DRAFT Master Water Reclamation Plan

CITY OF MORRO BAY WATER RECLAMATION FACILITY PROJECT

WRF Citizen's Advisory Committee Meeting
April 4, 2017

Presentation Overview

CITY OF MORRO BAY WATER RECLAMATION FACILITY PROJECT

- Tonight's Overall Goals
  - Acknowledge Input City has Received
  - Reminder: Where We are in the Process
  - Present the Draft Master Water Reclamation Plan
  - Describe the Next Steps
  - Q&A

Presentation Overview

CITY OF MORRO BAY WATER RECLAMATION FACILITY PROJECT

- Introduction
- Project Goals
- Project Background
- MWRP Scope
- Recycled Water Opportunities
- Alternatives Analysis
- Cost Estimates and Qualitative Evaluation
- MWRP Conclusions & Recommendations
- Q&A

Introduction

CITY OF MORRO BAY WATER RECLAMATION FACILITY PROJECT

- **Multiple major planning efforts addressing community goals**
- ***All plans contribute to a comprehensive effort of bettering the City's use and management of water resources***

WRF Project Community Goals

CITY OF MORRO BAY WATER RECLAMATION FACILITY PROJECT

- **Produce Tertiary Disinfected Wastewater**
  - *WRF designed accordingly*
- **Produce Reclaimed Wastewater Cost-Effectively**
  - *Master Reclamation Plan addresses this*
  - *Including reclamation as early as possible reduces long-term costs*
- **Allow for Onsite Composting**
  - *Onsite composting is not recommended, regional facility will be more cost-effective*

WRF Project Community Goals

CITY OF MORRO BAY WATER RECLAMATION FACILITY PROJECT

- **Design for Energy Recovery**
  - *Considered in the FMP*
- **Design to Treat for Contaminants of Emerging Concern**
  - *Included in FMP treatment evaluation*
- **Allow for other Municipal Uses (at WRF)**
  - *Site planning in FMP allows for this possibility*

WRF Project Community Goals

CITY OF MORRO BAY WATER RECLAMATION FACILITY PROJECT

- **Ensure Compatibility with Neighboring Land Uses**
  - *Considered in siting study*
  - *FMP utilized for siting and architecture*
  - *EIR will analyze further*

- **Operational within 5 years**
  - *Project on schedule for WRF operation in 2021*
  - *Potential to construct recycled water project concurrently*

WRF Project Background

CITY OF MORRO BAY WATER RECLAMATION FACILITY PROJECT

- **Jan 2013:** CCC denial of CDP for WWTP Upgrade
- **Dec 2013:** Site Options Report 17 sites narrowed to 7; Council direction to compare the best sites (in both Morro and Chorro Valley)
- **May 2014:** Report recommends Morro Valley, but Chorro Valley also suitable; Council direction to compare WRF in MV to regional facility at CMC
- **Dec 2014:** Report determines CMC facility not desirable (very high cost; logistical challenges); Council focus remains on Morro Valley
- **April 2015:** CSD decides to pursue separate project

WRF Project Background

CITY OF MORRO BAY WATER RECLAMATION FACILITY PROJECT

- **Feb 2016:** Neighborhood concerns in Morro Valley lead to additional site analysis
- **May 2016:** Chorro Valley site (South Bay Boulevard) determined to be most achievable in 5-year timeframe when balancing cost and other logistical issues
- **June 2016:** City Council selects South Bay Boulevard site for detailed studies, FMP site planning, and EIR analysis

Project Schedule – 2016

CITY OF MORRO BAY WATER RECLAMATION FACILITY PROJECT

Key Milestone	Scheduled Date	Actual Date
City Council Selects Site for Study (South Bay Blvd.)	June 2016	June 2016
Technical Studies (biology, cultural, geotech, survey work)	August 2016	August 2016
EIR Scoping Meeting	August 2016	August 2016
MOU with Property Owner	October 2016	October 2016

Project Schedule – 2016-17

CITY OF MORRO BAY WATER RECLAMATION FACILITY PROJECT

Key Milestone	Scheduled Date	Actual Date
Draft Facility Master Plan	December 2016	November 2016
Draft Master Water Reclamation Plan	March 2017	March 2017
Draft EIR Released	August 2017	On Schedule
Final EIR Certified	Fall 2017	On Schedule

Project Schedule – 2018-21

CITY OF MORRO BAY WATER RECLAMATION FACILITY PROJECT

Key Milestone	Scheduled Date	Actual Date
Award Contract for Phase I WRF Improvements	May 2018	On Schedule
Begin Project Design	August 2018	On Schedule
Project Construction Begins	June 2019	On Schedule
Completion of Phase I WRF Improvements	May 2021	On Schedule

WRF Program Overview

CITY OF MORRO BAY WATER RECLAMATION FACILITY PROJECT

What we know now …

- We can build a WRF at South Bay Blvd site that meets the Community Project Goals
- "Total WRF Project" by June 2021 is possible
  - *Recycled water 2 years ahead of schedule*
- Groundwater injection & extraction appears feasible

WRF Program Overview

CITY OF MORRO BAY WATER RECLAMATION FACILITY PROJECT

What we know now …

- **Total WRF Project** can provide recycled water for groundwater injection to supplement the City's **water supply** and provide **water independence**

- **Advantages** of Accelerating Recycled Water Component
  - *Potentially eligible for more **grant money***
  - *Long-term **construction cost savings***
  - *Potential **reduction in State Water Use***

WRF Program Overview

CITY OF MORRO BAY WATER RECLAMATION FACILITY PROJECT

What we know now …

- Estimated Cost without recycled water: $124M
- Estimated Total Cost with recycled water: $153M - $168M

Previous Findings from FMP and Studies

CITY OF MORRO BAY WATER RECLAMATION FACILITY PROJECT

- SBB site is preferred & has less delays
- Membrane Filtration and UV disinfection are essential
- Groundwater aquifer storage is available in the Morro Valley
- Possible to offset State Water deliveries with groundwater injection
- Standalone EQ storage is needed for advanced treatment
- City's share of WWTP decommissioning costs are now fully included

Water Independence

CITY OF MORRO BAY WATER RECLAMATION FACILITY PROJECT

Water independence is possible	Highest & best use
Majority of water demand may be met through reuse and groundwater	• Create dependable water source • Reduce reliance on State Water
Current and future costs of State Water could be eliminated	
Initial water/wastewater costs will be higher, but less vulnerable to escalation	• Produce Reclaimed Water • Best available treatment for CECs • Operational in 5 years
WRF will be well positioned to meet the Project Goals	

MWRP Scope

CITY OF MORRO BAY WATER RECLAMATION FACILITY PROJECT

- Review existing and future water demands
- Review wastewater flows and loadings and proposed WRF treatment technology
- Identify and investigate recycled water opportunities
- Determine treatment requirements for reuse
- Analyze project alternatives
- Provide recommendations for recycled water project
- Review construction financing plan

MWRP Background

CITY OF MORRO BAY WATER RECLAMATION FACILITY PROJECT

- Comprehensive **Recycled Water Study** (Carollo Engineers, October 1999)
- 2012 **Recycled Water Feasibility Study** Prepared for the City of Morro Bay and Cayucos Sanitary District Wastewater Treatment Plant Upgrade Project (Dudek, 2012)
- Morro Bay **New Water Reclamation Facility – Water Reuse Opportunities** (MKN, Draft May 2014)
- Regulatory Implications of **Discharge Options for the Future** City of Morro Bay Water Reclamation Facility (Larry Walker & Associates, October 2014)
- **Hydrologic Evaluation** of the Potential Benefits to the City Water Supply from Increasing Wastewater **Discharge to Chorro Creek**, San Luis Obispo County (Cleath-Harris Geologists, Inc., November 2014)

MWRP Background

CITY OF MORRO BAY WATER RECLAMATION FACILITY PROJECT

- Draft **Lower Morro Valley Basin Screening-Level Groundwater Modeling** for Injection Feasibility (GSI Water Solutions, Inc., January 2017)
- Morro Bay Water Reclamation Facility Project Status of **Salinity Source Identification** and Control Plan (MKN, January 2016)
- City of Morro Bay **Salinity Control Program** Development (Larry Walker & Associates, July 2016)
- **Effluent Disposal Feasibility Alternatives Study** (GSI Water Solutions, July 2016)
- Assessment of the **Hydrogeologic Characteristics of the Chorro Valley** (GSI Water Solutions, Inc., August 2016)
- City of Morro Bay Draft **Water Reclamation Facility Master Plan** (Black & Veatch, November 2016)

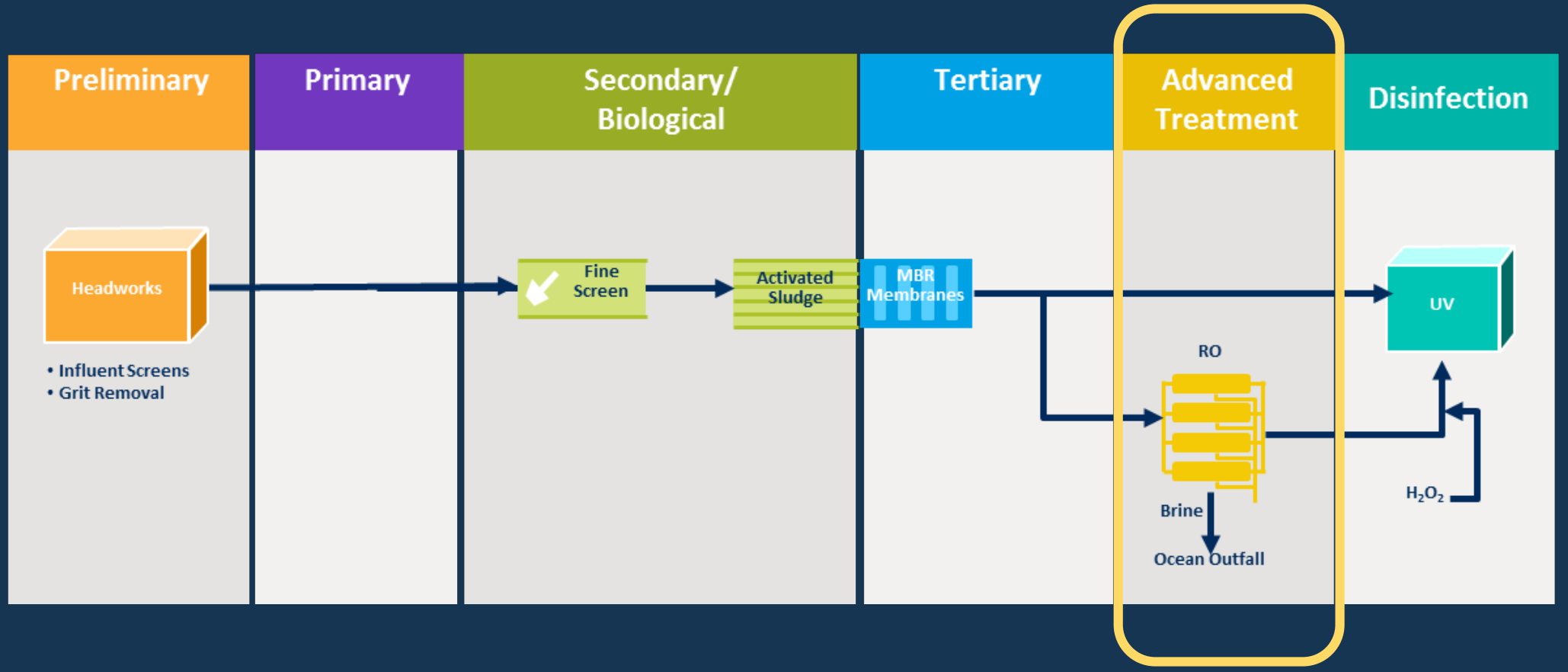
Facility Master Plan Information

CITY OF MORRO BAY WATER RECLAMATION FACILITY PROJECT

- Flows and Loadings
- Treatment technologies
- Effluent quality
- Pipeline routes
- Potential WRF site layout
- Planning-level Budget for WRF
- Planning-level Budget for Full advanced treatment

FMP - WRF Treatment Technology

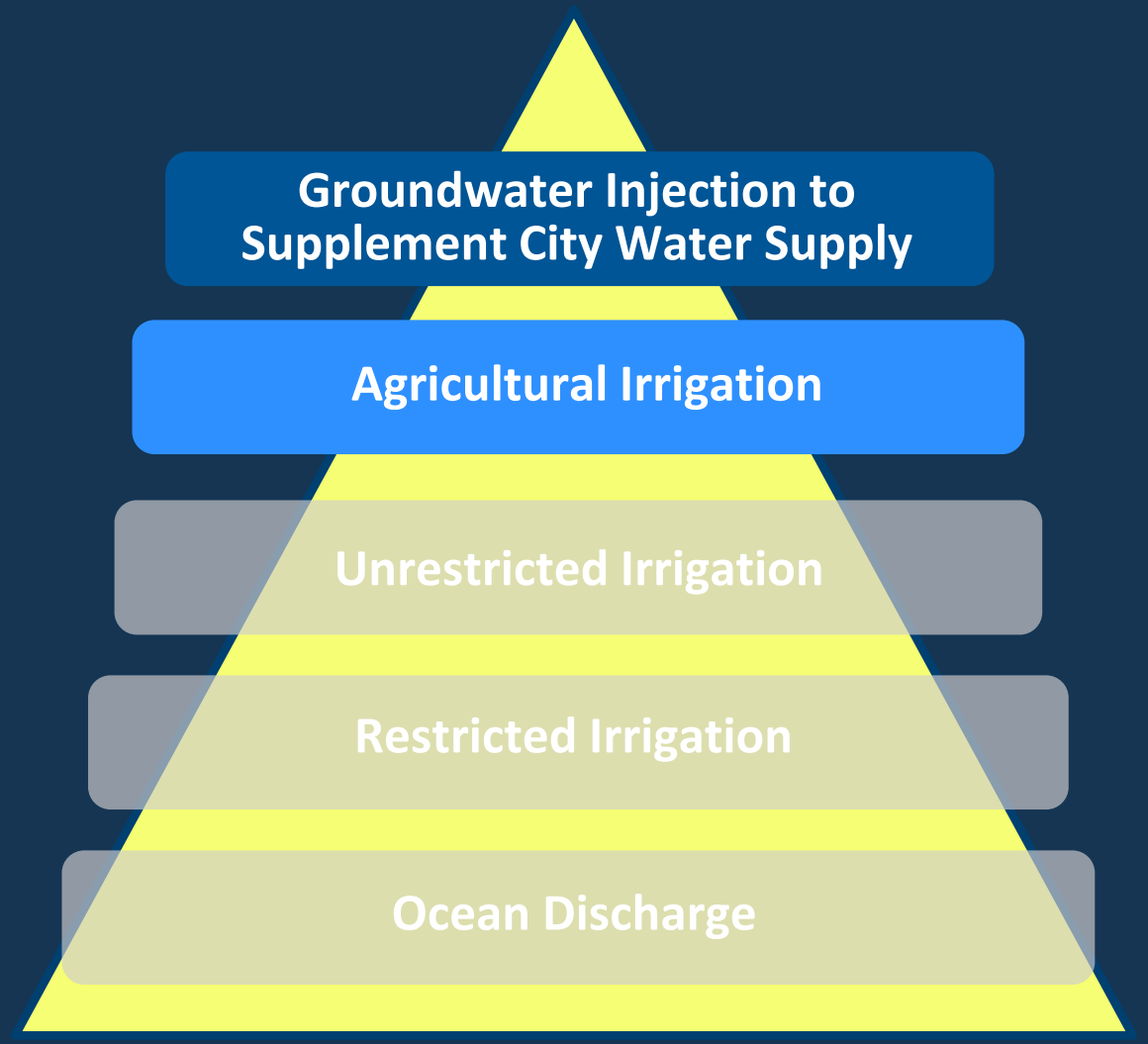
CITY OF MORRO BAY WATER RECLAMATION FACILITY PROJECT



Type and size of advanced treatment varies between recycled water uses

Advanced Treatment Required to Achieve Community Goals for Highest and Best Uses of Product Water

CITY OF MORRO BAY WATER RECLAMATION FACILITY PROJECT



- Advanced treatment is used to remove dissolved salts, viruses, TOCs, organic and inorganic chemicals, and emerging contaminants
- Title 22 requires MF/RO + AOP for Indirect Potable Reuse
- Based on the crop/use, agricultural and urban reuse opportunities require salts removal (MF/RO)

Reuse Opportunities

CITY OF MORRO BAY WATER RECLAMATION FACILITY PROJECT

Alternative	Evaluated Further	Comments
No Recycled Water Project	✓	• Does not meet Community project goal of recycled water • No water supply benefit to the City • Provides the minimum treatment that would meet requirements
Urban Reuse	✓	• Distribution system to urban irrigation opportunities • Potential to offset City potable water demand and fertilizer costs • Advanced treatment for salts removal • Lower advanced treatment requirements than agricultural irrigation

Reuse Opportunities

CITY OF MORRO BAY WATER RECLAMATION FACILITY PROJECT

Alternative	Evaluated Further	Comments
Agricultural Irrigation		• Distribution system to agricultural users • Advanced treatment for salts removal • Initial outreach indicated general unwillingness to participate • Does not increase City's potential water supply
Exchange of Recycled Water with Agricultural Users for Reduced Groundwater Pumping		• Distribution system to agricultural users • Additional treatment for salts removal • Initial outreach indicated general unwillingness to participate • Basin-wide groundwater management plan required • Does not increase City's potential water supply

Reuse Opportunities

CITY OF MORRO BAY WATER RECLAMATION FACILITY PROJECT

Alternative	Evaluated Further	Comments
Exchange of Recycled Water with Agricultural Users for Riparian Rights to Withdraw Groundwater		• Distribution system to agricultural users • Additional treatment for salts removal • Complex legal issues surrounding Riparian Rights • Initial outreach indicated general unwillingness to participate
Exchange of Recycled Water with Agricultural Users for Pumped Groundwater Delivered to the City	✓	• Distribution system to agricultural users • Pipeline from agricultural users to City water system • Additional treatment for salts removal • Initial outreach indicated interest depending on quality and cost

Reuse Opportunities

CITY OF MORRO BAY WATER RECLAMATION FACILITY PROJECT

Alternative	Evaluated Further	Comments
Streamflow Augmentation		• Present and future regulatory challenges • Long term/permanent commitment to stream discharge • Expansion of water treatment facilities to treat surface water • Minimal percolation from Chorro Creek, limited water supply benefit
Indirect Potable Reuse, Groundwater Replenishment Using Surface Application		• Limited water supply benefit especially during wet years • Land acquisition for percolation ponds • Advanced treatment for salts removal • Staffing and maintenance of percolation ponds

Reuse Opportunities

CITY OF MORRO BAY WATER RECLAMATION FACILITY PROJECT

Alternative	Evaluated Further	Comments
Groundwater Injection for Seawater Intrusion Barrier		• New injection wells • Limited water supply benefit - majority of water lost to ocean • Highest mandated treatment requirements
Indirect Potable Reuse, Groundwater Replenishment Using Subsurface Application – East	✓	• Injection wells near the Narrows • Pilot testing and additional modeling for permitting/refined water supply benefit estimates • Highest mandated treatment requirements • Highest potential water supply benefit

Reuse Opportunities

CITY OF MORRO BAY WATER RECLAMATION FACILITY PROJECT

Alternative	Evaluated Further	Comments
Indirect Potable Reuse, Groundwater Replenishment Using Subsurface Application – West	✓	• Injection wells near bike path behind Lila Keiser Park • Pilot testing and additional modeling for permitting/refined water supply benefit estimates • Highest mandated treatment requirements • Highest potential water supply benefit
Direct Potable Reuse		• Not currently legal in California • Future regulatory challenges

Recycled Water Project Alternatives

CITY OF MORRO BAY WATER RECLAMATION FACILITY PROJECT

- Alternative 0: No Recycled Water Project
- Alternative 1: Urban Reuse
- Alternative 2: Agricultural Exchange
- Alternative 3/4: Indirect Potable Reuse

No Recycled Water Project

CITY OF MORRO BAY WATER RECLAMATION FACILITY PROJECT

- Discharge effluent through existing ocean outfall
- Secondary disinfected will meet requirements for ocean discharge
- Does not meet Community Goal for tertiary treatment
- No potential water supply benefit

Project Component	Cost Opinion
WRF Capital Costs	$104.2M
Recycled Water Project Capital Cost	$0
Subtotal Program Cost	$104.2M
Construction Contingency	$19.3M
Total Program Cost Opinion	**$124M**

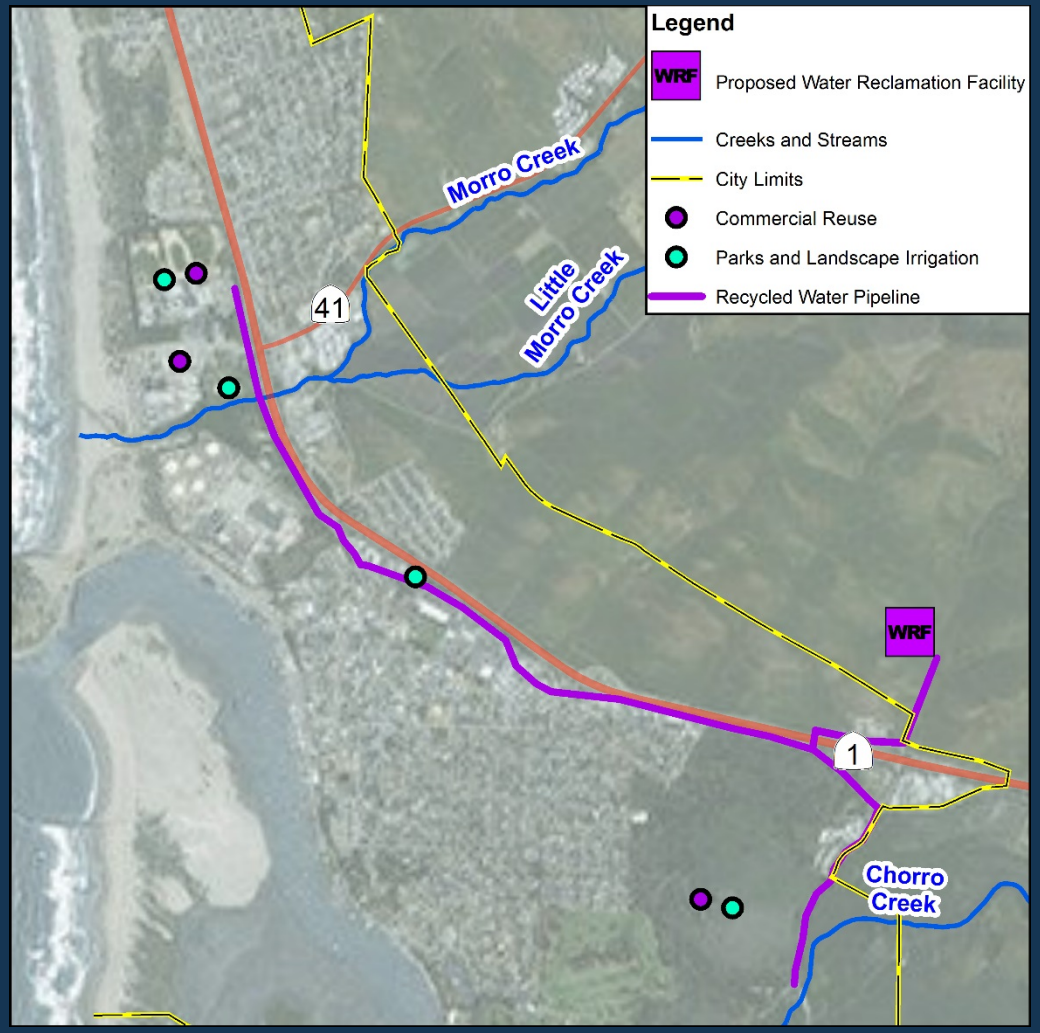
Note: Construction contingency is 25% of construction cost subtotal

Urban Reuse

CITY OF MORRO BAY WATER RECLAMATION FACILITY PROJECT

- Recycled water to urban irrigation and industrial users
- Additional treatment for salts removal required
- Potential water supply benefit: 45 AFY

Project Component	Cost Opinion
WRF Capital Costs	$117.3M
Recycled Water Project Capital Cost	$11.6M
Subtotal Program Cost	$128.9M
Construction Contingency	$24.1M
Total Program Cost Opinion	**$153M**



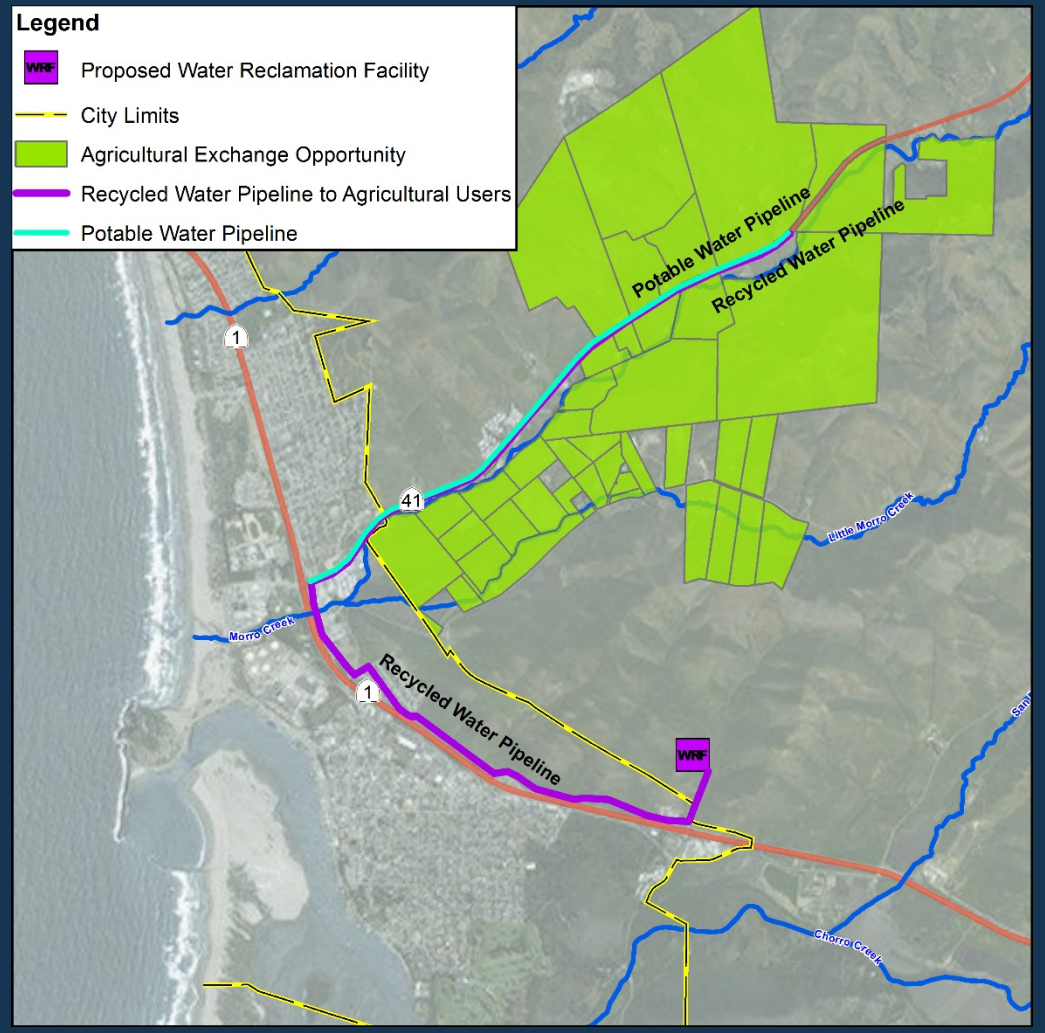
Note: Construction contingency is 25% of construction cost subtotal

Agricultural Exchange

CITY OF MORRO BAY WATER RECLAMATION FACILITY PROJECT

- Exchange recycled water with agricultural growers for groundwater (0.5 return ratio)
- Additional treatment for salts removal required
- Potential water supply benefit: 442 AFY

Project Component	Cost Opinion
WRF Capital Costs	$117.3M
Recycled Water Project Capital Cost	$23.9M
Subtotal Program Cost	$141.2M
Construction Contingency	$26.4M
Total Program Cost Opinion	**$168M**



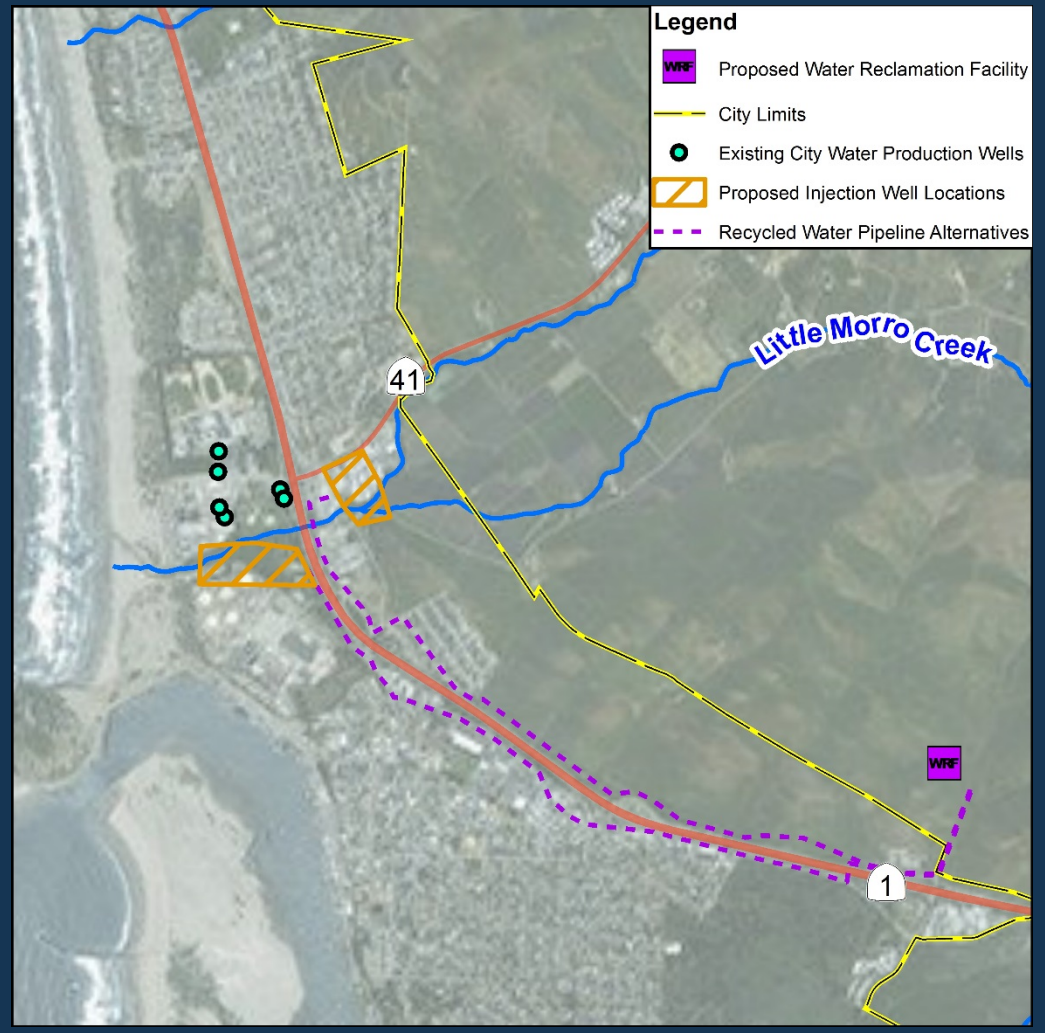
Note: Construction contingency is 25% of construction cost subtotal

Indirect Potable Reuse

CITY OF MORRO BAY WATER RECLAMATION FACILITY PROJECT

- Inject groundwater into the lower Morro Valley aquifer and recover at existing City wells
- Full advanced treatment (RO and advanced oxidation) required
- Potential water supply benefit: 943-1,119 AFY

Project Component	Cost Opinion
WRF Capital Costs	$117.3M
Recycled Water Project Capital Cost	$23.4M
Subtotal Program Cost	$140.7M
Construction Contingency	$26.3M
Total Program Cost Opinion	**$167M**



Note: Construction contingency is 25% of construction cost subtotal

Current Water Supply Sources

CITY OF MORRO BAY WATER RECLAMATION FACILITY PROJECT

- State Water Project
  - Allocation = 1,313 AFY + “drought buffer”
    - If SWP deliveries are between 36.5% & 100%, City receives 100%
    - Cost depends on use, but large fixed cost even with no use.
      - 2015: $2,100 per AF
- Groundwater
  - Chorro Valley: 1,142.5 AFY
    - Limitations: Chorro Creek flow and lack of treatment ability
  - Morro Valley: 581 AFY
    - $1,000/AF
- Seawater
  - Desalination plant capacity = up to 645 AFY
  - Limited by influent water quality; well capacities under investigation
  - $1,600/AF

CALIFORNIA STATE WATER PROJECT

CITY OF MORRO BAY
WATER RECLAMATION FACILITY PROJECT

Program Cost Opinions

CITY OF MORRO BAY WATER RECLAMATION FACILITY PROJECT

	No Recycled Water Project	Urban Reuse	Agricultural Exchange	Indirect Potable Reuse
Capital Cost Opinion Subtotal	$104.2M	$128.9M	$141.2M	$140.7M
Construction Contingency	$19.3M	$24.1M	$26.4M	$26.3M
Total Program Cost Opinion	**$124M**	**$153M**	**$168M**	**$167M**

Note: Construction contingency is 25% of construction cost subtotal

Consider Annual Costs

CITY OF MORRO BAY WATER RECLAMATION FACILITY PROJECT

	No Recycled Water Project	Urban Reuse	Agricultural Exchange	Indirect Potable Reuse
Annualized Program Cost(1)	$6.3M	$7.8M	$8.5M	$8.5M
Estimated Annual O&M	$1.4M	$1.8M	$2.0M	$2.3M
Estimated Annual Water Cost(2)	$2.6M	$2.5M	$1.7M	$1.6M
Estimated Total Program Annual Cost	**$10.3M**	**$12.1M**	**$12.2M**	**$12.4M**

Notes: (1) SRF financing assumed with a 30 year loan and 3% interest rate

(2) Water cost assumptions: Demand= 1200 AFY, SWP = $2200/AF, Groundwater = $1000/AF, Desal = $1600/AF

Qualitative Evaluation Criteria

CITY OF MORRO BAY WATER RECLAMATION FACILITY PROJECT

Potential City Water Supply Benefit

- *Production of high quality and cost effective recycled water*

Pipeline Length

- *Neighborhood compatibility, energy savings*

Land Acquisition

- *Neighborhood compatibility, project schedule*

Reliability

- *Project schedule*

Comparative Qualitative Ranking

CITY OF MORRO BAY WATER RECLAMATION FACILITY PROJECT

	Alternative 1	Alternative 2	Alternative 3	Alternative 4
	Urban Reuse	Agricultural Exchange	IPR East	IPR West
Potential City water supply benefit	1	2	4	4
Pipeline length	2	1	4	3
Land acquisition	4	3	1	2
Reliability	1	1	3	3
Total	**8**	**7**	**12**	**12**

MWRP Conclusions & Recommendations

CITY OF MORRO BAY WATER RECLAMATION FACILITY PROJECT

- IPR provides Highest water supply benefit (Alt 3 and 4)
  - 900 – 1100 AFY, near the City's current water demand
  - Optimization at WTP has potential to maximize this benefit
  - City could significantly reduce or eliminate reliance on imported water
- Least expensive alternative is No Recycled Water Project (Alternative 0), followed by Urban Reuse (Alternative 1)
- Alternative 0 provides no water supply benefit and Alternative 1 provides the least (45.4 AFY)

MWRP Conclusions & Recommendations

CITY OF MORRO BAY WATER RECLAMATION FACILITY PROJECT

- Capital costs for Agricultural Exchange (Alternative 2) and IPR (Alternatives 3 and 4) are similar
- IPR has significantly higher water supply benefit if a higher exchange rate is not possible for agricultural exchange
- Agricultural Exchange relies on successful contract negotiations, adding uncertainty

MWRP Conclusions & Recommendations

CITY OF MORRO BAY WATER RECLAMATION FACILITY PROJECT

- Recommended recycled water project is IPR (Alt 3 or 4)
  - Best fulfills the Council adopted community project goals producing reclaimed water
  - Provides the highest and most reliable potential water supply benefit of the alternatives
  - Allows City to reduce or eliminate reliance on imported water
  - If recycled water project is desired, there is potential for significant savings when implemented with the WRF

Next Steps related to Reclamation

CITY OF MORRO BAY WATER RECLAMATION FACILITY PROJECT

- Sewer Rate Study Update (*April 2017)*
- Draft EIR (*August 2017)*
- Consultation with Water Board
- Siting study for injection wells
- Pilot study for injection and extraction
- Final EIR *(autumn 2017)*

Next Steps related to Reclamation

CITY OF MORRO BAY WATER RECLAMATION FACILITY PROJECT

- Groundwater modeling update (after/with pilot study)
- WTP Optimization Study (One Water)
  - Improve recovery/production
- Design of recycled water system, including advanced treatment, injection wells, pumps, and pipelines

CITY OF MORRO BAY
WATER RECLAMATION FACILITY PROJECT

Questions and Comments