebate Program

A rebate program for incentives to purchase high-efficiency clothes washing machines (HECWs) is not cost effective at this time.

The City has 5,111 single-family residential water connections, and 175 multi- family connections. Assuming that there are four families per multi-family connection, there are 4*175 + 5,111 = 5,811 equivalent dwelling units with washing machines. Assuming that 10% of the population already use HECWs, there are approximately 5,230 standard washing machines that can be upgraded. Assuming that 10% of the machines are replaced with HECWs and a $100 rebate, the cost to the City will be 52 * $100, or $5,200. Assuming that the HECWs use an average of 15 gallons less water per load and there are 6 loads of wash per week per family, the benefit would be an overall saving of 243,000 gallons of water (0.7 Acre-Feet) per year. The cost to the participants was assumed to be $1,000 per unit, with a $100 rebate, or $900. The average cost of a regular washer was assumed to be $400, for a difference of $500 cost to the consumer. The total costs to the consumers are therefore $500*52= $26,000. The overall savings in water fees would be approximately 243 * $1.59 = $386.00

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DMM 7 – Public Information Programs

The City will implement a public information program to promote water conservation and water conservation-related benefits. The program will include, when possible, but is not limited to, providing speakers to employees, community groups and the media; using paid and public service advertising; using bill inserts; providing information on customers' bills showing use for the last billing period compared to the same period the year before; providing public information to promote water conservation measures; and coordinating with other government agencies, industry groups, public interest groups, and the media. The program shall include, when possible, social marketing elements which are designed to change attitudes to influence behavior. This includes seeking input from the public to shape the water conservation message; training stakeholders outside the utility staff in water conservation priorities and techniques; and developing partnerships with stakeholders who carry the conservation message to their target markets.

DMM 8 – School Education Programs

The City's Resource Management Element (RME) found in the City's General Plan RME includes Policy 4.1.6: To implement programs to educate adults and children about the importance of water conservation and methods to reduce water use.

The City will implement the school education program to promote water conservation and water conservation-related benefits. Programs will include working with school districts and private schools in the service area to provide instructional assistance, educational materials, and classroom presentations that identify urban, agricultural, and environmental issues and conditions in the local watershed. Educational materials shall meet the state education framework requirements and grade-appropriate materials shall be distributed. When mutually agreeable and beneficial, a lead regional agency will operate all or part of the education program. Implementation will commence on July 1, 2012.

The City shall maintain an active school education program to educate students in the agency's service area about water conservation and efficient water use.

The school information program shall consist of some of the following:

- Curriculum materials developed and/or provided by the City (including confirmation that materials meet state education framework requirements and are grade-level appropriate).
- Materials distributed to K-6 students. When possible, school education programs will reach grades 7-12 as well.
- Description of materials used to meet minimum requirement.
- Annual budget for school education program.
- Description of all other water supplier education programs

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DMM 9 – Commercial, Industrial and Institutional Programs

Measures to achieve the water savings goal for Commercial, industrial, and institutional (CII) accounts for the City has been mainly focused on landscaping water savings, since landscaping irrigation makes up one of the highest demands during the summer; see DMM 5. The City is actively seeking funds for a regional recycled water treatment plant for industrial use.

DMM 10 – Wholesale Assistance

The City will continue to work with IID to participate in regional DMM efforts through the Integrated Regional Water Management Plan (IRWMP), informational groups and projects, and determination of the most cost- effective DMMs.

DMM 11 – Conservation Pricing

For conservation pricing, the City uses meters for each type of water connection, billed on a monthly basis. The City has recently installed residential meters. Some commercial accounts are still billed on a flat rate. The City is in the planning process to complete the remaining commercial water meters.

The City's goal is to recover the maximum amount of water sales revenue from volumetric rates that is consistent with utility costs, financial stability, revenue sufficiency, and customer equity. In addition to volumetric rate(s), conservation pricing also includes the following other charges:

- Service connection charges designed to recover the separable costs of adding new customers to the water distribution system.
- Monthly meter/service charges to recover costs unrelated to the volume of water delivered or new service connections and to ensure system revenue sufficiency.
- Special rates and charges for temporary service, fire protection service, and other irregular services provided by the City.
- The City charges a flat rate plus water usage rate structure. The current flat rate is $36.29, with a water commodity charge of $1.59 per 1,000 gallons.

The City's total annual revenue from the volumetric rate divided by the total annual revenue of volumetric rate plus the total annual revenue from the fixed service charge was approximately 58% in 2010.
Let V stand for the total annual revenue from the volumetric rate(s) and M stand for total annual revenue from customer meter/service (fixed) charges, then the rate structure should be at least 70% for conservation pricing:

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$$\frac{V}{V+M} > 70\%$$

The City should review its current water rate structure for conservation pricing. The flat rate should be reduced, while the volumetric rate is increased to encourage water residential water efficiency. It is recommended that a rate study be completed.

DMM 12 – Conservation Coordinator

The City will designate a person as the City's responsible conservation coordinator for program management, tracking, planning, and reporting on the DMM implementation. This may be a regional position.

DMM 13 – Water Waste Prohibition

The City enacted a No Waste Resolution prohibiting wasteful use of water as part of the 2010 UWMP. The Resolution is titled "PROHIBITING WASTEFUL USE OF WATER REGULATIONS AND RESTRICTIONS ON WATER USE". The implementation of this resolution is ongoing.

DMM 14 – Residential High Efficiency Toilet (HET) Replacement Programs

The City's General Plan (Resource Management Element) requires that all new developments to install low-flow showers and toilets. Consider implementing a low-flow replacement program for showers and toilets in existing facilities.

The City also encourages the replacement of existing water fixtures, toilets, and landscaping with water-conserving counterparts.

The City requires compliance with state regulations for water efficient devices in new construction, per the Uniform Building Code. Retailers in California are generally required to provide only high water efficiency toilets and appliances. Also, the State of California has enacted legislation to require retrofit for houses for sale or during rehabilitation.

The City's building department personnel perform drawing reviews/inspections during the building permit process. During this process, HET items, or lack thereof, are identified and noted to be included/installed in compliance with the applicable standards and codes. Upon satisfying those comments, a follow up review/inspection is performed prior to permit issuance to verify compliance.

9.3 Reporting Implementation

9.3.1 Implementation over the Past Five Years

Provide a description of the supplier's water demand management measures. This description shall include all of the following: (1)(A) … a narrative description that addresses the nature and extent of each water demand management measure implemented over the past five years (10631(e)(1)(A)).

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The City has implemented, to some extent, all DMM's listed previously. More specific information on what precise actions were taken when any particular DMM was implemented is not available. However, the City has surpassed the 2020 Target and continues towards continued water reduction.

9.3.2 Implementation to achieve Water Use Targets

Provide a description of the supplier's water demand management measures. This description shall include all of the following: (1)(A) … a narrative description that addresses the nature and extent of each water demand management measure implemented over the past five years (10631(e)(1)(A)).

Implementation of many of the DMMs discussed below have assisted the City in achieving its water use targets. In particular have been DMM 2 – Residential Plumbing Retrofit, DMM 4 – Metering with Commodity Rates for New Connections and Retrofit of Existing Customers, DMM 5 – Large Landscape Conservation Programs and Incentives, DMM 8 – School Education Programs, and DMM 13 – Water Waste Prohibition. These DMMs have had the most significant impacts towards city-wide water conservation.

The City continues striving to meet State water conservation and demand requirements, thus far the City has been successful in meeting all restrictions and water reduction targets. The City will continue relying on the DMM's in coming year to ensure future water reductions goals and targets are not compromised.

9.4 Water Use Objectives (Future Requirements)

The City continues striving to meet State water conservation and demand requirements, thus far the City has been successful in meeting all restrictions and water reduction targets. The City will continue relying on the DMM's in coming year to ensure future water reductions goals and targets are not compromised.

Additionally, the CWC requires that Suppliers develop new water use objectives that are based on specific standards for certain water use sectors. These water use objectives will not be developed until 2023, and the first report will require information on what DMMs Suppliers will implement to meet their objectives. As such, each Supplier is encouraged to consider aligning conservation management actions and the changing urban use patterns in order to consider these future obligations

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Chapter 10 – Plan Adoption, Submittal, and Implementation

This chapter describes and documents the steps taken to make this 2020 UWMP and stand-alone WSCP publicly available, as well as the steps taken to adopt and submit the 2020 UWMP and WSCP in accordance with the Water Code. This chapter also contains the City's plan to implement these documents and the process for amending both an adopted UWMP and WSCP.

10.1 Inclusion of All 2020 Data

The information presented within this report and WSCP reflects the most current population estimates and water supply and use information. The report reflects input from City personnel regarding the current city status and future plans.

10.2 Notice of Public Hearing

10.2.1 Notice to Cities and Counties

Every urban water supplier required to prepare a plan shall… at least 60 days prior to the public hearing on the plan … notify any city or county within which the supplier provides waters supplies that the urban water supplier will be reviewing the plan and considering amendments or changes to the plan (10621(b)).

The constituents of the City of Brawley and the Imperial County were notified well ahead of the 60-day threshold that the City of Brawley would be reviewing the updated UWMP and new WSCP and would be having a public hearing for consideration of amendments or changes to this 2020 UWMP and WSCP prior to their adoption. The notice included information regarding the time and place of the public hearing along with where the draft reports would be available for review. **Table 10-1** shows the summary of notification to cities and counties.

Table 10-1 Retail: Notification to Cities and Counties

City Name	60 Day Notice	Notice of Public Hearing
Brawley	☑	☑
Other?	☐	☐
County Name	**60 Day Notice**	**Notice of Public Hearing**
Imperial County	☑	☑
	☐	☐

Figure 67 - Table 10-1 Retail: Notification to Cities and Counties

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10.2.2 Notice to the Public

…Prior to adopting either [the plan or water shortage contingency plan], the urban water supplier shall make both of the plan and the water shortage contingency plan available for public inspection…Prior to any of these hearings, notice of the time and place of hearing shall be published within the jurisdiction of the publicly owned water supplier pursuant to Section 6066 of the Government Code… (10642).

Per the Government Code 6066, publication of the notice was provided once a week for two successive weeks. On April 12th and April 19th, 2021, notification of Public Hearing was advertised in the local newspaper for both the 2020 UWMP and WSCP. These notices were in accordance with the 60-day advance notice prior to the hearing date. The advertisement may be found in **Appendix D.**

10.3 Public Hearing and Adoption

…Prior to adopting either, the [plan or water shortage contingency plan], the urban water supplier shall make both the plan and the water shortage contingency plan available for public inspection and shall hold a public hearing or hearings thereon (10642).

In complying with this part, an urban retail water supplier shall conduct at least one public hearing to accomplish all of the following: (1) Allow community input regarding the urban retail water supplier's implementation plan for complying with this part. (2) Consider the economic impacts of the urban retail water supplier's implementation plan for complying with this part. (3) Adopt a method, pursuant to subdivision (b) of Section 10608.20 for determining its urban water use target (10608.26(a)).

10.3.1 Public Hearing

…After the hearing, the plan shall be adopted as prepared or as modified after the hearing (10642).

The public hearing for the 2020 UWMP and WSCP was held on June 15th, 2021 and adopted by the City on the same day. Pursuant to the Water Conservation Act of 2009, the City of Brawley provided baseline values, water use targets and compliance information as part of the public hearing.

10.3.2 Adoption

…After the hearing or hearings, the plan or water shortage contingency plan shall be adopted as prepared or as modified after the hearing (10642).

The adoption hearing for the 2020 UWMP and WSCP was held on the same day as the public hearing of June 15th, 2021. Due to combining the meetings, the agenda included the public hearing as an agenda item and the public hearing portion took place before the adoption portion. At that time, the UWMP was formally adopted by the City of Brawley's governing board. A copy of the resolution is attached in **Appendix E.** The city will implement the UWMP and WSCP after adoption. Procedures to implement will include annual reviews of progress on the Demand Management Measures, use of the UWMP and WSCP in developing a revised Water Master Plan, shaping public views and understanding, and in the planning process of new development within the City.

10.4 Plan Submittal

Each urban water supplier shall update and submit its 2020 plan to the department by July 1, 2021 (10621(e)).

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The City of Brawley will submit a copy of this 2020 UWMP and WSCP after its adoption to the necessary agencies and in the manner discussed in the following sections below.

10.4.1 Submitting a UWMP to DWR

The City of Brawley will electronically submit its 2020 UWMP and WSCP to DWR within 30 days of its adoption and before July 1, 2021. This section will be updated upon any feedback from the DWR's review.

10.4.2 Electronic Data Submittal

The plan, or amendments to the plan, submitted to the department…shall be submitted electronically and shall include any standardized forms, tables, or displays specified by the department (10644(a)(2)).

The City of Brawley will submit the 2020 UWMP and WSCP and any amendments per DWR's review to the DWR WUE Data Portal available at https://wuedata.water.ca.gov/.

10.4.3 Submitting a UWMP to the California State Library

An urban water supplier shall submit to the department, the California State Library, and any city or county within which the supplier provides water supplies a copy of its plan no later than 30 days after adoption (10644(a)(1)).

The City of Brawley will submit the 2020 UWMP and WSCP to the California state library no later than 30 days after its adoption at the following location:

California State Library
Government Publications Section
Attention: Coordinator, Urban Water Management Plans
P.O. Box 942837
Sacramento, CA 94237-0001

If delivered by courier or overnight carrier then the 2020 UWMP shall use the following address:

California State Library
Government Publications Section Attention: Coordinator, Urban Water Management Plans
900 N Street
Sacramento, CA 95814

10.4.4 Submitting a UWMP to Cities and Counties

The urban water supplier shall provide that portion of its urban water management plan prepared pursuant to this article to any city or county within which it provides water supplies no later than 60 days after the submission of its urban water management plan (10635(c)).

An electronic copy of the 2020 UWMP and WSCP will be shared with the City of Brawley and the imperial County no more than 60 days after its adoption to satisfy CWC Section 10635(c). Brawley does not supply water to another city or nor to any other area of Imperial County.

10.5 Public Availability

Not later than 30 days after filing a copy of its plan with the department, the urban water supplier and the department shall make the plan available for public review during normal business hours. (10645(a)).

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Not later than 30 days after filing a copy of its water shortage contingency plan with the department, the urban water supplier and the department shall make the plan available for public review during normal business hours. (10645(b))

Within 30 days of submitting the UWMP and WSCP to DWR, the adopted UWMP and WSCP will be available for public review during normal business hours. The documents are available for review at the City's Public Works Department office and on the City's website at www.brawley-ca.gov.

City of Brawley Public Works Department
180 S. Western Avenue
Brawley, CA 92227

10.6 Notification to Public Utilities Commission

An urban water supplier regulated by the Public Utilities Commission shall include its most recent plan and water shortage contingency plan as part of the supplier's general rate case filing (10621(c)).

The City of Brawley is not regulated by the public utilities commission. As such, it is not necessary to submit a copy of the UWMP or WSCP to the agency.

10.7 Amending an Adopted UWMP

The amendments to, or changes in, the plan shall be adopted and filed in the manner set forth in Article 3 (commencing with Section 10640) (10621(d)).

Copies of amendments or changes to the plans shall be submitted to the department, the California State Library, and any city or county within which the supplier provides water supplies within 30 days after adoption (10644(a)(1)).

If changes are necessary to the UWMP after its adoption, the City will follow each of the steps for notification, public hearing, adoption, and submittal to readopt the amended plan.

10.7.1 Amending a Water Shortage Contingency Plan

If an urban water supplier revises its water shortage contingency plan, the supplier shall submit to the department a copy of its water shortage contingency plan prepared…no later than 30 days after adoption, in accordance with protocols for submission and using electronic reporting tools developed by the department (10644(b)).

Similar to the amendment of the UWMP, the City will submit its revised WSCP through the WUE Data Portal within 30 days of its readoption. The City will follow each of the steps for notification, public hearing, adoption, and submittal to readopt the amended WSCP as done for the 2020 UWMP.

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