City of Morro Bay
Water Reclamation Facility Program Management

TITLE XVI FEASIBILITY STUDY

DRAFT | February 2020

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Abbreviations

AADF	annual average daily flow
AFY	acre-feet per year
BOD	biochemical oxygen demand
BWRO	brackish water reverse osmosis
CCC	California Coastal Commission.
CDP	Coastal Development Permits
CCR	California Code of Regulations
CCWA	Central Coast Water Authority
CCRWQCB	Central Coast Regional Water Quality Control Board
cfs	cubic feet per second
City	City of Morro Bay
CWA	Clean Water Act
CSD	Cayucos Sanitary District
DWR	California Department of Water Resources
gpm	gallons per minute
IPR	indirect potable reuse
LCP	Local Coastal Plan
MG	million gallons
mg/L	milligrams per liter
mgd	wastewater per day
NO_3	Nitrate
NPDES	National Pollutant Discharge Elimination System
ppm	parts per million
RWQCB	Regional Water Quality Control Board
SLOCFCWCD	San Luis Obispo County Flood Control and Water Conservation District
State Water or SWP	California State Water Project
TDS	Total Dissolved Solids
TSS	Total Suspended Solids
USBR	Bureau of Reclamation
WRF	Water Reclamation Facility
WWTP	wastewater treatment plant

EXECUTIVE SUMMARY

The City of Morro Bay (City) in the County of San Luis Obispo is equidistant from Los Angeles and San Francisco on the coast of California, and has a population of roughly 10,000. The City is adjacent to both the Pacific Ocean and Morro Bay—a marine protected area designated as a state and national bird sanctuary, and a national estuary. Founded in 1870 as a fishing port, Morro Bay's economy today is based on small businesses and tourism. It still has a vital working waterfront and commercial fishing port. Protecting and efficiently managing water resources is essential to maintaining a strong, vibrant economy in Morro Bay and the surrounding region.

Problem Statement and Need

The City of Morro Bay seeks a new water supply in order to reduce reliance on imported water. The imported water supply is vulnerable to disruptions from drought, curtailments, earthquakes and climate change.

The City also has an urgent need to build a new wastewater treatment facility (water reclamation facility), as its current facility is out of compliance with modern treatment and water quality standards and discharge requirements. Because it is located in a tsunami zone *and* on a beach, the California Coastal Commission has mandated that the City build its new facility in an inland location. Furthermore, the Regional Water Quality Control Board and the California Coastal Commission, in accordance with California's Recycled Water Policy, have specified that the project should contain a re-use component.

Building a Water Reclamation Facility which incorporates advanced treatment for indirect potable reuse, addresses the City's need for a new water supply and its need to build a new water reclamation facility. Morro Bay is a small city with limited resources and options. The selected project is an efficient and cost effective means to address the need for a new water supply and the need for a new water reclamation facility.

Proposed Recycled Water Project

The preferred alternative is a water reclamation facility that incorporates advanced treatment, providing the City with a local, reliable water supply. The Water Reclamation Facility Project (WRF Project or Title XVI Project) will be designed to treat an annual average flow of 0.97 million gallons of wastewater per day (mgd) through preliminary, secondary, tertiary, and advanced treatment. The WRF will produce purified water that meets indirect potable reuse standards for a groundwater replenishment reuse application, per California Code of Regulations Title 22 purified water requirements. At an annual volume of 825 acre-feet per year (AFY), the purified water produced will have the ability to offset approximately 80 percent of the community's water demand. This project will benefit residents and businesses in the City of Morro Bay and water and sewer customers in the surrounding area.

Project Cost Summary

The Water Reclamation Facility Project is estimated to cost $126 million. The City of Morro Bay has demonstrated diligence in its proactive funding approach implementing water and sewer surcharges, and securing the remaining financing with low-interest loans and grants. While the unit cost of the WRF Project exceeds that of the "No Project Alternative," the economic analysis demonstrates significant qualitative benefits, as described below.

Project Benefits

The Water Reclamation Facility Project is both locally and regionally significant. The City currently purchases most of its water supply from outside the region, importing water from the California State Water Project. This water originates hundreds of miles away, in the Sierra Nevada Mountains and the Bay-Delta, and is vulnerable to disruption from drought, curtailments, climate change and earthquakes.

By purchasing water from an external supplier, residents and businesses in Morro Bay face considerable uncertainty about future costs and reliability. It follows that creating more certainty in the water supply provides many economic and public health benefits including:

- Reduced risk of supply disruptions and associated economic impacts
- Improved drought resilience
- Improved community ability to adapt to climate change.
- Reduce demand on the State Water Project.
- Improved environmental water quality in Morro Bay
- Reduced risk of public health impacts from supply disruptions
- Protection the local economy which relies on small businesses and a clean environment.
- Improved water quality through injection of advanced treated recycled water into the improve groundwater.

Section 1

INTRODUCTION

The City is interested in pursuing funding for the Water Reclamation Facility Project under the Title XVI Reclamation Wastewater and Groundwater Study and Facilities Act, Section 1604 (Feasibility Studies) (Pub. L. 102-575; 43 USC 390h et seq.), as amended and the Water Infrastructure Improvements for the Nation Act of 2016 – Title I Water Resources Development, section 4009 (Pub. L. 114-322). This feasibility study provides the U.S. Bureau of Reclamation (USBR) the necessary information to address Bureau requirements to request funding for a water reclamation and reuse application. The City is the only project sponsor, and intends to finance the WRF Project through a combination of low-interest State and federal loans and water and sewer utility surcharges.

1.1 Reclaimed Water Project Study Area

The Water Reclamation Facility Project (WRF) project consists of three reclamation components that will be utilized to augment the City's water supply:

1. The Water Reclamation Facility (WRF).
2. Injection wells to allow for indirect potable reuse.
3. Raw wastewater conveyance system and pump stations.

Figure 1 shows the proposed location of the WRF Project components. Because these components are at three different locations within the City of Morro Bay, the study area for the project encompasses a large portion of the City. The WRF will be located on South Bay Boulevard near the intersection of Highway 1, just southeast of the City proper and North of Highway 1. The facility will be constructed on undeveloped pasture land in the foothills north of Highway 1 outside of the City limits. The City may annex the land into the City limits and incorporate it into the sphere of influence once the WRF is constructed.

Source waters from the City's wastewater collection system will be pumped to the WRF site from the City's wastewater treatment plant located on Atascadero Road just northeast of Morro Rock. This raw wastewater will be pumped via dual force main pipelines parallel to Highway 1, as illustrated by the black line in Figure 1. Advanced treated purified water produced at the WRF will be conveyed three miles to injection wells for indirect potable reuse (IPR). This location is still not yet finalized as the City is still undergoing hydrogeological investigations, however, the injection will occur at one of two potential injection well sites labeled "West IPR" and "East IPR" in Figure 1. The purified water will be injected into the underlying Morro Valley Groundwater Basin. After the required residence time (groundwater travel time) as required by the California Division of Drinking Water (DDW), groundwater will be extracted downgradient using municipal wells owned by the City of Morro Bay. These wells are located near the intersection of Atascadero Road and Highway 1, just east of Pump Station A (PS-A).

Figure 1 Water Reclamation Facility (WRF) Project Study Area

Section 2

WATER RESOURCES SUPPLY AND DEMAND

2.1 Problem Statement and Need

The City of Morro Bay currently purchases 87 percent of its water supply from outside the city limits by importing water from the California State Water Project (State Water or SWP) which is delivered to the City via the California Aqueduct. Purchased water originates hundreds of miles away in the Sierra Nevada Mountains and the California Bay-Delta. The remaining water supply comes from local groundwater wells owned and operated by the City.

By importing water from the State Water Project, the City faces considerable uncertainty about the future cost and reliability of its water supply. Many externalities beyond the City's control could drastically affect this water supply. State Water Project deliveries may be disrupted at any time by earthquakes, droughts, or other natural disasters. Source water ecosystems of the Bay-Delta are collapsing, and protecting a supply of water for that environment is essential for species preservation and recovery. Environmental water issued could reduce allocations in the future. These issues surrounding the State Water Project are exacerbated by climate change and population growth. By 2050, California's Population is projected to reach 50 million people.

The City's groundwater basins have significant water quality issues, including seawater intrusion and high nitrate concentrations. Due to surface water interactions the use of some of the City's wells becomes impossible during times of drought, decreasing the local supply when it's needed most. It follows that creating more certainty in Morro Bay's water supply by decreasing reliance on imported water and rehabilitating the current groundwater condition will provide both social and economic benefits to residents and businesses of this community.

2.2 Current Water Supply

The City has utilized the same water supply portfolio for over 20 years and does not plan on developing any new supplies in the near future other than the proposed WRF Project. Morro Bay's water supply portfolio currently consists of four different sources:

1. The California State Water Project.
2. The Morro Groundwater Basin.
3. The Chorro Groundwater Basin.
4. Ocean Desalination by reverse osmosis (RO).

The City currently does not have access to any reclaimed water supplies or systems. All domestic water use is supplied by potable water. Figure 2 shows the percent of water production from Morro Bay's water supply over the last 20 years.

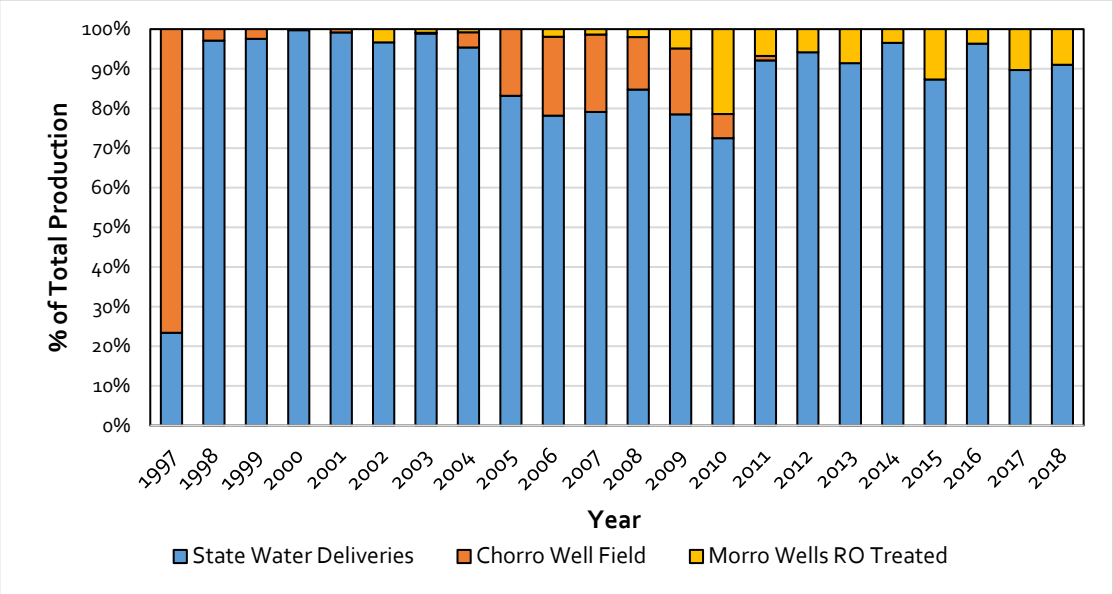


Figure 2 Percentage of Total Water Production

2.2.1 State Water Project

The SWP is a water storage and delivery system of reservoirs, aqueducts, power plants and pumping plants extending more than 700 miles—two-thirds the length of California. As shown in Figure 3, the State Water delivered to the City originates in both the Shasta-Trinity and Oroville reservoirs and is conveyed via the Sacramento and Feather Rivers to the Clifton Court Forebay of the Sacramento-San Joaquin Delta. From there, water flows by the California Aqueduct and is lifted through a series of pumping plants which divert the water throughout the State to its contractors. Figure 4 shows the names, location, and first year of service for long-term State Water contractors as of December 21, 2016. State Water directed to the Central Coast contractors is diverted via the Coastal Branch turnout.

Water is then pumped through the Costal Branch Pipeline from the Bluestone Pumping Plant to the Polonio Pass Treatment Facility and then to the Cholame Valley near the small city of Santa Margarita in San Luis Obispo County. The Polonio Pass water treatment facility is owned and operated by the Central Coast Water Authority (CCWA). CCWA is a public entity formed under Central Coast public agencies to manage water resources supplied by the California Department of Water Resources (DWR) facilities for beneficial use to the surrounding regions. From Polonio Pass, CCWA facilities serve as the primary transmission infrastructure of State Water to San Luis Obispo and Santa Barbara Counties. From here, the Coastal Branch splits by various turnouts to serve regions throughout the Central Coast.

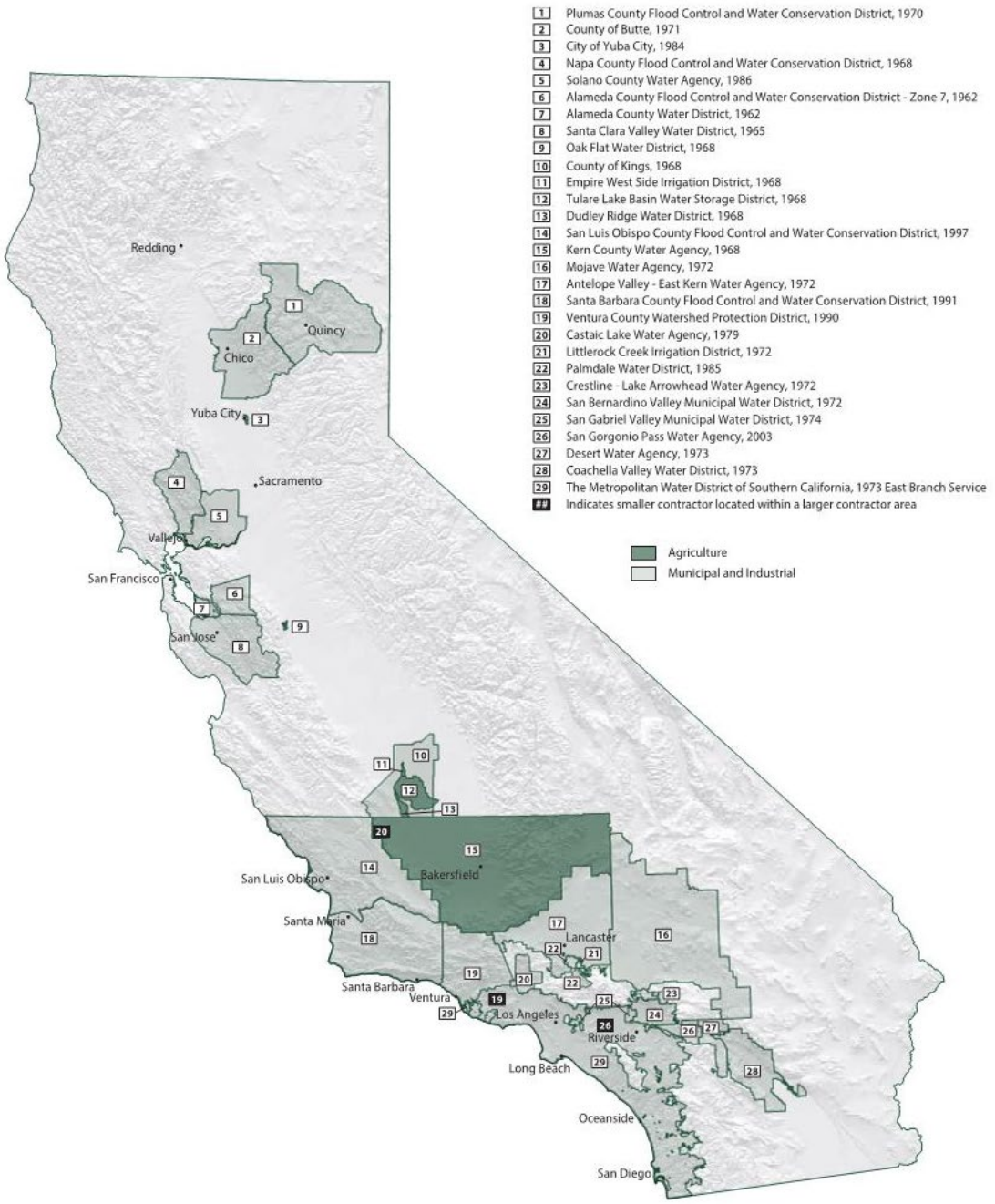
San Luis Obispo County has a long term contract with DWR for 25,000 acre-feet annually of "Table-A water", This is the maximum amount of State Water the County can receive each year, as displayed in Bulletin 132, Management of the California State Water Project, Table B-4. However, because the Coastal Branch pipeline cannot hydraulically convey the full allocation, only 4,830 acre-feet of Table A water is contracted to San Luis Obispo County. Of this amount, only 1,313 acre-feet is allocated to the City of Morro Bay

Figure 5 shows the volume of State Water the City received over the last 20 years. Total Table-A water allocations have been reduced over the last 20 years, deliveries average 85 percent of the

contracted allocation. The remaining 15 percent of water demand is met with groundwater. Note deliveries in 1997 were significantly below average since this was the first year the coastal branch delivered water to State Contractors. During drought years, Morro Bay's allotment of water from the State Water Project is especially unreliable. To mitigate these challenges, the City has the ability to take its unused State Water allocation and store it behind San Luis Reservoir as "carry-over water" for use during the same year or the following year. The City also purchases "drought buffer water" from the State, which can be stored for use at a later date (carry-over water).

During low allocation years for the State Water Project the City of Morro Bay relies on its drought buffer with San Luis Obispo County Flood Control and Water Conservation District (SLOCFCWCD). This ensures the City receives its entire allocation of 1,313 AFY when the SWP can deliver at least 36 percent of contracted water to its recipients. However, the storage from carryover water is no longer available if it interferes with storage of State Water for SWP needs in San Luis Reservoir. Once this occurs, the carry over water is converted to Article 21 water and made available to all SWP contractors causing Morro Bay to lose its purchased carry-over water stored in the San Luis Reservoir.

Figure 3 Path of Water Imported from the State Water Project to Morro Bay



Source: DWR Bulletin 132-17

Figure 4 Long-Term Contractors Receiving Water Allotments from the State Water Project

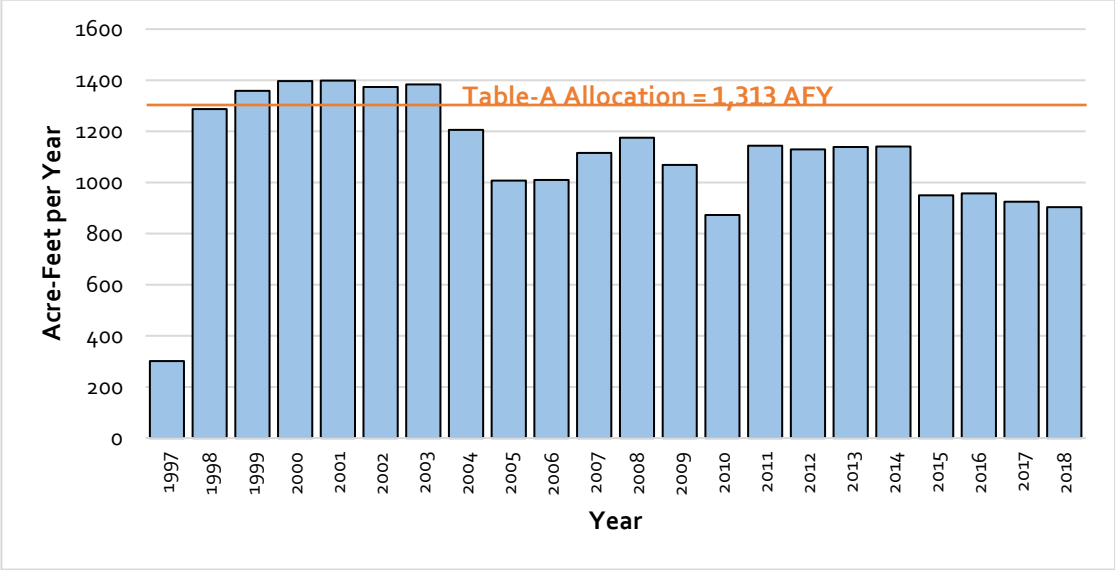


Figure 5 State Water Project Deliveries to Morro Bay

2.2.2 Morro Groundwater Basin

The Morro Groundwater Basin underlies Morro Valley in west-central San Luis Obispo County and is the primary source of groundwater for the City. The groundwater basin is approximately 1,200 acres and is bounded on the west by the Pacific Ocean and on all other sides by contact with impermeable rocks of the Jurassic to Cretaceous age Franciscan Group. The groundwater basin is sourced by surface water percolation from Morro Creek flowing into Morro Bay from the east. Groundwater is unconfined, and DWR Bulletin 118 and well reports indicate a basin thickness of around 60 feet with well depths ranging from 60 to 80 feet. Water quality concerns in this region include high concentrations of nitrate (NO_3) from agricultural runoff and salinity (TDS) resulting from seawater intrusion during drought years.

The City's Morro Well Field includes eight wells located near the intersection of Atascadero Road and Highway 1. As shown in Figure 7 the City treats groundwater from the Morro Well Field for both nitrate and TDS at the Brackish Water Treatment Facility. Finished water is sent to a City owned tank (King's Tank) for public distribution.

The State Water Quality Control Board permitted yield for this well field is 581 AFY, and 1.2 cubic feet per second (cfs) instantaneously through appropriative rights to the Morro Groundwater Basin. The Morro Well Field has been used the last nine out of the last ten years due to drought conditions which resulted in SWP cutbacks. Average use of the well field was 104 AFY in the years used. Table 1 shows the total use of the Morro Well field since 1997. Note this is not the total volume extracted from the Morro Well Field, but the total produced and sent to the distribution system sourced by the Morro Wells.

2.2.3 Chorro Groundwater Basin

The Chorro Groundwater Basin underlies Chorro Valley in west-central San Luis Obispo County and serves as the secondary source of groundwater to the City. The basin is approximately 3,200 acres and is bounded on the west by the Pacific Ocean and on all other sides by impermeable Franciscan Group and Miocene intrusive rocks. The basin runs parallel to Highway 1 and Chorro Creek which ultimately drains into Morro Bay State Marine Reserve. The

Chorro Groundwater Basin is sourced from Chorro Creek and treated wastewater from the California Men's Colony wastewater treatment plant approximately nine miles east of Morro Bay. Groundwater in this basin is unconfined. High concentrations of nitrates from agricultural runoff are also a concern here.

The City's Chorro Well Field includes six wells and is located west of the City near Chorro Creek Road, as shown in Figure 7. Groundwater from these wells is not treated before being sent to the King's Tank, so these wells are disconnected from the drinking water distribution system.

The State Water Quality Control Board permitted yield of the Chorro Groundwater Basin is 1,142.5 AFY with an instantaneous yield of 3.2 cfs through appropriative rights to the Chorro Groundwater Basin. Groundwater pumping is available at the Chorro Well Field only when the recorded stream flow in the adjacent Chorro Creek is above 1.4 cfs. Historically, during dry years, the Chorro Well Field is inoperable due to extremely low flows in Chorro Creek. Table 1 shows the total use of the Chorro Well Field since 1997.

Figure 6 shows years where streamflow was below the pumping threshold, which limited the Chorro groundwater supply to the City. During the last severe drought period in the state—2010 to 2015—streamflows in the summer months were much less than flows during the same months in years prior. 2016 and 2017 proved to be wet years for the state, recharging the groundwater basin. Because of Chorro Creek's reactivity to precipitation, use of the well field for a potable water supply continuously throughout the year is limited, if non-existent.

Table 1 Total City Water Facility Production

Year	Chorro Wells Annual Total Production (acre-feet)	Morro Wells RO Treated Annual Total Production (acre-feet)
1997	986.0	0.0
1998	38.5	0.0
1999	34.1	0.0
2000	3.8	0.0
2001	11.5	0.0
2002	0.0	47.5
2003	3.0	12.8
2004	48.6	9.8
2005	203.5	0.0
2006	257.2	24.6
2007	275.6	19.1
2008	183.4	27.9
2009	226.0	66.5
2010	73.6	258.1
2011	14.1	84.1
2012	0.0	70.3
2013	0.0	107.0
2014	0.0	40.7
2015	0.0	137.9
2016	0.0	36.2
2017	0.0	106.4
2018	0.0	89.1

2.2.4 Ocean and Brackish Groundwater Desalination

Morro Bay operated an ocean desalination facility in the past, which supplemented the City's water supply since the 1990s. The desalination facility is shared with the Brackish Water Treatment Facility, which treats groundwater from the Morro Well Field. Five seawater wells provided source water for the desalination facility. Currently, the facility is outdated and in a state of much needed repair and therefore not in use. The City originally constructed the facility in response to drought conditions, but has intermittently used it for domestic water production. Initial Coastal Development Permits were issued on an emergency basis, and allowed the City to operate the ocean desalination facility for only two years before requiring a new Costal Development Permit to continue operation.

In 2009, the City made modifications to its seawater treatment system and expanded its brackish water treatment train to more effectively treat nitrates from the Morro Well Field. In 2010, the facility served as the City's primary source of water during a partial shutdown of the State Water Project. Source water for the facility is obtained from brackish water wells located along the Harbor Walk Pathway, as shown in Figure 7. In 2016, the City requested a coastal development permit to continue intermittent operation of the seawater wells and facility discharge. This permit was granted given the condition that the CCRWQCB approves its discharge during operations using seawater. Operating the desalination train of the Brackish Water Treatment Facility produces an instantaneous treatment capacity of 400 gallons per minute (gpm) and a permitted annual production capacity of 645 AFY.

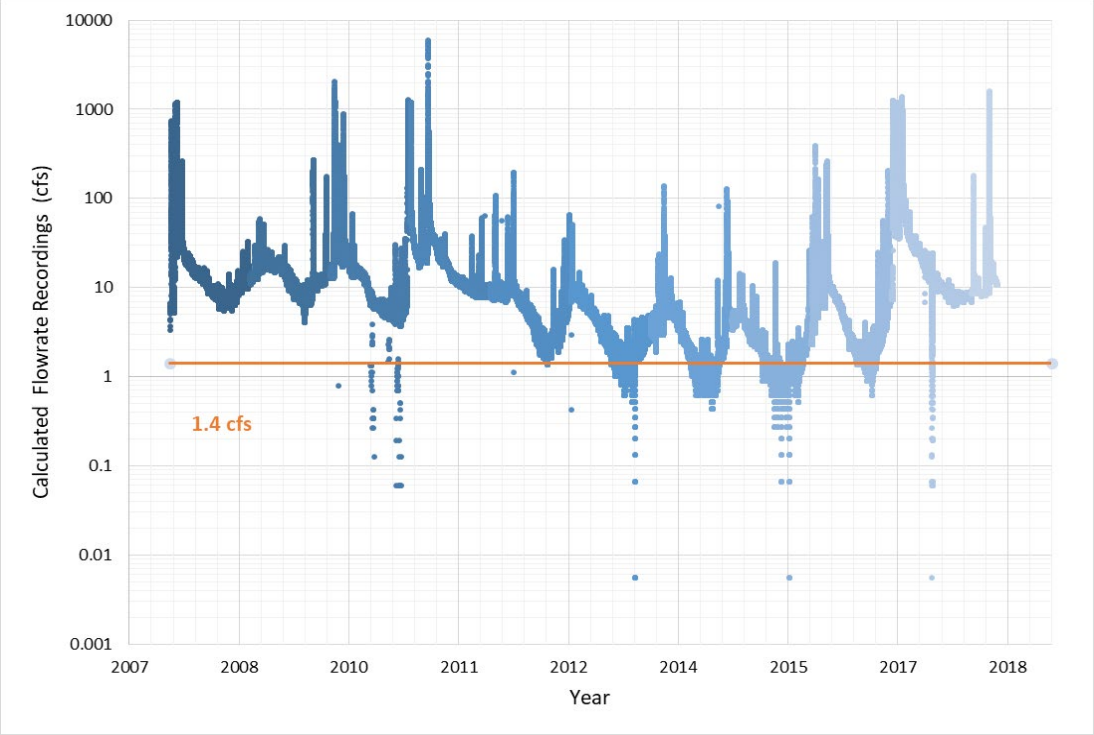


Figure 6 Calculated Streamflow Measurements for Chorro Creek at Canet Bridge

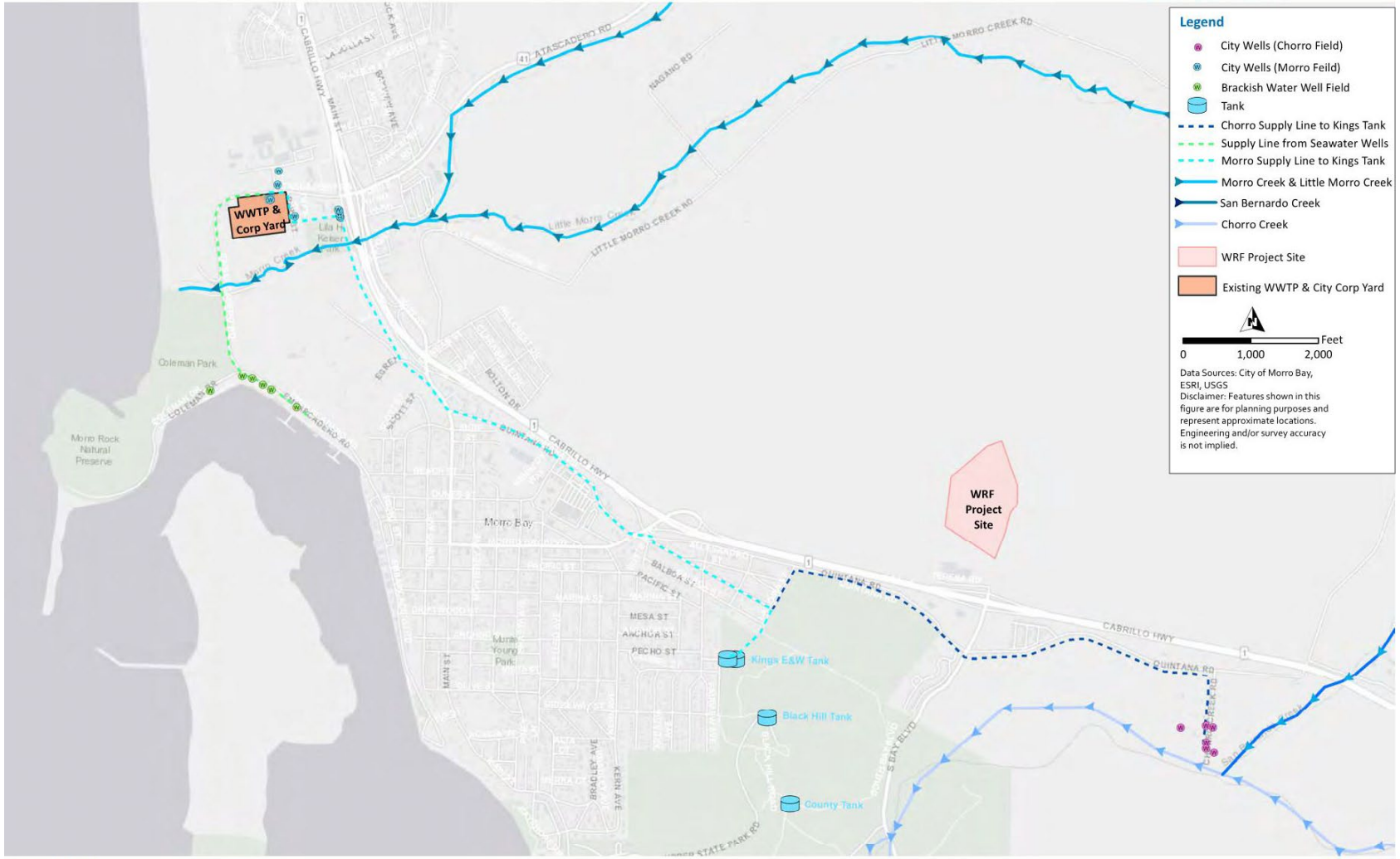


Figure 7 City of Morro Bay Production Wells

2.3 Domestic Water Demands and Imbalances

Historical water system production have varied greatly, as do project demands through the year 2040. There is a potential for supply imbalances given the City's current water supply portfolio and external factors that may cause fluctuations in the supply from year to year. The following sections describe the details of these water demands and imbalances.

2.3.1 Water Production

Water production varies annually in response to customer water usage, which is correlated to weather, development, economic conditions, population, and conservation activities. Figure 8 illustrates the City's water production from 1997 to 2019, which includes water from the City's four water supply sources: The State Water Project, The Morro Groundwater Basin, the Chorro Groundwater Basin and ocean desalination. As shown in Figure 8, water production has trended downward since 1997, with significant drops in water production every year since 2014. This is attributed to water conservation associated with State mandates under extreme drought conditions.

2.3.2 Projected Demands and Imbalances

Currently, the City is able to meet demand by utilizing a combination of imported State Water and local groundwater. However, during severe drought conditions where State Water allocations are minimal or a scenario in which imported water is unavailable, the City's water supply portfolio has major limitations. The Chorro Well Field has a strong surface water connection. When the Chorro Well Field is not operational due to low or zero flows in Chorro Creek, the only remaining local supply is the Morro Well Field lacks sufficient production volume to meet demand. Additionally, during drought conditions, Morro Groundwater typically has higher TDS concentrations from seawater intrusion and requires treatment prior to distribution. Reliability issues may also arise when the volume of the San Luis Reservoir is needed for State Water operations, causing the City to lose rights to all previously purchased stored water, as described in section 2.2.1.

Population growth will also create a significant imbalance in the City's ability to meet future water demands. The population of Morro Bay is projected to increase to 12,150 people by the year 2040, and the City's average daily demand and total annual demand are projected to approach 1.29 mgd or 1,445 acre feet per year by 2040, as shown in Table 2.

A reliable source of water is necessary to confidently meet these growing water demands. With the additional water supply provided by the Water Reclamation Facility Project, the City of Morro Bay can increase groundwater extraction up to approximately 1,120 AFY[1] significantly closing the gap between supply and demand.

[1] Lower Morro Valley Basin Screening-Level Groundwater Modeling for Injection Feasibility by GSI Water Solutions, Inc. May 16th, 2017

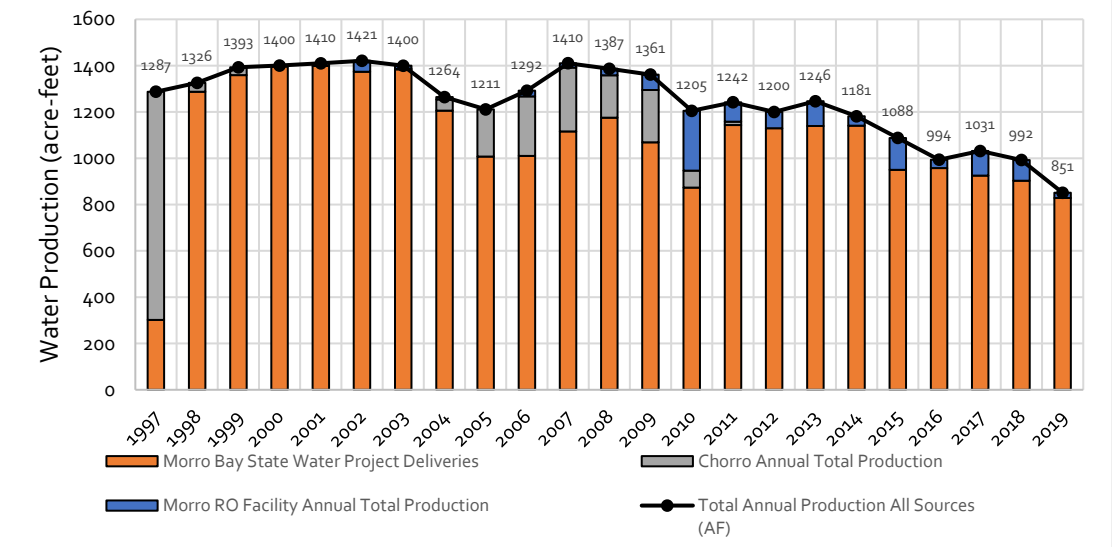


Figure 8 City of Morro Bay Water Production since 1997

Table 2 Future Demand Projections for the City of Morro Bay through 2040

Year	Projected Average Day Demand (mgd)	Projected Annual Demand (AFY)
2020	1.16	1299
2025	1.19	1333
2030	1.22	1367
2035	1.25	1400
2040	1.29	1445

2.4 Water Quality Concerns

Three of the City's four water supply sources have water quality limitations that restrict supply, and require treatment operations. However, water imported to Morro Bay via the State Water Project is generally good quality surface water that originates from snow melt from the Sierra Nevada Mountains. There are no water quality that concern supply with imported State Water. The water is treated at the Central Coast Water Authority Polonio Pass Surface Water Treatment Facility. This water is sent directly into the water distribution system via the City's King's Tank.

2.4.1 Water Quality in the Morro Groundwater Basin

High concentrations of nitrate (NO_3) and salinity (TDS) are water quality concerns within the Morro Groundwater Basin. Prior studies indicate upstream fertilizer runoff from agricultural land use as the leading cause of nitrate contamination in the basin, resulting in concentrations as high as 220 mg/L. Maximum contaminant levels (MCLs) are set at 12 mg/L. Further contamination is possible during drought years when low groundwater elevation leads to seawater intrusion Studies indicate that TDS concentrations have ranged from 400 to 1,000 mg/L in the Morro Basin. TDS MCLs are set at 500 mg/L. Because of these water quality concerns, the City treats groundwater from the Morro Well Field for both nitrate and TDS at the Brackish Water Treatment Facility. Finished water is sent to the King's Tank for public distribution.

2.4.2 Water Quality in the Chorro Groundwater Basin

High concentrations of nitrates are also a concern within the Chorro Groundwater Basin. Nitrate concentrations range from 25 mg/L to 100 mg/L and are attributed to nitrate based fertilizer runoff from upstream agricultural land use. Since groundwater from the Chorro Well Field is not treated prior to being sent to the King's Tank, these wells have been disconnected from the drinking water distribution system.

2.4.3 Water Quality from Ocean Desalination

As described in Section in 2.2.4, the ocean desalination facility is currently inoperable due to mechanical and permitting issues. When the facility operates using its brackish water wells, the product water quality meets drinking water quality standards and its effluent has salinity levels between 21,000 to 26,000 parts per million (ppm), which is less than levels in ambient seawater of 31,000 to 34,000 ppm. The Central Coast Regional Water Quality Control Board determined that the discharge from the ocean desalination facility is subject to the Board's "General Low-Threat" discharge permit. This permit is available to discharges that contain minimal amounts of pollutants and pose little threat to water quality. If the ocean desalination facility were to be re-activated and the seawater wells were to be used, the Regional Water Board would need to re-assess the permit.

Section 3

WATER RECLAMATION AND REUSE OPPORTUNITES

3.1 Current Water Reuse and Reclamation Availability

The City of Morro Bay has no water reclamation and reuse technology in its current water supply portfolio. Rather, treated wastewater is discharged through the ocean outfall and diffuser located approximately 2,900 feet offshore. The City's current wastewater treatment plant does not meet Title 22 standards and is out of compliance with current secondary treatment standards. It has been determined that reclamation efforts with the existing facilities are not possible.

In 2017, the City contracted Michael K. Nunley & Associates (MKN) to develop the "City of Morro Bay Master Water Reclamation Plan" (see Appendix A) which investigated opportunities for water reclamation and reuse in the study area. All opportunities utilized effluent from a new Water Reclamation Facility treated to a level specific to each use of reclaimed water. The following sections summarize recommendations from the plan.

3.1.1 Source Water for Water Reclamation

Source waters are defined as the untreated wastewater that is to be processed at the proposed WRF to ultimately be reused as purified water. The map provided in Figure 7 shows the City's existing Wastewater Treatment Plant located on Atascadero Road, northeast of Morro Rock and West of Highway 1. This facility is jointly owned and serves both the City of Morro Bay and the

Cayucos Sanitary District. The new Water Reclamation Facility will be owned by the City of Morro Bay and will only serve the Morro Bay Service area.

The Central Coast Regional Water Quality Control Board (CCRWQCB) oversees wastewater treatment plant discharge requirements through monitoring the National Pollution Discharge Elimination System (NPDES) permit. The City of Morro Bay's Wastewater Treatment Plant does not meet the regulatory requirements for discharge since it lacks the capability of secondary treatment therefore the CCRWQCB has established interim discharge requirements, which are presented in Table 3 below.

Table 3 Interim Effluent Limitations

Parameter	Units	Interim Effluent Limitations	
		Average Monthly	Instantaneous Maximum
Biochemical Oxygen Demand 5-day @ 20°C (BOD_5)(1)	mg/L(2)	120	180
	lbs/day(2)	2,062	3,092
Total Suspended Solids (TSS)(1)	mg/L(2)	70	105
	lbs/day(2)	1,203	1,804

(1) The 30-day average percent removals shall be no less than at least 75 percent for TSS and 30 percent for BOD_5.
(2) Mass-based effluent limitations were calculated using the following formula: lbs/day = pollutant concentration (mg/L) * Design flow (2.06 mgd) * conversion factor (8.34)
Source: www.waterboards.ca.gov Permit No. CA0047881

Annual average daily flow (AADF) for the Wastewater Treatment Plan is 0.84 mgd, however, instantaneous flows in excess of 1 mgd require a portion of the primary effluent to be blended with disinfected secondary effluent prior to discharge to the ocean outfall. The process flow diagram components are listed below and shown in Figure 9.

- Liquid Treatment Processes:
  - Headworks
  - Fine Screening
  - Grit Removal
  - Tricking Filters
  - Secondary Clarifiers
  - Disinfection with Sodium Hypochlorite
- Solids Treatment
  - Anaerobic Digestion
  - Drying Beds with On-site Composting

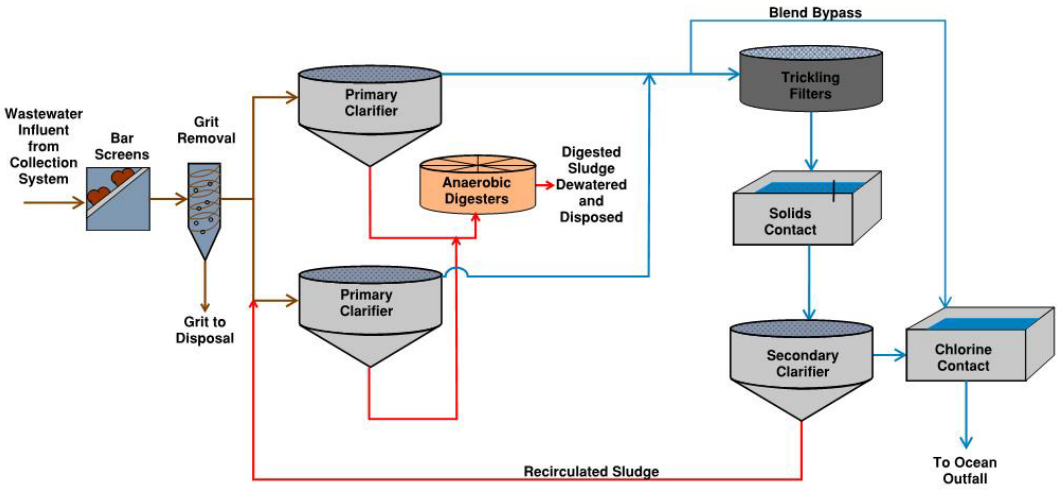


Figure 9 Existing WWTP Process Flow Diagram

Two pump stations will convey raw sewage source waters from the Wastewater Treatment Plant to the new Water Reclamation Facility requiring only minimal modifications to the existing wastewater collection system. When the WRF is completed, the old Wastewater Treatment Plant will be decommissioned.

Stormwater runoff is not considered a source for potential water reclamation as the City's storm drain collection system has minimal conveyance infrastructure and much of the stormwater flows overland to the Pacific Ocean. Also due to land constraints, there are very few opportunities to capture stormwater.

3.1.2 Potential Reclaimed Water Use

The City investigated several opportunities for reclaimed water use as recommended by the Master Water Reclamation Plan. The water reuse opportunities were developed by the considering the feasibility of utilizing recycled water by having an established customer base and identifying all of the potential uses for recycled water in the City. Additional uses to augment existing water supplies were investigated by the City. Finally, each developed option was evaluated to assess the feasibility of implementing the project. These water reuse options are listed below:

1. No water reuse application
2. Urban reuse
3. Agricultural irrigation
4. Exchange with agricultural users for:
    a. Reduced groundwater pumping
    b. Riparian rights
    c. Pumped groundwater delivered to the City.
5. Indirect potable reuse via surface application or injection wells
6. Seawater intrusion barrier
7. Augmented streamflow in Chorro Creek
8. Direct potable reuse

3.1.2.1 No Water Reuse Application

The "no water reuse application" consists of constructing the WRF Project with the exception of any facilities necessary to meet Title 22 standards for either unrestricted reuse or potable reuse. All treated effluent from the WRF would be disposed via the ocean outfall through a dedicated pipeline. This option is also technical infeasible as the City's Local Coastal Plan (LCP) requires reclamation. This application is representative of the City's current water supply condition.

3.1.2.2 Urban Reuse

Urban reuse consists of utilizing reclaimed water for public landscaping and urban use such as irrigating play fields, golf courses, parks, roadway medians, and urban landscaping. Urban reuse requires reclaimed water to be tertiary filtered and disinfected per Title 22 standards for unrestricted reuse. Use of reclaimed water can offset potable water for landscaping applications. This use would require additional distribution system infrastructure, which comes with significant costs, and would require a user base that is willing to utilize the purified..

3.1.2.3 Agricultural Irrigation

Agricultural irrigation opportunities include selling reclaimed water to agricultural users for irrigation purposes. Any reuse for agricultural purposes must be treated appropriately to meet criteria set by Title 22 standards. Agricultural users are all outside of the City's water system service area boundary, therefore, a new distribution system is necessary to serve the purified water. The MKN Technical Memorandum "Morro Bay New Water Reclamation Facility – Water Reuse Opportunities" describes the outreach efforts done by the City to agricultural users for securing indications of interest. The MKN Master Water Reclamation Plan states that outreach efforts revealed that farmers did not view the deal favorably due to price competitiveness between pumped groundwater and delivered reclaimed water.

3.1.2.4 Exchange with Agricultural Users

Exchange of purified water produced at the WRF for groundwater from private agricultural users could take three forms: 1) exchange for reduced groundwater pumping, 2) exchange for riparian rights to increase groundwater withdraw and 3) exchange for pumped groundwater delivered to the City. Users would enter into an agreement to reduce their upstream groundwater pumping or riparian groundwater withdrawals, and allow the City to maximize its wellfield capacity by limiting the volume of groundwater removed from the Morro or Chorro basin.

Alternatively, the City could also enter into an agreement with private users to have groundwater pumped from agricultural wells conveyed to the City's drinking water treatment facility to be distributed for domestic use. Similar to the "agricultural irrigation" opportunity in Section 3.1.2.3, the MKN Master Water Reclamation Plan states that nearby agricultural users were unwilling to participate in any reclaimed water reuse contracts with the City in exchange for groundwater rights.

3.1.2.5 Indirect Potable Reuse

Indirect potable reuse includes recharging the groundwater basin with reclaimed water through surface application (ponds) or subsurface injection via injection wells. A study performed by GSI Water Solutions (GSI) in July 2016 determined that groundwater recharge by percolation ponds can provide the City with a small water supply benefit; however, the opportunity is dependent upon land availability and weather conditions. GSI also investigated the potential benefit of injecting reclaimed water into the Morro Groundwater Basin. Their findings suggest that a

benefit equal to the volume of State Water imported annually could be withdrawn from the City wells. Additionally, injecting reclaimed water into the groundwater basin will improve groundwater quality by reducing nitrate levels and providing an additional freshwater barrier to seawater intrusion.

3.1.2.6 Seawater Intrusion Barrier

Injecting purified water into the City's brackish water wells or other strategically placed injection wells could create a seawater intrusion barrier for the City's existing wells. This would allow the City to maintain groundwater pumping during drought years by reducing the threat of seawater intrusion. The volume of purified water required to maintain the seawater barrier is considerable, and the purified water has no beneficial reuse application once it mixes with seawater underground. This opportunity was seen as uneconomical to the City.

3.1.2.7 Chorro Creek Streamflow Augmentation

Purified water could be used to improve the flow rate in Chorro Creek enabling greater use of the Chorro Well Field. The State Water Board considers this application to be "indirect potable reuse," and additional treatment would be required. During wet years, surface application of reclaimed water in Chorro Creek would not result in a significant benefit to groundwater recharge; therefore, most of the purified water likely sent directly to the ocean via Chorro Creek. Similar to the "seawater intrusion barrier," opportunity of section 3.1.2.6, having purified water discharge directly to the ocean provides no beneficial use to the City. If the City were to execute an agreement to contribute flow to Chorro Creek, this would result in a long term binding commitment which would require the City to maintain its portion of flow regardless of drought conditions and its water supply. Future regulations by the CCRWQCB will also require a high-level of treatment for any treated wastewater discharged to this surface water to meet stringent nitrate and salinity limits.

3.1.2.8 Direct Potable Reuse

Direct potable reuse has not been authorized for any domestic use applications in the State of California. It is expected that direct potable reuse regulations will be set in the next 3 to 5 years so this application could be a useful opportunity in the future.

3.1.3 Water Reuse Opportunity Analysis

The Master Water Reclamation Plan concluded that the preferred selection of water reuse would be an indirect potable reuse application utilizing injection wells and extraction wells. This provides the greatest water supply benefit to the City in comparison to agricultural exchanges with nearby farmers and urban reuse. Indirect Potable Reuse was not compared to Chorro streamflow augmentation, seawater intrusion barrier protection, and direct potable reuse since these opportunities were seen as uneconomical applications and did not present any beneficial use to the City.

Section 4

WATER RECLAMATION AND REUSE ALTERNATIVES

4.1 Water Supply Alternatives Analysis

In 2017, the City examined multiple water supply project alternatives in a comprehensive planning effort known as the OneWater Plan (see Appendix B). From the results of the water reuse opportunities analysis in Section 3, potable water supply projects alternatives were developed utilizing purified water from the Water Reclamation Facility project and from proposed improvements to the City's existing water system. The objective of each alternative is to diversity the City's water supply portfolio while creating resiliency in the supply for future drought or emergency conditions.

Table 4 shows the water supply project alternatives and corresponding capacities that were compared in the Water Supply Alternatives Analysis. Many of the alternatives no not meet the 2040 potable water demand of 1,445 AFY and are supplemented with imported State Water, as shown in Figure 10.

The alternatives underwent an evaluation with respect to criteria reflecting Morro Bay's interests. The evaluation criteria considers the general economic, resilience, and implementation aspects of each project to assess how each alternative compares to the existing system supply and operations. The following sections present a detailed description of each alternative evaluated for the City, as well as a discussion of the selection of the preferred water supply alternative.

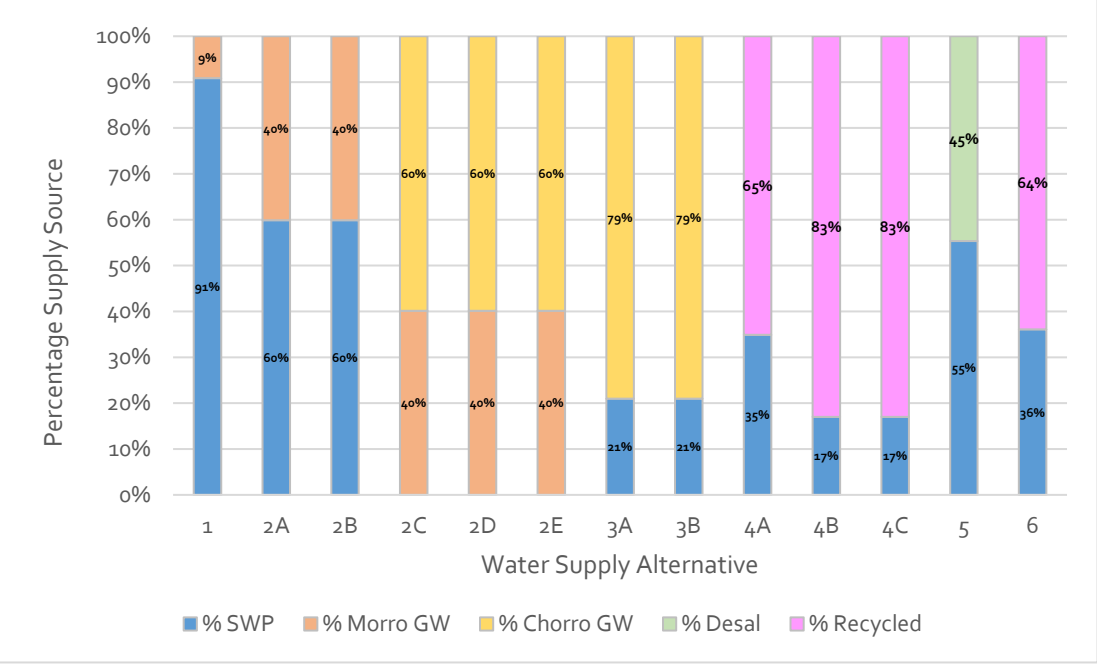


Figure 10 Water Supply Source Percentages of Average Day Demand

Table 4 Water Supply Project Alternatives

Project No.	Project Name	Supply Capacity (AFY)
1	State Water Project (No Project Alternative)	1,313
2A	Morro Well Field with Salinity Treatment	581
2B	Morro Well Field with Nitrate Treatment	581
2C(1)	Morro & Chorro Well Fields with Salinity Treatment	1,724
2D(1)	Morro & Chorro Well Fields with Nitrate Treatment	1,724
2E(1)	Morro & Chorro Well Fields with Nitrate & Salinity Treatment	1,724
3A(1)	Chorro Well Fields with Streamflow Augmentation	1,142
3B(1)	Chorro Well Fields with Streamflow Augmentation & Nitrate Treatment	1,142
4A	Morro Well Field IPR by Groundwater Injection	943
4B	Morro Well Field IPR by Groundwater Injection with Salinity Treatment	1,200
4C	Morro Well Field IPR by Groundwater Injection with Nitrate Treatment	943
5	Ocean Desalination	645
6	Direct Potable Reuse	923

Notes
(1) Assuming Chorro Creek flowrate is greater than 1.4 cfs, permitting groundwater extraction from the City's Chorro Well Field.

4.1.1 Alternative 1 - State Water (No Project)

The "No Project Alternative" includes the City building a new wastewater treatment plant for secondary treatment only. By continuing to rely solely on imported State Water from the California Aqueduct as a main source of water, the City faces considerable uncertainty about future costs and reliability. State Water originates in Northern California and is conveyed through a series of canals, pipes, and pumping plants to the Polonio Pass Treatment Facility, which serves as the primary conveyance of State Water to San Luis Obispo and Santa Barbara Counties. Of the 4,830 acre-feet of Table-A water contracted to San Luis Obispo County, 1,313 acre-feet is allocated to the City of Morro Bay. The City and other State Water Project users in San Luis Obispo County have also purchased a "drought buffer" of excess Table-A supply to improve reliability in times of reduced deliveries, the City has a more reliable supply. The location and major project components of Alternative 1 are shown in Figure 3.

Since 1997, when the City began receiving deliveries form the State Water Project, about 87 percent of the City's domestic water supply is imported. During periods of drought, the State Water is not always available to its contractors, as demonstrated in 2015 when SWP deliveries dropped to 21 percent. The 2017 DWR Final State Water Project Delivery Capability Reports estimates the SWP Table-A delivery allocations meeting the average delivery demand to its contractors will be approximately 77 percent over the next two years.

4.1.2 Alternative 2A - Morro Well Field with Salinity Treatment

Alternative 2A (Figure 11) includes treatment of groundwater extracted from the Morro Well field by a new Brackish Water Reverse Osmosis (BWRO) facility that would replace the City's existing, aging brackish water desalination facility. The new BWRO facility is preliminarily estimated to provide treated capacity to match the Morro Well Field annual extraction of 581 AFY. To meet the total demand for the City, Alternative 2A will be supplemented with imported State Water and provides 40 percent of the City's water supply from local sources. For this alternative, it has been assumed that the existing BWRO facility will be completely replaced by the proposed BWRO facility at a new location and the waste product (brine) will be sent directly into the existing ocean outfall. Alternative 2A would be exclusively fed by the Morro Well Field and, once treated, finished water will be sent by a new booster pump station to the King's Tank. The process flow diagram for Alternative 2A is shown in Figure 12.

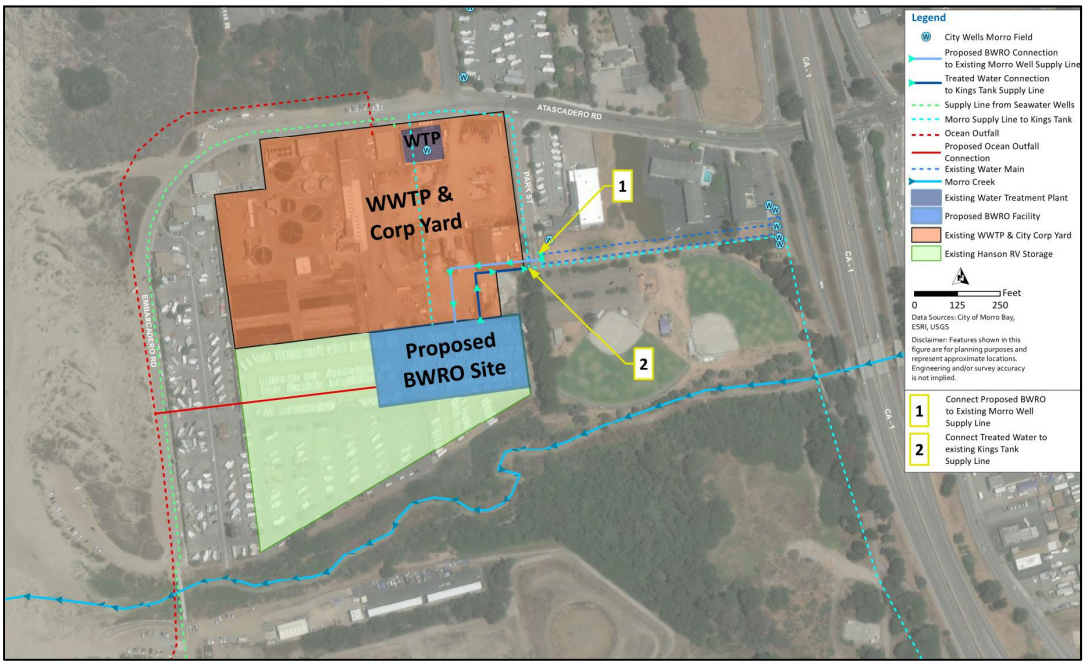


Figure 11 Overview of Alternative 2A

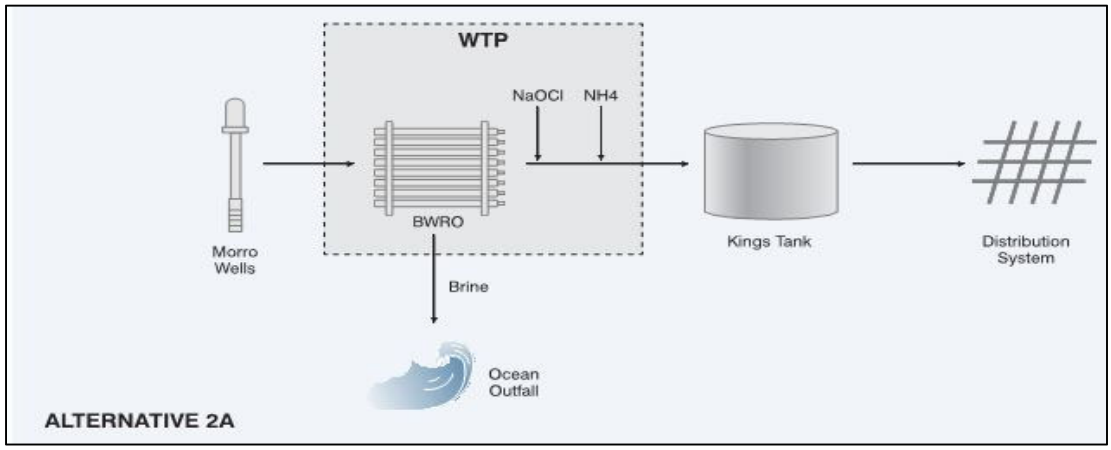


Figure 12 Process Flow Diagram for Alternative 2A

4.1.3 Alternative 2B - Morro Well Field with Nitrate Treatment

Alternative 2B (Figure 13) includes treating extracted groundwater from the Morro Well Field at a new nitrate treatment facility. This alternative is similar to Alternative 2A, but utilizes a different treatment process to provide the necessary treatment before the water can be used by the City's distribution system. The total yield for Alternative 2B is the same as Alternative 2A and also provides 40 percent of the City's water supply from local sources. Nitrate concentrations in the Morro Well Field have exceeded the drinking water primary maximum contaminant level (MCL) as a result of agricultural runoff. This option assumes that salinity is not the primary concern for the Morro Well Field and high nitrates are the constituent of concern. From the new treatment facility, finished water will be pumped by a new booster pump station to the existing King's Tank prior to distribution. The process flow diagram for Alternative 2B is shown in Figure 14.

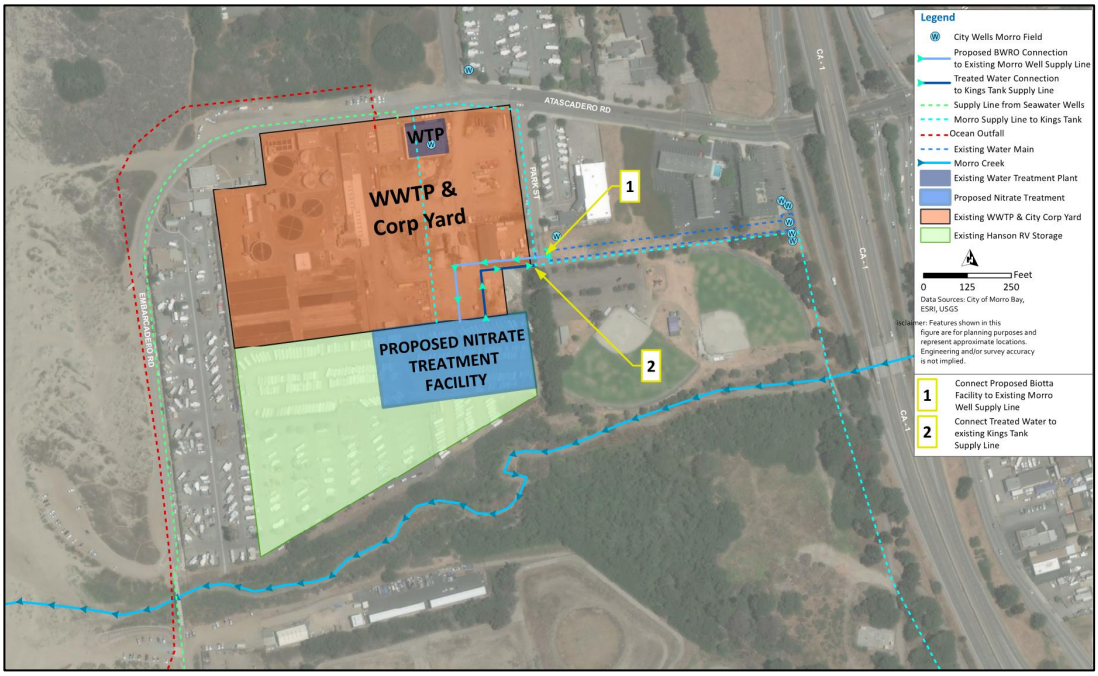


Figure 13 Overview of Alternative 2B

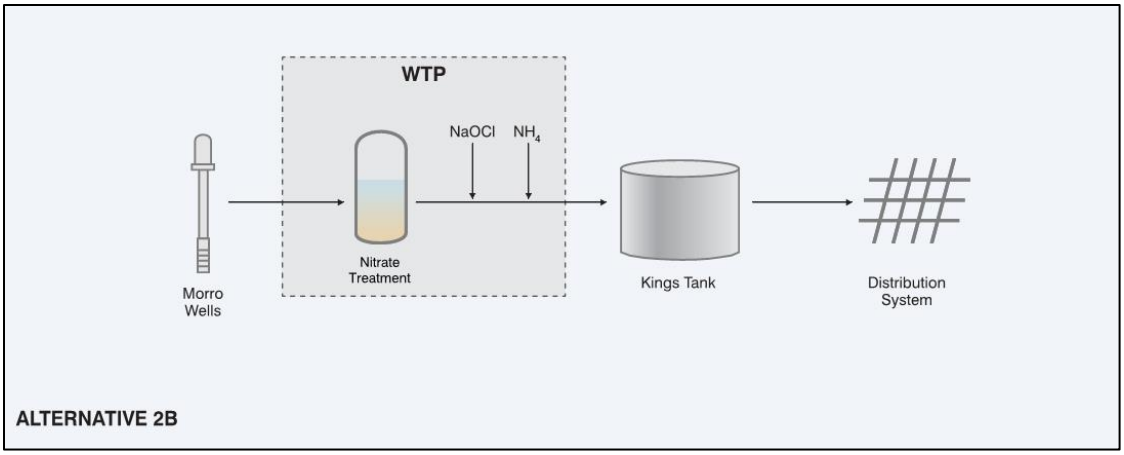


Figure 14 Process Flow Diagram for Alternative 2B

4.1.4 Alternative 2C - Morro & Chorro Well Fields with Salinity Treatment

Alternative 2C (Figure 15) includes treating extracted groundwater from both the Morro and Chorro Groundwater Basins at a centralized salinity treatment facility similar to Alternative 2A. Morro and Chorro Groundwater Basins have permitted yields of 581 and 1,142.5 ac-ft per year, respectively. However, the combined groundwater yield of 1,723.5 AFY is only available when the Chorro Creek discharge is above the permit limit. When both sources are available, the entire City water supply could be sourced locally. For the combined treatment from both the Morro and Chorro Well Fields, facilities must be designed to treat the total well capacity of both basins combined and have the range to treat water from only the Morro Well Field if conditions dictate. A transmission pipeline and booster pump station will be required to convey extracted raw groundwater from the Chorro wells to the new treatment facility. Finished water will be sent via a booster pump station to the King's Tank prior to distribution. The process flow diagram for Alternative 2C is shown in Figure 16.

Figure 15 Overview of Alternative 2C

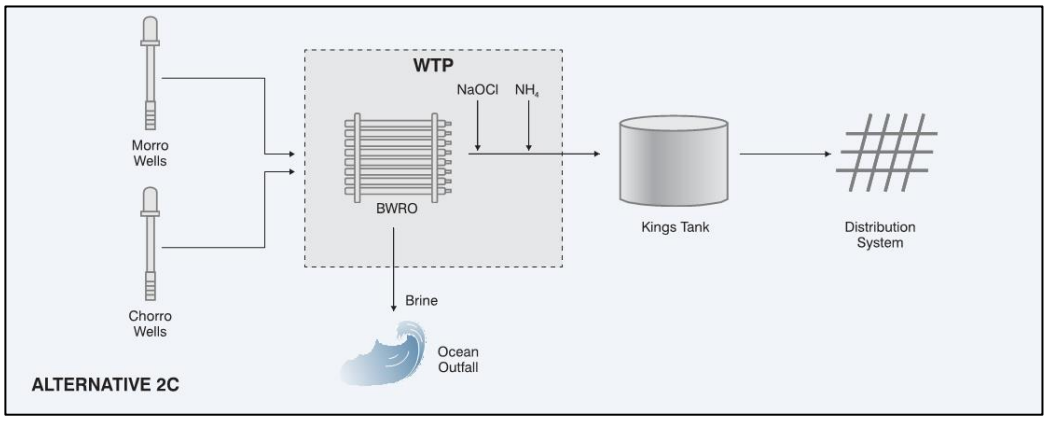


Figure 16 Process Flow Diagram for Alternative 2C

4.1.5 Alternative 2D - Morro & Chorro Well Fields with Nitrate Treatment

Alternative 2D (Figure 17) includes treating extracted groundwater from both the Morro and the Chorro Groundwater Basins at a centralized treatment facility similar to Alternative 2B. However this option assumes that salinity is not the primary concern for the Morro or Chorro Well Fields and high nitrates are the constituent of concern. The groundwater yield and limitations are the same as Alternative 2C. The proposed treatment facilities in Alternative 2D must be designed to treat the total well capacity of both basins and have the range to treat water from only Morro Well Field if conditions require. Finished water will be stored in the King's Tank prior to distribution. This alternative assumes that TDS removal is not required. The process flow diagram of Alternative 2D is shown in Figure 18.

Figure 17 Overview of Alternative 2D

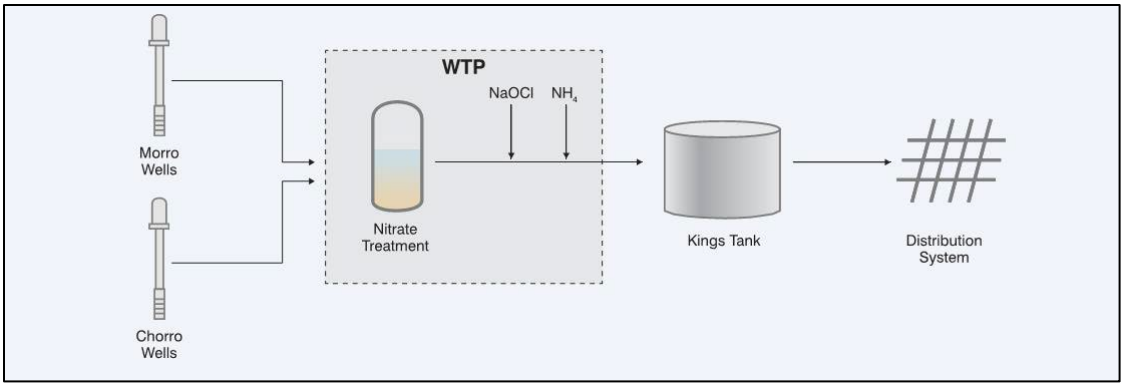


Figure 18 Process Flow Diagram for Alternative 2D

4.1.6 Alternative 2E - Morro & Chorro Well Fields with Nitrate & Salinity Treatment

Alternative 2E (Figure 19) includes treating extracted groundwater from both the Morro and the Chorro Groundwater Basins at individual salinity and nitrate treatment facilities, respectively. The groundwater yield and limitations are the same as Alternative 2C. Figure 19 shows the facilities associated with Alternative 2E. The salinity treatment facility will be located in the same location as Alternative 2A, and the nitrate facility will be located at the King's Tank site, similar to Alternative 2D. A transmission pipeline and pump station will be required to convey extracted raw groundwater from the Chorro Well Field to the new treatment facility whereas the majority of the conveyance for the Morro Well Field will utilize existing infrastructure. All treated groundwater will be sent to the King's Tank prior to distribution. The process flow diagram of Alternative 2E is shown in Figure 20.

Figure 19 Overview of Alternative 2E

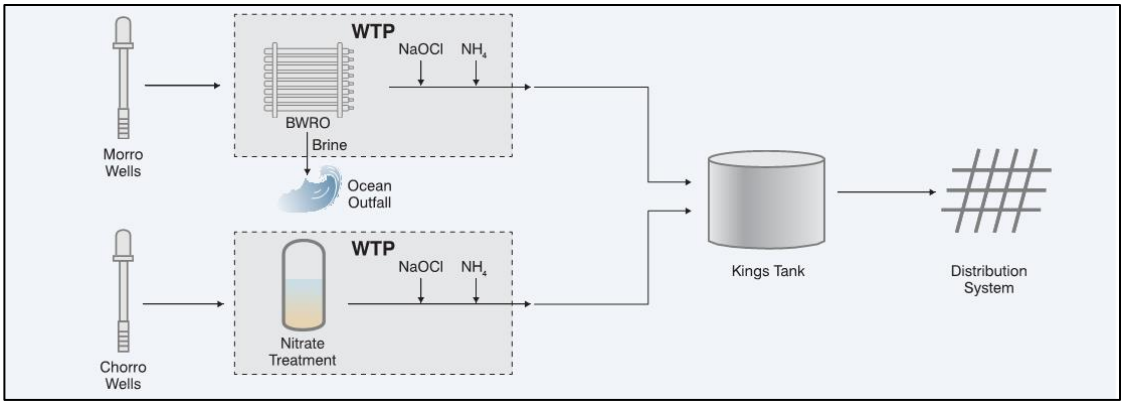


Figure 20 Process Flow Diagram for Alternative 2E

4.1.7 Alternative 3A - Chorro Well Fields with Streamflow Augmentation

Alternative 3A (Figure 21) utilizes treated water from the Water Reclamation Facility's secondary effluent as streamflow augmentation to satisfy the discharge limitations stated in the Chorro Well Field groundwater permit. The treated wastewater water undergoes filtration and disinfection meeting Title 22 recycled water standards at the WRF site and is discharged directly to Chorro Creek. Approximately half of the total effluent flow will pass through reverse osmosis (RO) at the WRF to reduce TDS below the total maximum daily load for Chorro Creek. The discharge locations are specific to the Chorro Groundwater Basin permit requirements. Therefore, a new permanent streamflow gauge is required to be installed downstream of the Chorro Well Field. Having the appropriate flow within Chorro Creek allows for normal use of the Chorro Well field. Augmenting Chorro Creek to meet the required discharge requirements yields a total volume of 1,142.5 acre foot per year to the City from the Chorro Well Field. Groundwater yields are required to be supplemented with imported State Water and provides 79 percent of the City's water supply from local sources. Alternatively, if the Morro Wells are available, then Alternative 3A can also be supplemented by the Morro Wells to provide the City's water supply. Extracted groundwater will be conveyed directly to the King's Tank prior to distribution. The process flow diagram of Alternative 3Ais shown in Figure 22.

Figure 21 Overview of Alternative 3A

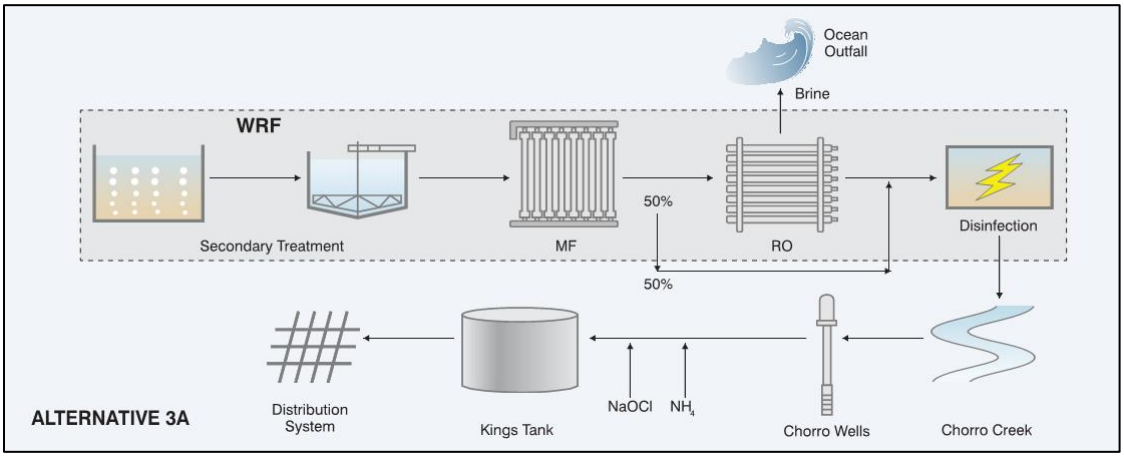


Figure 22 Process Flow Diagram for Alternative 3A

4.1.8 Alternative 3B - Chorro Well Fields with Streamflow Augmentation & Nitrate Treatment

Alternative 3B (Figure 23) consists of utilizing recycled water produced from the WRF Project secondary effluent as streamflow augmentation to satisfy the streamflow limitations in Chorro Creek similar to Alternative 3A. The supply yield is the same as Alternative 3A and also provides 79 percent of the City's water supply from local sources. Extracted groundwater will be conveyed directly to a new nitrate treatment facility prior to the King's Tank for storage. The process flow diagram for Alternative 3B is shown in Figure 24. While Alternative 3A assumed that the drinking water standards for nitrate could be met without post treatment, Alternative 3B assumes that water extracted at the Chorro Well Field would be treated prior to reaching the King's Tank.

Figure 23 Overview of Alternative 3B

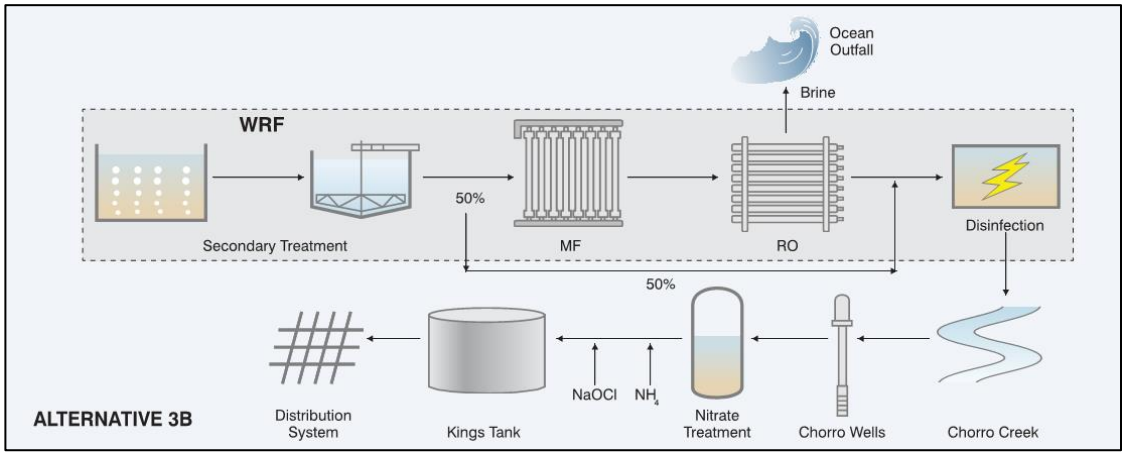


Figure 24 Process Flow Diagram for Alternative 3B

4.1.9 Alternative 4A - Morro Well Field IPR by Groundwater Injection

Alternative 4A (Figure 25) utilizes purified water produced by the WRF project for injection into the Morro Well Field for IPR. The purified water at the WRF will undergo complete advanced treatment prior to injection into the Morro Groundwater Basin, the primary source of groundwater for the City. The injection wells will be located either east or west of existing Morro groundwater to ensure the appropriate residence times prior to extraction to meet State indirect potable water reuse regulations. Once extracted from the existing Morro Wells, the water will undergo the City's existing treatment and distribution operating procedures as necessary. The supply yield of Alternative 4A is limited by the allowed volume of water extracted from the Morro Well Field. A preliminary study was performed by GSI suggested that a maximum extraction volume of 943 AFY would limit sea water intrusion effects on the Morro Groundwater

Basin. To meet the City's future demand, Alternative 4A yield would be supplemented by imported State Water and provides 65 percent of the City's water from local sources. The process flow diagram for Alterantive 4A is shown in Figure 26.

Figure 25 Overview of Alternative 4A

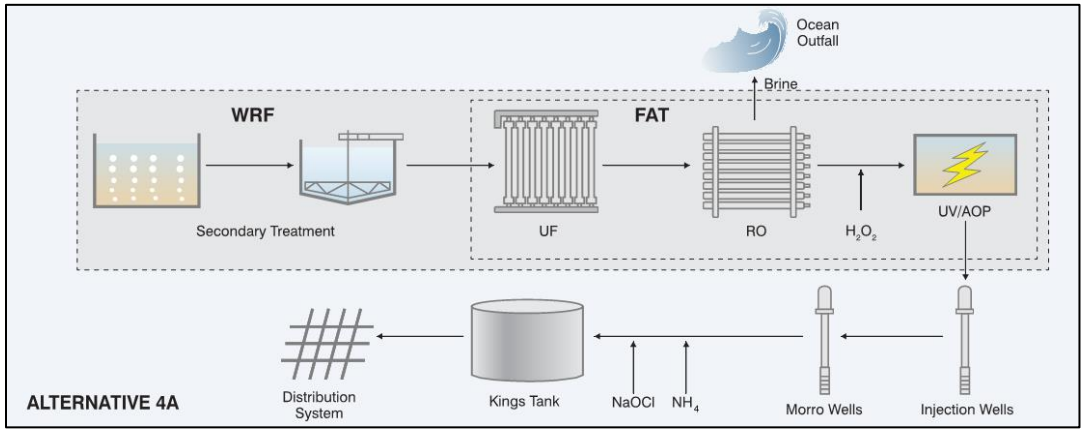


Figure 26 Process Flow Diagram for Alternative 4A

4.1.10 Alternative 4B - Morro Well Field IPR by Groundwater Injection with Salinity Treatment

Alternative 4B (Figure 27) includes the same infrastructure as Alternative 4A with the exception of a new brackish water reverse osmosis (BWRO facility) to treat extracted groundwater from the Morro Groundwater Basin. In the past, Morro Groundwater Basin has experienced seawater intrusion issues causing increased TDS levels in the extracted groundwater. The new salinity treatment facility will be located with the same layout and infrastructure as Alternative 2A. The supply yield of Alternative 4B is limited by the allowed volume of water extracted from the Morro Well Field. A preliminary study performed by GSI suggested that a maximum extraction volume of around 1,200 AFY would cause sea water intrusion effects on the Morro Groundwater Basin but, with the proposed salinity treatment facility, TDS levels caused by increased seawater intrusion can be eliminated. Effects of seawater instruction would be continually monitored to avoid deterioration of the Morro Groundwater Basin. The Alternative 4B supply yield would be supplemented by imported State Water and provides 83 percent of the City's water from local sources. The process flow diagram for Alternative 4B is shown in Figure 28.

Figure 27 Overview of Alternative 4B

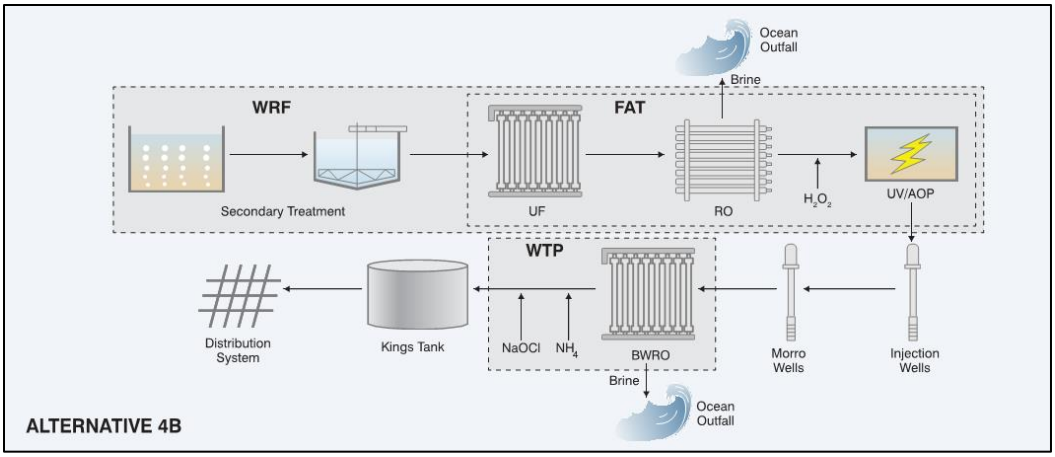


Figure 28 Process Flow Diagram for Alternative 4B

4.1.11 Alternative 4C - Morro Well Field IPR by Groundwater Injection with Nitrate Treatment

Alternative 4C (Figure 29) includes the same infrastructure as Alternative 4A and 4B with the exception of a new nitrate treatment facility to treat extracted groundwater from the Morro Groundwater Basin. Historically, agricultural runoff upstream of Morro Creek has increased nitrate concentrations in the groundwater. Exceeding nitrate concentrations within the groundwater requires treatment post-extraction from the Morro wells. The supply yield of Alternative 4C is limited similarly to Alternative 4A. Since the nitrate treatment facility is not designed to treat high salinity levels, the seawater intrusion affects from increased pumping would need to be closely monitored in order to prevent seawater intrusion. The process flow diagram for Alternative 4C is shown in Figure 30.

Figure 29 Overview of Alternative 4C

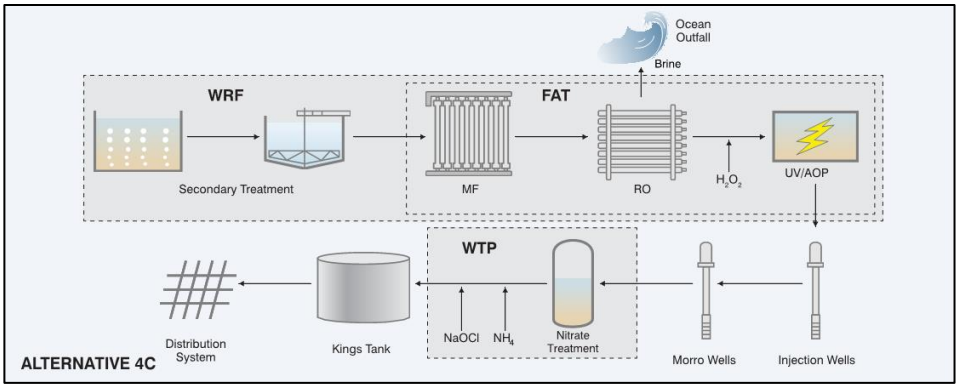


Figure 30 Alternative 4C Process Flow Diagram

4.1.12 Alternative 5 - Ocean Desalination

Alternative 5 (Figure 31) consists of a new ocean desalination treatment facility. The original Coastal Development Permit limited emergency operation of the desalination facility to only two years, with the opportunity to renew for normal use. The permit was never renewed, but the facility was operated during water supply shortages. Due to the age and condition of the original desalination facility, Alternative 5 completely replaces the existing facility. To mitigate exposure from the 100-year flood zone, Alternative 5 will be relocated to a new location outside of the flood zone and away from coastal hazards. This facility will be supplied by seawater wells which will all be rehabilitated prior to operation. The City's current seawater desalination facility has an annual permit limit of 645 AFY with an instantaneous capacity of 400 gallons per minute (gpm). Alternative 5 assumes the new facility will have the same capacity of the existing desalination plant to be within the existing permit guidelines. To meet the projected demands for the City, it would be necessary for either groundwater or imported State Water to supplement the proposed desalinated supply. If supplemented with State Water or local groundwater, Alternative 5 provides 45 percent of the City's supply with local sources. The treated water will be conveyed to the King's Tank prior to distribution. The CCRWQCB has indicated that continued use of a desalination facility would require the City to dispose of brine using an alternative outfall. This alternative does not include the cost, planning, permitting, or construction for a new ocean outfall. The process flow diagram for Alternative 5 is shown in Figure 32.

Figure 31 Overview of Alternative 5

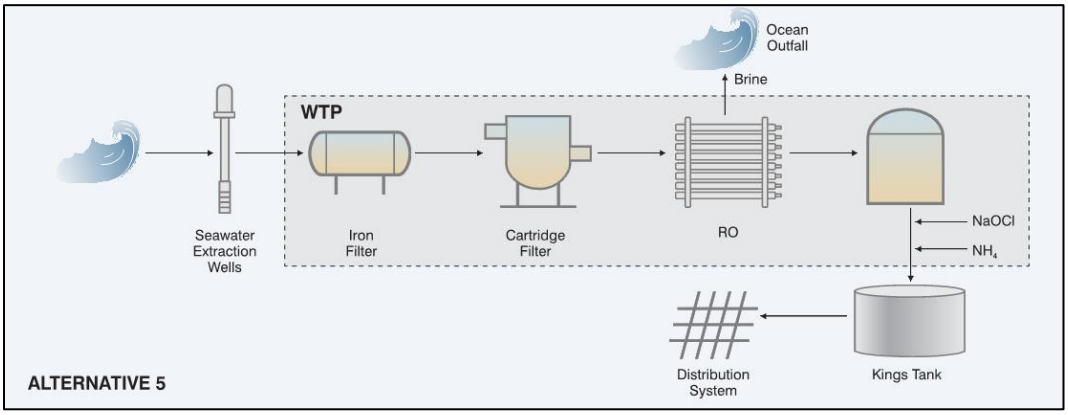


Figure 32 Process Flow Diagram for Alternative 5

4.1.13 Alternative 6 – Direct Potable Reuse

Alternative 6 (Figure 33) utilizes secondary effluent coupled with advanced treatment, monitoring, and engineered storage for direct potable reuse located at the WRF. Direct Potable Reuse includes the full advanced treatment train similar to Alternatives 4A through 4C followed by additional downstream microfiltration, granular activated carbon vessels for polishing, advanced monitoring, and engineered water storage. Unlike the other alternatives described in this report, this alternative does not rely on the City's ground or surface water resources. The capacity of Alternative 6 is dependent upon the treatment capacity of the WRF facility – designed for a capacity of 0.97 million gallons per day (mgd), however advance treatment components has an 85 percent recovery therefore the purified water production capacity is approximately 923 AFY. To meet the projected demands for the City, groundwater or imported State Water would supplement the proposed supply. If supplemented with State Water, Alternative 6 provides 64 percent of the City's water from local sources. From the on-site storage

tanks, the treated water will be conveyed to the King's Tank prior to distribution. The process flow diagram of Alternative 6 is shown in Figure 34.

Figure 33 Overview of Alternative 6

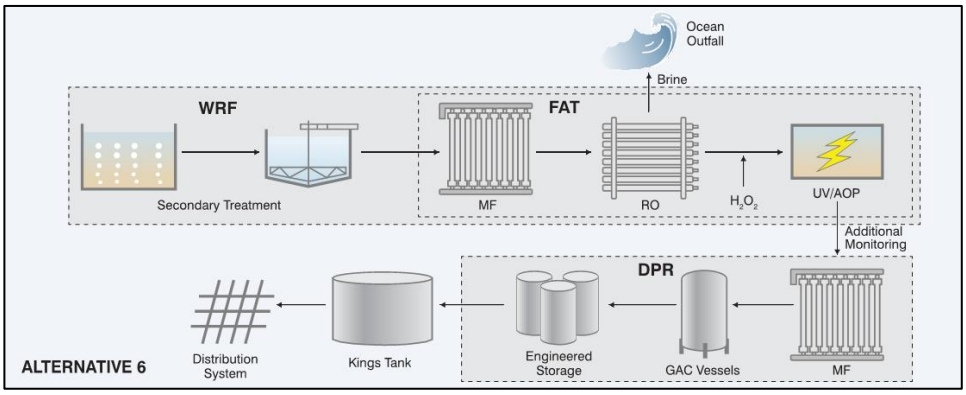


Figure 34 Process Flow Diagram for Alternative 6

4.2 Selection of Preferred Water Supply Alternative

From the OneWater Plan Water Supply Analysis, Alternative 4A was selected as the preferred water supply option. In this Alternative, the WRF Project includes advanced treatment, producing purified water for injection into the Morro Well Field, and aligns with the indirect potable reuse application presented in the Master Water Reclamation Plan.

Groundwater extracted from the Morro Well Field would directly supply the City's potable water distribution system when State Water is not available. While the Morro Groundwater Basin currently has nitrate concentrations that exceed the nitrate primary maximum contaminant level in places, preliminary hydrogeology work indicates that injection and more consistent pumping could lower nitrate concentrations to below drinking water standards. Other options such as blending with State Water could be used if the water extracted from the Morro Groundwater Basin with IPR still exceeds drinking water standards.

Benefits of this alternative include the ability to reuse purified water produced from the WRF Project limiting the City's reliance on imported State Water and improving water quality of the Morro Groundwater Basin. Alternative 4A provides optimal life-cycled benefits to the City by utilizing a new source of water rather than relying on an existing supply as the source.

Section 5

ECONOMIC ANALYSIS AND FINANCIAL PLAN

5.1 Background

The preferred water supply alternative (Alternative 4A) adds advanced treatment to the Water Reclamation Facility Project to support indirect potable reuse. Purified water produced at the facility will be injected into the Morro Well Field. This section presents the economic analysis for the selected alternative, as well as the "No Project Alternative" of importing State Water. Because the same water supply alternative was recommended as a result of both the Master Reclamation Plans and OneWater Morro Bay, comparing additional alternatives was not necessary in this analysis. The following details are presented for each component of the economic analysis.

- Imported State Water cost components and potential cost fluctuations of imported water.
- WRF Project financial analysis, including presentation of the water and sewer WRF Project surcharges used to fund the project development.
- The benefits forgone by the City if it pursues the "No Project Alternative" as required by the California Coastal Commission, yet remains reliant upon imported water.

5.1.1 Economic Analysis of Imported Water from the State Water Project

The City's water demand has been trending downward since 2014, Morro Bay has increasingly relied upon imported State Water rather than its local supply. The California Department of Water Resources (DWR) Bulletin 132-17, *Management of the California State Water Project*, Table B-24 in Appendix B shows that Costal Branch Area Water Supply Contractor's pay a significantly higher unit cost for water supply than the other five project service areas, with the exceptions of San Gorgonio Pass Water Agency and Ventura County Watershed Protection District. The unit cost of water fluctuates from year to year depending on State reservoir supply, and whether DWR has scheduled capital projects affecting any reach of the State Water Project. Figure 35 shows a flowchart of the cost components the City considers for all imported State Water.

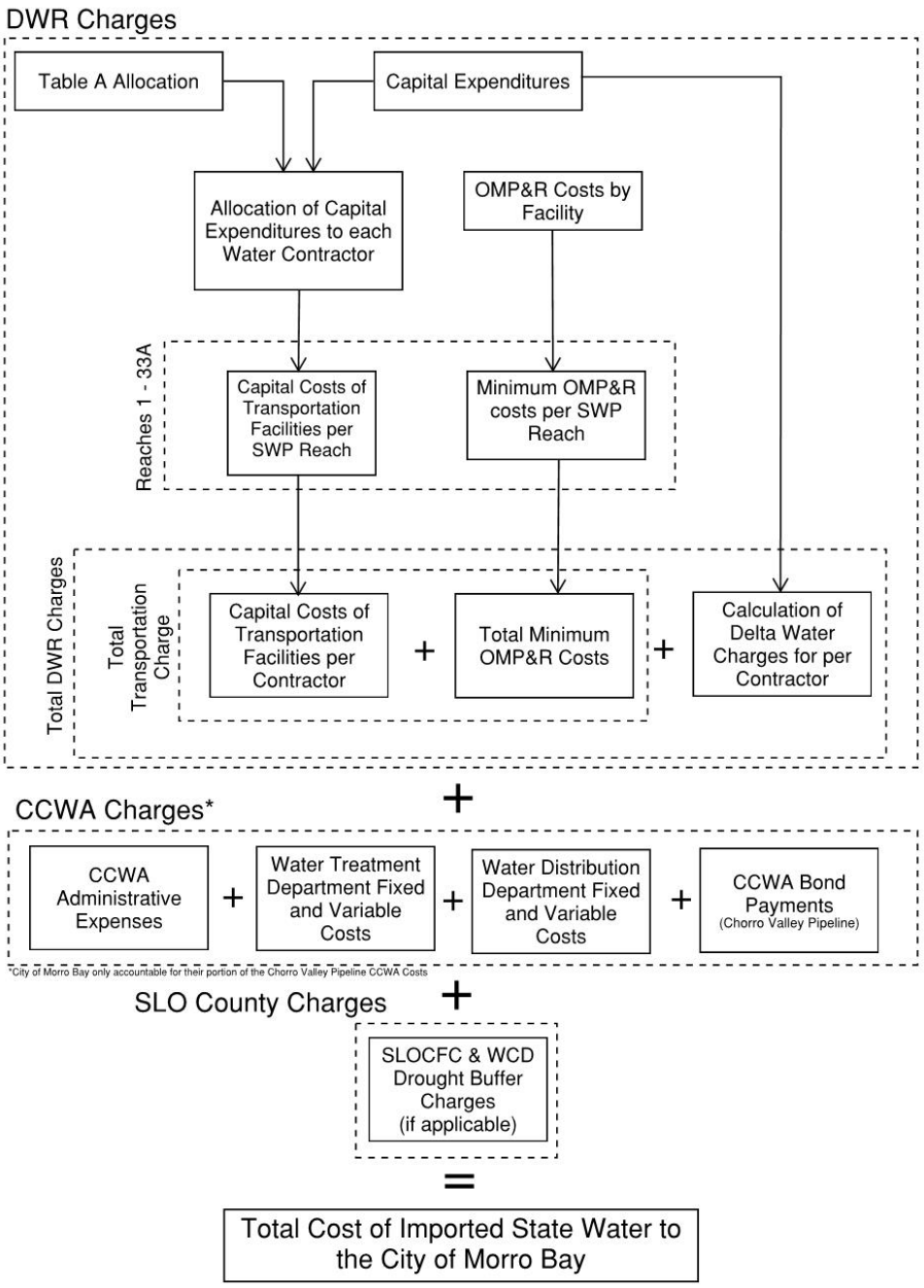


Figure 35 Cost Components of Imported State Water

As illustrated in Figure 35, a large portion of the cost of importing water is the capital cost required to finance the major conveyance facilities such as the CCWA Polonio Pass Water Treatment facility, the Chorro Valley Pipeline, and a portion of the State Water Project infrastructure. The City is expecting to complete financing payments for the CCWA component by 2022 and the State Water components by 2035. However, the City will be required to absorb a portion of the cost of the California WaterFix project, a large-scale

infrastructure project planned to address capacity in the SWP in the future. This cost is not to be accounted for until approximately 2032.

Each year, minimum operation, maintenance, power and replacement costs (OMP&R) are included in the total water cost, in addition to an annual variable OMP&R cost that is added as needed. Variable operations and maintenance costs are also included for CCWA. The City must also pay an annual capital cost financing payment for the CCWA facilities as well as an annual operation and maintenance cost for the water delivered. Figure 36 shows a projected unit cost of State Water to the City in present day dollars given the various cost components shown in Figure 35. It is assumed that the City will receive 85% of their Table-A allocation in the future. This projection assumes the present value of the DWR and CCWA cost components with respect to the actual and projected State Water Deliveries to the City. Note that the State Water future deliveries past 2018 are assumed to be 100 percent. Under these assumptions, capital transportation and minimum OMP&R cost components will remain constant regardless of the volume of water delivered.

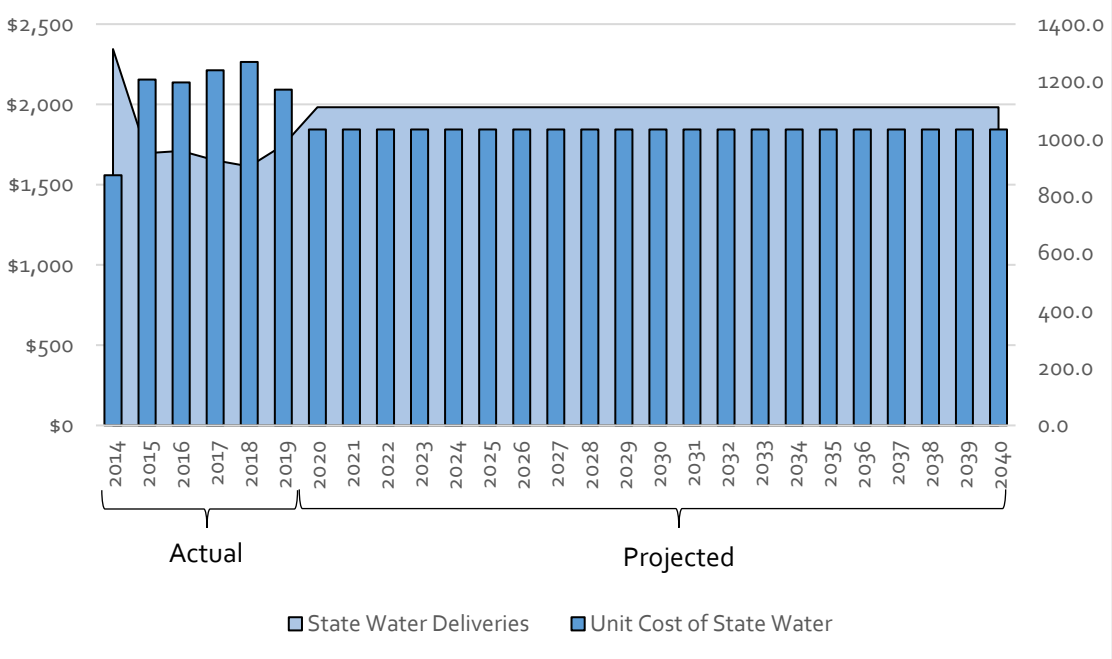


Figure 36 The City's Actual and Projected Costs of Importing State Water

Figure 37 shows the estimated fluctuation of unit cost given reduced annual water deliveries to the City. Over the past five years, the City on average has received about 72 percent of its total allocation of State Water and has paid approximately $2,100 per acre-foot.

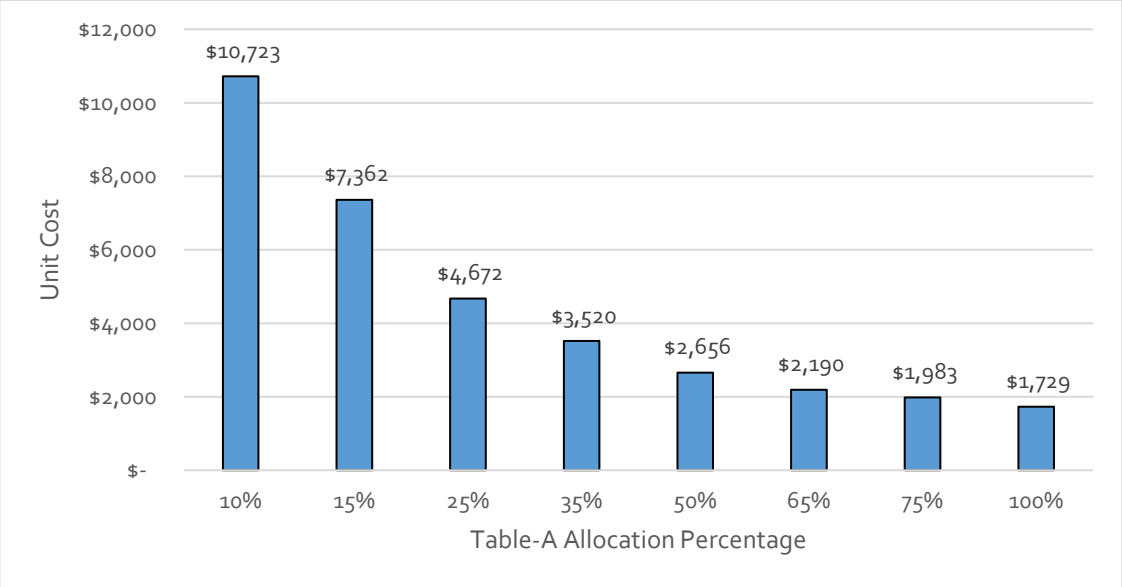


Figure 37 Variation in Unit Cost for Table-A Water Allocation

The economic analysis determined that the "no project" alternative has a significant degree of cost fluctuation associated with State Water deliveries. Coupled with the City's reliance on State Water for potable water supply, the "No Project Alternative" presents a potential economic hardship for the City. By being dependent on allocations set by the State, while simultaneously making annual payments for the capital financing of SWP and CCWA delivery facilities, the City does not control how much water it receives. Therefore, local water production management must be strategically balanced with the volume and cost of available State Water to meet the City's demands. The "No Project" alternative is also inconsistent with the City's LCP that requires the City to incorporate reclamation into the WRF Project.

It is not the intention for the proposed Title XVI – Water Reclamation Facility to completely replace State Water, but to supplement the City's supply with a local, reliable, and cost-effective source and lessen its dependence on the SWP. This approach also has a secondary benefit of improving the water quality with respect to both nitrates and salinity in the Morro Groundwater Basin Ultimately, the sole reliance on imported State Water does not prove to be an economic solution given the variable delivery of Table-A allocations, the vulnerability of the State Water Project infrastructure, and the high capital financing and OMP&R costs associated with its facilities.

5.2 Economic Analysis of the Water Reclamation Facility

The City of Morro Bay has anticipated the need to finance a new wastewater treatment plant by adopting five years of sewer and water rate increases in 2015, creating a new wastewater treatment plant fund of approximately $56 million. The last of these rate increases was implemented in July 2019. Prior to these rate increases, the City had not adopted any water rate increase in 20 years, but had periodically adopted some sewer rate adjustments.

The recommended alternative discussed in the Master Water Reclamation Plan and the One Water Morro Bay is to implement a water reuse strategy into the WRF Project that augments the City's water supply using indirect potable reuse via groundwater injection. Cost estimates for the

reuse and water supply alternatives were compared in the evaluation analysis. The addition of the IPR water supply component to the WRF project increased the total cost to an estimated $126 million, as detailed in Table 5.

To fund a project of this size, the City implemented a WRF project surcharge to the water and sewer utility bills as outlined in the City of Morro Bay Financial Plan and Rate Analysis for a New Water Reclamation Facility by Bartle Wells Associates (Rate Study) located in Appendix C. The update to this study can be found in Appendix D. The WRF Project Surcharge will generate revenue to finance the City's annual water and sewer capital improvement projects in the City and to provide cash reserves for debt services for the WRF Project construction. To finance the project, the City secured additional funding through low-interest-rate loans and grants.

Table 5 Total Project Construction and O&M Costs for the Water Reclamation Facility Project

Project Capital Costs	
Water Reclamation Facility	$77,264,000
Conveyance Facility	$31,321,000
Offsite Recycled Water Facilities	$5,583,000
General Program Implementation	$11,714,000
Total	$125,882,000

Notes:
(1) Costs include permitting, design, procurement, construction, & construction management
(2) Includes estimated cost inflation to construction mid-point where applicable.

Estimated Operating & Maintenance Expenses		
	Cost Estimate (2018 $)	Escalated Cost(1) (2022 $)
WRF Wastewater Operations	$2,879,000	$3,368,000
Conveyance to WRF	$246,000	$288,000
Recycled Water Operations	$193,000	$226,000
Total	$3,318,000	$3,882,000

Notes:
(1) Operating cost estimates escalated by 4 percent per year through projected operational startup on January 1, 2022

With the total annual operation cost of the WRF once complete, shown in Table 5 and the total water supply of 825 AFY provided by the project, the approximate annual water supply unit cost is approximately $4,705 per acre-foot in 2022 dollars. Of the total costs shown in Table 5, the allocation of the WRF Project cost to water and wastewater utilities is shown in Table 6. The ultimate allocation of total cost is shown in Figure 38. The water cost represents the facilities for the purified water distribution system and the injection wells for IPR application. The wastewater costs represent the conveyance facilities and the wastewater component of the WRF. It is expected that the total costs will be distributed over the next three fiscal years until 2021/22 as shown in Figure 39.

Table 6 WRF Project Cost Allocation to Water vs. Wastewater

Project Component	Total Cost	Water		Wastewater	
Water Reclamation Facility	$77,264,000	$22,407,000	29%	$54,857,000	71%
Conveyance Facilities	$31,321,000	-	0%	$31,321,000	100%
Offsite Recycled Water Facilities	$5,583,000	$5,583,000	100%	-	0%
General Program Implementation*	$6,651,000	$1,629,000	24.5%	$4,664,000	70.1%
Prior Project Expenditures	$5,063,000	$244,000	4.8%	$4,819,000	95.2%
Total	$125,882,000	$29,863,000	24%	$95,661,000	76%

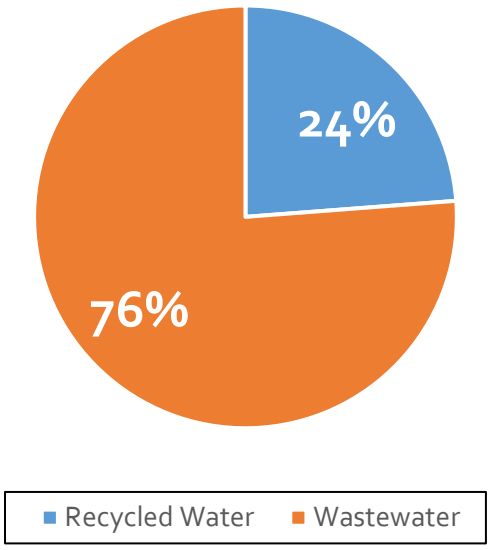


Figure 38 Water versus Sewer Allocation Percent of Total Project Costs

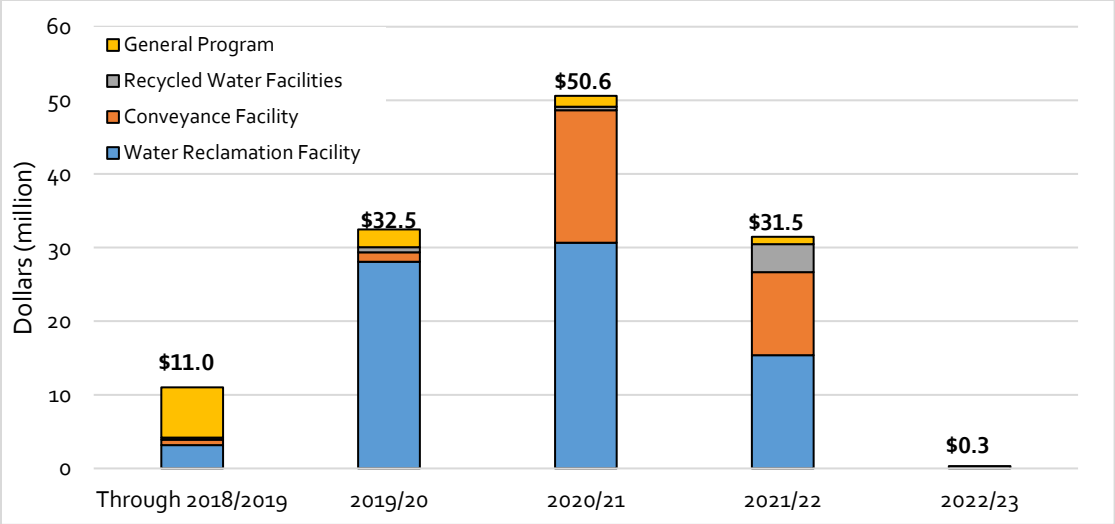


Figure 39 WRF Total Cost by Fiscal Year

5.2.1 Cost Comparison

For the "No Project Alternative" wherein the City continues to purchase imported water from the State Water Project, the unit cost is estimated at $2,300 per acre-foot in 2022 dollars. While the preferred alternative of the WRF Project has a greater unit cost of approximately $5,635 per acre-foot in 2022 dollars. However, the "No Project Alternative" has several fatal flaws and is not a feasible direction for the WRF Project. As stated previously, a WRF Project devoid of reclamation would be inconsistent with the City's LCP. Furthermore, reclamation has been mandated by the California Coastal Commission (CCC). The City first brought the WRF Project to the CCC in 2013. At the time, the project consisted of the construction of new secondary treatment facilities located adjacent to the existing Wastewater Treatment Plant site. At the time, the CCC denied the City a Coastal Development Permit (CDP) for several reasons including its location in an area of coastal hazards and tsunami and the lack of reclamation. Over the years, the CCC has made it clear to the City that any wastewater treatment project seeking a CDP must include some form of reclamation.

The "No Project Alternative" also does nothing to improve the water quality in the Morro Groundwater Basin. Even if the City were to continue to utilize State Water as its primary source of supply, it must rely on the Morro Well Field during periodic maintenance of State Water Project infrastructure or unplanned outages. Without injection, nitrates in the Morro Groundwater Basin will continue to exceed regulatory limits and water extracted by the Morro Well Field will need to be treated before it can be used by the community. Use of the City's BWRO facility is costly and it is in need of significant repairs. Significant expenditures would certainly be incurred in the near future if this treatment is still required.

The City's water supply portfolio remains unchanged at a cost of $102 million dollars to develop the WRF project without a water supply component. The WRF with no reuse is approximately $6.2 million more than compared to the estimated wastewater component cost of $96 million as shown in Table 6. Table 7 shows the total cost comparison between the WRF Project and the WRF Project without the water reuse component, rather the Morro Well Field Water Supply Alternatives from OneWater Morro Bay. Of the Morro Well Field water supply alternatives

evaluated, options considering Chorro Groundwater Basin were not included due to the unreliability of the Chorro Wells. With the WRF water reuse component, the project is eligible for competitive funding opportunities through the State of California and the Federal Government therefore reducing annual debt payments for the City.

Table 7 Project Annual Cost Comparison

Water Supply Portfolio	Local Supply Yield (AFY)	Local Supply Annual Production Estimated Cost	WRF Annual Finance Cost	WRF Annual O&M Cost	State Water Volume	Imported State Water Cost	Total Annual Cost
WRF IPR BWRO State Water	943	$755,000	$4,422,000	$3,882,000	502	$1,055,000	$10,114,000
WRF (no reuse) Alt 2A State Water	581	$903`,000	$4,164,000	$3,656,000	864	$1,815,000	$10,538,000
WRF (no reuse) Alt. 2B State Water	581	$830,000	$4,164,000	$3,656,000	864	$1,815,000	$10,465,000
WRF (no reuse) Alt. 5 State Water	645	$1,401,000	$4,164,000	$3,656,000	800	$1,680,000	$10,491,000

5.2.2 Project Funding Sources

The City expects funding for the WRF Project to be a combination of long term debt from low-interest-rate financing and grants, and cash funding provided by the WRF Project sewer and water surcharge. Table 7 outlines the water and sewer components of the anticipated funding for the project as shown in the rate study. Based on the City's latest financial analysis, it plans to finance the WRF Project using the following funding sources:

- $10.3 million planning loan awarded to the City from California's Clean Water State Revolving Fund (SRF) with a subsidized interest rate of 1.70 percent.
- $48.5 million loan from the US EPA's Water Infrastructure and Financing Innovation Act (WIFIA). WIFIA can be used to finance up to 49 percent of the WRF project cost with low interest rates and advantageous repayment terms.
- $48.5 million loan which will include $5 million in principal forgiveness from the Clean Water SRF Financing Program.

The total funding source allocation between the water and wastewater components of the project is shown in Table 8. Grants and subsidized loans enhance the cost-effectiveness of the project, resulting in lower future debt service and reducing the burden on local ratepayers.

The City has incorporated a WRF Project surcharge for water and sewer utilities applied monthly to residential and commercial users. The surcharge generates cash to fund debt repayment on an annual basis. The surcharge was implemented in FY 2019/20. Table 9 outlines the total monthly charge as presented in the rate study. Note that the water monthly charge is based on a typical single family home using 500 cubic feet of water per month.

Table 8 WRF Project Funding Sources

	Total	% of Total	Water	% of Total	Sewer	% of Total
WRF Total Project Costs	$125,882,000		$29,865,000	23.7	$96,017,000	76.3
Projected Funding Sources						
WIFIA Loan	$48,500,000	38.5	$13,200,000	44.2	$35,300,000	36.8
SRF Loans(1)	$48,500,000	38.5	$13,200,000	44.2	$35,300,000	36.8
SRF Grant	$5,000,000	4.0	$1,186,000	4.0	$3,814,000	4.0
Cash Funding	$23,882,000	19.0	$2,279,000	7.6	$21,603,000	22.5
Total	**$125,882,000**	**100.0**	**$29,865,000**	**100.0**	**$96,017,000**	**76.3**

Notes:
(1) Assumes outstanding SRF Planning Loan is rolled into a 30-year SRF Loan.

Table 9 Total Monthly Water and Sewer Charges with WRF Surcharges

	2018/19	2019/20	2020/21	2021/22	2022/23
Monthly Utility Bill					
Sewer Monthly Charge	$77.00(1)	$83.00(1)	$83.00	$83.00	$83.00
Water Monthly Charge	$62.50(1)	$67.00(1)	$67.00	$67.00	$67.00
Subtotal Monthly Bill	$139.50	$150.00	$150.00	$150.00	$150.00
WRF Facility Surcharges					
Sewer WRF Facility Surcharge	-	$25.00	$25.00	$25.00	$25.00
Water WRF Facility Surcharge	-	$16.00	$16.00	$16.00	$16.00
Subtotal Monthly Surcharge	-	$41.00	$41.00	$41.00	$41.00
Total Monthly Charges	**$139.50**	**$191.00**	**$191.00**	**$191.00**	**$191.00**

Notes:
(1) Last rate increase from 5-year plan that began in 2015.

5.2.3 Financial Capability of Sponsor

The City of Morro Bay City Council passed Resolution No. 71-18 to establish user surcharge rates for the WRF Project. The water and sewer surcharges shown in Table 9 reinforce the City's sewer and water fund reserves to finance capital improvements for the WRF Project on an annual basis. In addition to revenue produced by normal sewer and water service rates, surcharges are expected to generate $2.17 and $1.65 million annually for the sewer and water capital projects. Tables 11 and 12 in Appendix D shows the sewer and water cash flow projections for the City during the WRF construction and first five years of the debt service payments.

5.2.4 Financial Analysis

The total financing for the WRF Project includes the combination of financing required by the City to fund the WRF Project construction. As discussed in Section 5.2.1, the City has received funding sources providing low-interest-rate loans to minimize debt service over the repayment period. The major funding sources shown in Table 8 include two $48.5 million low-interest-rate loan from WIFIA and SRF. Table 10 presents the assumed WIFIA and SRF loan debt service estimates as shown in the Updated Rate Study located in Appendix D.

Table 10 Loan Debt Service Estimates

Funding Source	Funding Value	Interest Rate	Repayment Term	Associated Loan Costs	Total Loan Principal	Annual Debt Service
WIFIA	$48,500,00	2.20%	30 years	$2,049,000	$50,549,000	$2,320,000
SRF	$48,500,00	1.60%	30 years	$1,269,000	$49,769,000	$2,102,000
Total Debt Service Payment						$4,422,000

The amortization schedule and allocation between water and sewer costs are shown in Tables 8, 9, and 10 of the Updated Rate Study located in Appendix D. The total finance cost of both loans is approximately $132.6 million dollars over the 30 year repayment term. Given the total cost, approximately $96.6 and $36.1 million are allocated to water and sewer debt service respectively.

Tables 11 and 12 in Appendix D show the water and sewer cash flow projections. These cash flows go up to fiscal years 2027/28. The following items are key points to consider for the City's financial plan to fund the WRF project.

- The surcharges are expected to generate $2.17 and $1.65 million annually for the sewer and water facilities in addition to revenue produced by normal utility service rates.
- Cash reserves accumulate until 2021/2022 to begin debt service payments in 2022/23.
- Loan repayment is covered with cash revenue form the surcharge.
- WIFIA loan and SRF loan proceeds are initially received in 2019/20 to begin financing the beginning of construction of the WRF Project.
- WIFIA and SRF loan proceeds end in 2021/22, cash funds to cover remaining project expenses.
- Sewer and Water CIP project costs steadily increase up to 2021/22 and remain around $1 million a year after WRF project is complete.

5.2.5 Conditions With and Without the Project

Foregoing the development of a new water supply project would result in the City using imported water as its primary source. A new wastewater treatment plant (water reclamation facility) will still be constructed, but it will not include the advanced treatment purified water production component. Treated effluent will be discharged to the existing ocean outfall.

The Rate Study analyzed this scenario and found that the total monthly surcharge would be $41 per monthly bill for a single-family home. The water component of the project promotes the project to be competitive for low-interest-rate loans, however, no longer having a water supply component associated with the project eliminates potential subsidized funding. Developing the project without this component will rely solely on revenue bonds paid annually by cash

generated from the WRF surcharge and require a larger annual finance payment resulting in a higher WRF Project monthly surcharge. By not developing the water supply project alternative into the WRF Project, the City is relinquishing the additional local supply volume, diversification, and drought tolerance generated by IPR via groundwater injection. The costs are necessary to develop the WRF Project in order for the City to meet the Coastal Development Permit and NPDES permit requirements set by the California Coastal Commission and the RWRQCB, respectively. There is no water supply benefit in the "No Project Alternative"—the City's water supply portfolio remains unchanged at a significant cost to develop the WRF project.

5.2.6 Non-Economic Benefits

The WRF Project development provides various qualitative benefits to the City that are difficult to measure at any one time. The WRF development has aimed to provide the City with a beneficial long term investment in their water supply portfolio by creating a drought resilient water supply and by rehabilitating the existing Morro Groundwater Basin. Having a drought tolerant supply provides a sense of economic security by enabling the City and the local economy to confidently trust that their water supply is resilient and available year round. This in turn reduces water importation and sole reliance on the State Water ultimately reducing importation costs. All of the projects evaluated in OneWater Morro Bay, with the exception of the "No Project Alternative" would result in the City reducing their reliance on imported water from the State Water Project, not only benefiting the City but the State as well. Additionally, environmental benefits from the WRF project are improvements made to the existing Morro Groundwater Basin. By injecting purified water into the aquifer, nitrate contaminant concentrations are reduced therefore improving groundwater quality. During times of drought, the injected purified water will also benefit the basin by providing additional seawater intrusion protection. The WRF Project will improve treated effluent quality that is discharged to the ocean therefore eliminating hazards with marine habitats within the vicinity of the ocean outfall and its surrounding environments. Any social impacts caused by odors, aesthetics, or traffic associated with the existing wastewater treatment plant will be lessened to areas near Morro Bay's waterfront.

Section 6
SELECTION OF TITLE XVI PROJECT

The selected Title XVI Project (Water Reclamation Facility (WRF) Proejct) utilizes source water from the City's existing sanitary sewer collection system and produces purified water at the Water Reclamation Facility to be injected into the existing Morro Groundwater Basin and ultimately extracted by existing City wells for domestic use. This projects provides significant benefits by increasing the supply volume and drought resilience of the City's water supply portfolio. Additionally, this project also meets a City goal to provide water reuse efforts and reduce the volume of imported State Water. This reduction provides a sense of security by reducing reliance upon imported water. Being able to confidently use water from a sustainable source provides a positive impact to the local community and economy. The economic benefits can ultimately be seen in the long term with reduced water import costs and eliminate the need

for costly emergency measures to be taken if State Water is unavailable. The selected Project falls in line with the recommendations made in both the City's Master Water Reclamation Plan and OneWater Morro Bay to provide water supply through IPR via groundwater injection. As discussed in section 2, the City's existing water supplies are vulnerable to drought, infrastructure deterioration, and contaminating constituents. Coupled with the growing demands and the likely scenario of supply shortfalls, the City will not be able to meet its domestic water demands. The selected Title XVI project provides the resilience and supply the City needs to meet those demands.

The Title XVI Project postpones the need for the City to expand or retrofit its existing water supply portfolio. The augmented supply to the Morro Groundwater Basin postpones the need to develop treatment from extracted groundwater from the Chorro Basin, upgrade the ocean desalination facility, and acquire additional State Water Rights from DWR to meet growing future water demands. The City can still pursue capital projects aimed to expand and protect its water supply at an additional cost outside of the WRF Project.

Section 7

ENVIRONMENTAL CONSIDERATIONS AND POTENTIAL EFFECTS

7.1 Environmental Considerations for the WRF Project

The City of Morro Bay has prepared an Environmental Impact Report (EIR) pursuant to the California Environmental Quality Act (CEQA) and State CEQA guidelines to provide the public with information regarding the potential effects of the surrounding local environment and region associated with the development of the WRF Project. The WRF Project Draft EIR, which can be found in Appendix E, investigated multiple site alternatives for the WRF facility and developed the associated environmental impacts for each site, as well as an analysis for the "No Project Alternative". The site analysis investigated if alternate locations would alleviate significant effects caused by the WRF Project and the potential effects would be lessened or avoided if the WRF Project was not pursued. The ultimate goal of the EIR is to identify significant environmental effects and their associated mitigation measures. The following list itemizes the environmental resources assessed in the EIR:

- Aesthetics
- Agricultural and Forestry Resources
- Biological Resources
- Cultural Resources
- Geology, Soils and Seismicity
- Greenhouse Gas Emission and Energy
- Hazards and Hazardous Materials
- Hydrology and Water Quality
- Land Use and Planning

- Mineral Resources
- Noise and Vibration
- Environmental Justice
- Population and Housing
- Public Services
- Recreation
- Traffic and Transportation
- Tribal Cultural Resources
- Utilities and Service Systems.

The following sections describe the results of the EIR site analysis and environmental resources assessed in the EIR.

7.1.1 WRF Site Alternatives Analysis

Between 2011 and 2017, the City performed numerous site screening studies to determine which site would serve as the best location for the WRF project. A total of 17 sites were investigated as potential options. The City's ultimate decision criteria was to find a site that had the least environmental impact and was also cost effective and enabled the City to maintain its goals of producing recycled water. The City created the Water Reclamation Facility Citizens Advisory Committee (WRFCAC) to ensure public involvement throughout the site alternative screening studies performed by the City. During these studies, outreach via stakeholder meetings and public workshops were conducted to gather input associated with cost, environmental impacts, aesthetics, constructability, private property impacts, and potential hazards which ultimately developed into siting criteria throughout the screening process. Per CEQA guidelines alternatives are to be analyzed based on lessening or mitigating potential environmental impacts as listed in the previous section. As a result of the public outreach performed in the Draft EIR, input from the public resulted in very similar comments regarding the following:

- Adequacy of the WRF Alternative's Analysis
- WRF Site and Annexation
- Accidental Spills and Impacts to Morro Bay Estuary

Section 10 of the Final EIR, located in Appendix F, addresses these comments through developed Master responses. A brief summary of each response if provided below.

Adequacy of the WRF Alternative' Analysis

Several commenters expressed concerns that the selected South Bay Boulevard site was not the ideal selection for the WRF project and that other sites presented preferential conditions the City should consider. The City performed numerous site alternative screenings prior to the selection of the proposed WRF project. Several site alternatives were investigated as well as a No Project Alternative and an existing wastewater treatment site alternative. It was found that the No Project Alternative, which is also considered the "Environmentally Superior Alternative" in this case, would not achieve the benefits provided by the WRF Project and not meet the CCRWQCB requirement to improve effluent quality or the City's goal to produce recycled water. Additionally, the Exiting Site Alternative was rejected from future consideration, because the existing facility was seen by the California Coastal Commission (CCC) as inconsistent with the City's Local Coastal Plan and a new coastal development permit (CDP) for any development would not be approved. The Draft EIR concluded that the South Bay Site did not present any

significant and unavoidable environmental impacts identified and the only impacts would be to cultural resources on the conveyance facility pipeline near Morro Creek.

WRF Site Annexation

Public comments were received regarding the preferred WRF site and its associated footprint, developed area, conservation of open space and easements, annexation into the City, and the arrangement of the remainder of the total parcel area. The 27.6-acre area of the WRF site is part of a larger 396-acre parcel. The City expects to annex the 27.6-acre area into the City limits and sphere of influence. The position of the proposed site is strategically placed to allow design flexibility in order to minimize impacts to aesthetics, biological resources, and geologic resources. Additionally, the position of the WRF Site with respect to the remainder parcel area, allows for the acquisition of a conservation easement to address agricultural and open space concerns and potentially provide habitat preservation zones.

Accidental Spills and Impacts to Morro Bay Estuary

Public Comments were received regarding the concern for potential spills during operation of the WRF Project and its associated facilities. This concern rises due to the fact that the WRF project is adjacent to a tributary of Chorro Creek and rests within the Chorro Creek Watershed, which drains into the Morro Bay Estuary. Concerns were presented regarding flooding of the lift station wet wells since they are located in a FEMA 100-year inundation zone. Additionally, the rupture of the proposed raw wastewater pipeline at any point from the lift station to the WRF was an expressed concern. The following responses were provided to address the concerns regarding potential spills during operations.

- The WRF infrastructure includes instruments and design alarms that would provide continuous monitoring to prevent or contain potential spills on site. The prevention of spills is of the utmost importance to the City during operation of the WRF.
- The proposed lift stations are expected to be designed to be completely flood proofed above the 100-year inundation zone. Mechanical and electrical equipment and wet well access points are to be elevated above the flood elevation to be completely operational during an extreme flood event.
- The proposed raw water pipelines from the influent lift stations are to be designed and installed with a leak detection system that would monitor pressure continuously during operations.

7.1.2 Environmental Impacts and Mitigation Measures

The Draft EIR investigated potential impacts caused by the WRF project and its associated components. Impacts were categorized by the list presented in Section 7.1 and given a significance to represent its effects. The significance definitions as defined in the Draft EIR are shown in Table 11.

Table 11 Impact Classification and Significance

Impact Significance	Definition
Class I. Significant and Unavoidable	Impact that cannot be reduced to below the threshold level even with mitigation measures
Class II. Significant but Mitigable	Impact that can be reduced to below the threshold level given available and feasibly mitigation measures.
Class III. Not Significant	Impact may be adverse, but does not exceed the threshold levels and does not require mitigation.
Class IV. Beneficial	Effect that would reduce existing environmental problems or hazards.

Mitigation measures were assigned to Class I and Class II impacts. It was found the preferred South Bay Boulevard Site and Lift Station locations had no significant impacts with regards to the site. The only significant impact identified was to Cultural Resources which occurred along the conveyance pipelines and at the injection and monitoring wells shown below.

Human Remains

> *Impact 3.5-3: The proposed project could disturb human remains during construction, including those interred outside of formal cemeteries. This would be a Class I impact, Significant and Unavoidable.*

Mitigation measures have been outlined in the Draft EIR to alleviate the impact to cultural resources. Specifically mitigation measures CUL-1 through CUL-9 and CUL-14 can be implemented to reduce impacts to Cultural Resources. Pages 3.5-22 through 3.5-29 of the Draft EIR describe the mitigation measures to be taken to alleviate the cultural resources impacts during the development of the WRF Project.

7.2 Affected Biological Resources

Section 3.4 of the Draft EIR states that the special status species under biological resources that impact the Morro shoulderband snail were identified as a Class II impact, less than Significant with Mitigation. Biological mitigation measures can be found in Section 3.4 of the Draft EIR in Appendix E. Additionally, the California Red Legged Frog (CRLF) and the Tidewater Goby could potentially be present, at least on a seasonal basis in Morro Creek; however, it was concluded that due to lack of habitat, it is unlikely for these species to be present in or near the preferred WRF site or along the proposed pipeline alignment except at the Morro Creek crossing locations. Definitive surveys to determine the species status or absence were not performed because the lower reach of Morro Creek or seasonal drainages in the study area do not appear to provide suitable aquatic habitat for the species. Since the WRF Project is receiving federal funding from the Environmental Protection Agency's (EPA) WIFIA program, it requires concurrence by the U.S. Department of Fish and Wildlife of environmental impacts made from project. The EPA concluded that the WRF project may affect, but is not likely to adversely affect the CRLF, Tidewater Goby, and the Morro Shoulderband Snail. These potential affect determinations were coordinated with the U.S. Fish and Wildlife (USFW) for concurrence. USFW concurred that the WRF project would not likely adversely affect the Morro shoulderband snail if mitigation measures are incorporated into the project. Additionally, USFW did not concur with the EPA that the WRF project does not adversely affect the CRLF and the Tidewater Goby and has requested more information to better assess the EPA's determination. All additional information requested

has been sent to USFW as well as a request from the EPA and the City to expedite any review of information to be completed by January 20th, 2020. On December 19, 2019, the City received a response from USFW regarding the request to expedite the consultation of requested information for the WRF Project, but with no commitment to a particular date of completion. As of yet, neither the City nor the EPA has not received any additional communication with USFW.

Section 8

LEGAL AND INSTITUTIONAL REQUIREMENTS

The implementation of the WRF Project must meet various legal and institutional requirements prior to its completion. The following items are currently being addressed with the associated governing agencies.

Water Rights Issues

- The City has appropriative groundwater rights to the Morro Groundwater Basin. The WRF Project will potentially inject approximately 825 acre-feet per year of purified water into the groundwater basin allowing the City to extract around 943 acre-feet per year in total. The City will have to update their appropriative groundwater permit for the Morro Groundwater Basin to allow for the increase in annual groundwater extraction.

Permits

- Prior to the beginning of construction, the City will be required to acquire a Coastal Development Permit (CDP) from the California Coastal Commission (CCC). The City is currently addressing the special condition requirements outlined in the Notice of Intent to Issue Costal Development Permit (CDP 3-19-0463 issued July 19, 2019) to move forward to begin constructing the WRF Project components.
- Potable water supplied by indirect potable reuse (IPR) will require extensive permitting by the SWRCB for quality.
- Being that the WRF Project will treat raw wastewater from the City's collection system, the City will be required to update their NPDES permit with the SWRCB. The current discharge requirements for the existing plant are under interim discharge as shown in Table 3 since the facility cannot meet secondary treatment requirements in its current design.
- As mentioned in section 7, the City is currently coordinating with the EPA WIFIA Program and the USFW to determine if the WRF Project adversely affects any endangered species. This effort is ongoing.

Monitoring

- Additional groundwater monitoring will be required to confirm the residence time from groundwater injection to extraction at the City Municipal Wells.

Outfall Inspection

- The CCC has required that prior to operation of the WRF, a complete assessment of the existing ocean outfall must be performed to verify the integrity of the outfall diffuser,

ports, and pipeline. The WRF is projected to discharge 25 percent of its treated effluent and brine to the existing ocean outfall.

Appendix A

MASTER WATER RECLAMATION PLAN

Appendix B

ONEWATER PLAN

Appendix C

FINANCIAL PLAN & RATE ANALYSIS FOR A NEW WATER RECLAMATION FACILITY

Appendix D

WATER RECLAMATION FACILITY FINANCIAL PLAN UPDATE

Appendix E

MORRO BAY WATER RECLAMATION FACILITY DRAFT ENVIRONMENTAL IMPACT REPORT

Appendix F

MORRO BAY WATER RECLAMATION FACILITY FINAL ENVIRONMENTAL IMPACT REPORT