Enhanced Recycled Water Feasibility Analysis Update

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carollo®

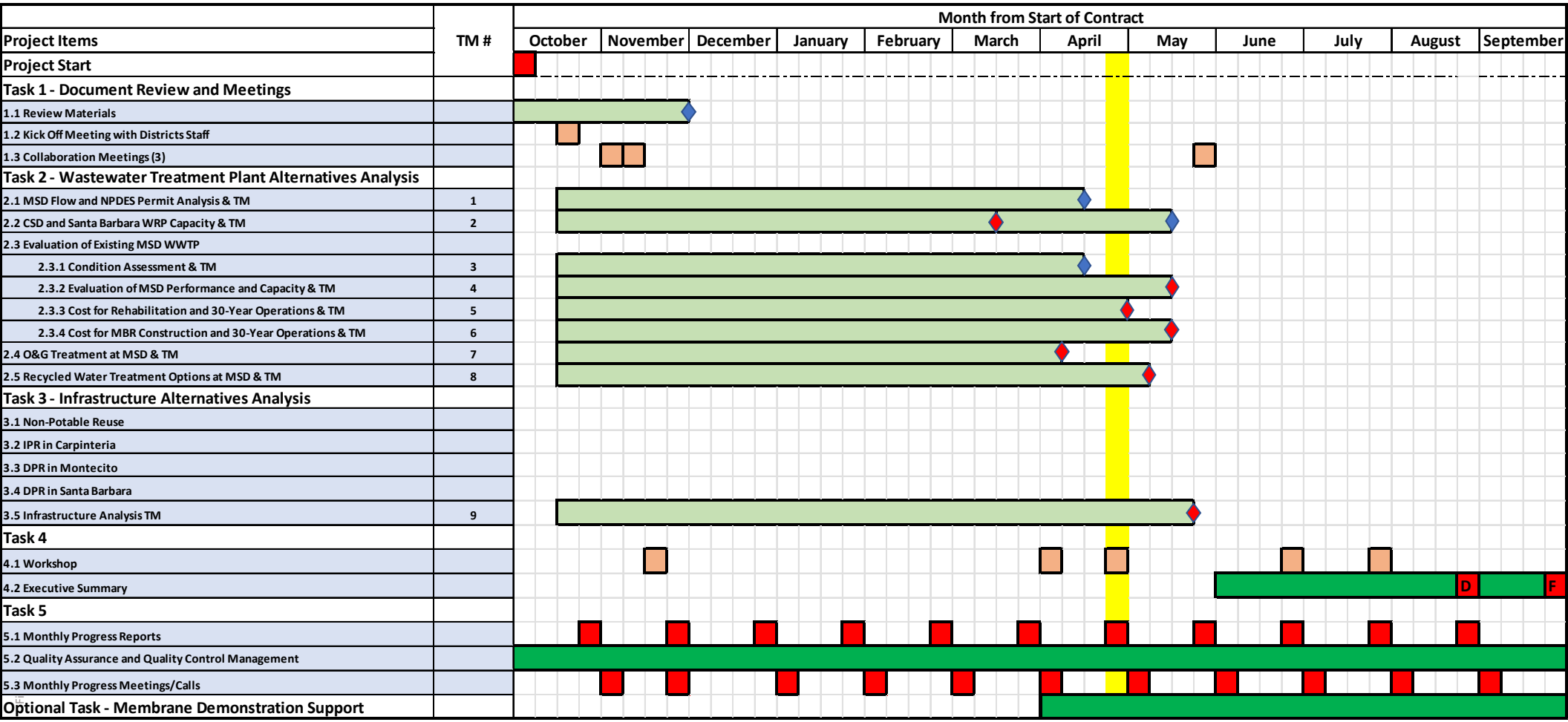
in association with WSC

Teams // April 28, 2022

Outline

- Schedule
- Brief Project Overview
- Details on Specific Tasks
- Open discussion

Project Schedule



Regional Collaboration

Montecito ⇄ **Regional Partner**

CARPINTERIA
Sanitary District

// Project Memorandums

- TM 1 – MSD Flow and NPDES Permit Analysis
- TM 2 – CSD and SB WRP Capacity
- TM 3 – MSD Condition Assessment
- TM 4 – Evaluation of MSD Performance and Capacity
- TM 5 – Cost for Rehabilitation and 30-year Operations
- TM 6 – Cost for MBR Construction and 30-year Operations
- TM 7 – O&G Treatment at MSD
- TM 8 – Recycled Water Treatment Options at MSD
- TM9 - Infrastructure Analysis

Montecito Sanitary District & Montecito Water District
Enhanced Recycled Water Feasibility Analysis

Technical Memorandum 7
O&G TREATMENT AT MSD

DRAFT | April 2022

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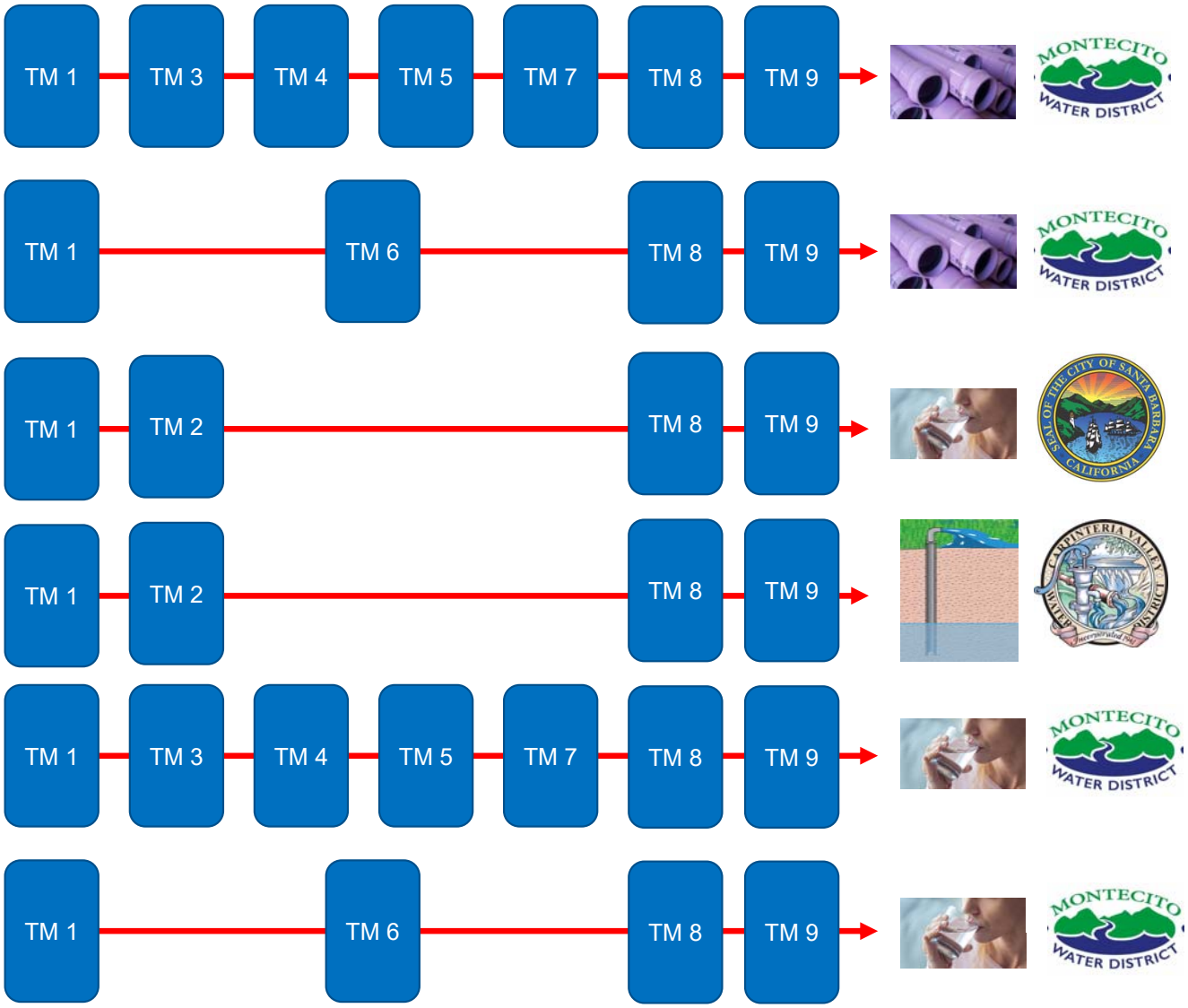
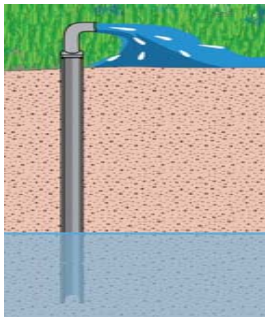
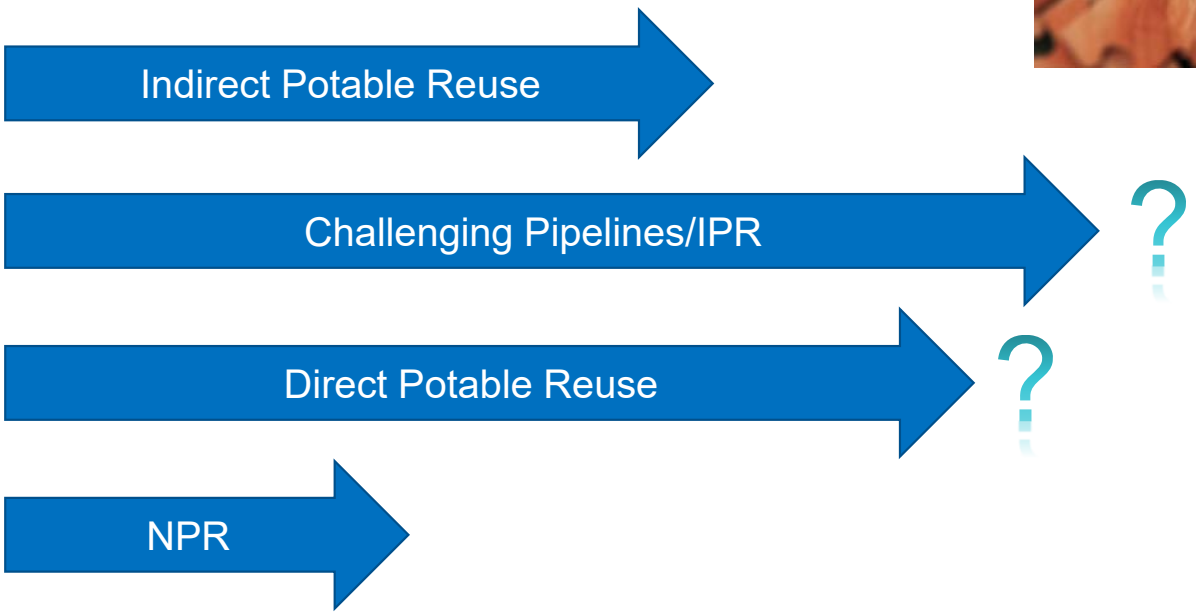
// Executive Summary



// Executive Summary- Project Phasing



// Executive Summary- Project Timelines



// Executive Summary- Interagency Coordination and Agreements

// Key Conclusions (to be made)

- Regional Collaboration Opportunities, Timelines, and Challenges
- MSD Capacity and MSD Rehabilitation Needs
- Treatment and Distribution Infrastructure Location and Footprint
- Costs to implement:
  - NPR in Montecito
  - DPR in Montecito
  - DPR in Santa Barbara
  - IPR in Carpinteria
  - All in $/acre-foot per year based upon a 30-year cost analysis
- Potential savings and benefits for O&G removal based upon MSD Pilot System Testing

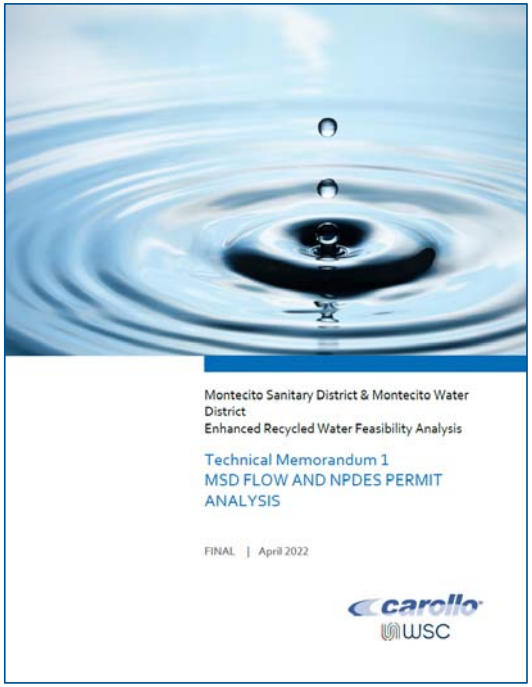
Task Updates

“Mini” Master Plan

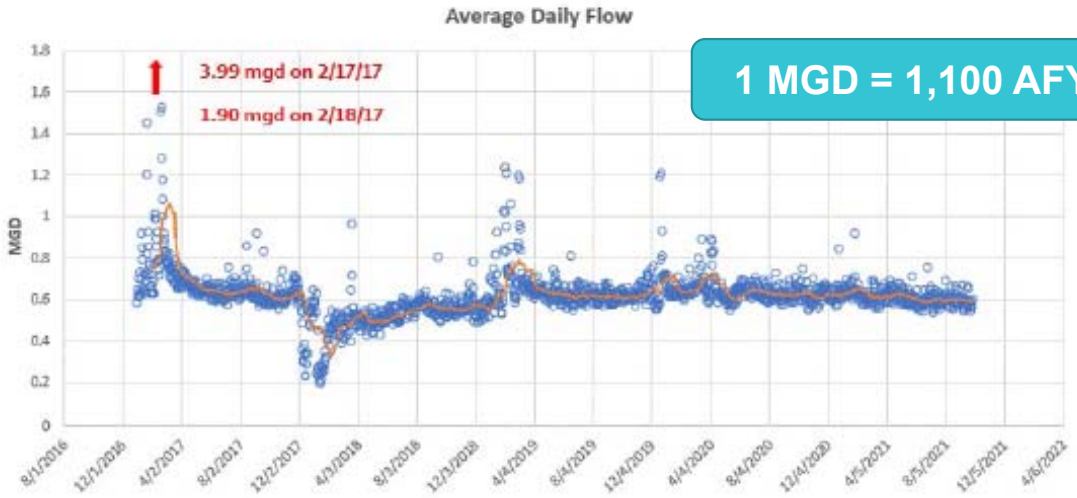
- TM 1 – MSD Flow and NPDES Permit Analysis
- TM 3 – MSD Condition Assessment
- TM 4 – Evaluation of MSD Performance and Capacity
- TM 5 – Cost for Rehabilitation and 30-year Operations
- TM 6 – Cost for MBR Construction and 30-year Operations

TM 1 – MSD Flow and NPDES Permit Analysis

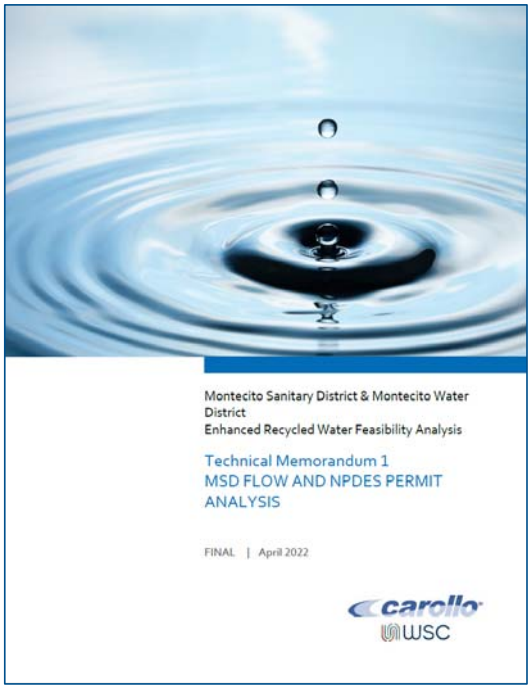
- Review Current & Anticipated Wastewater Flows and Loads
- Evaluate NPDES Permit Pertaining to Future Advanced Treatment and RO Concentrate
- Evaluation Outfall Operation for Potential Future Low Flow (due to water reuse)



TM 1 – MSD Flow and NPDES Permit Analysis



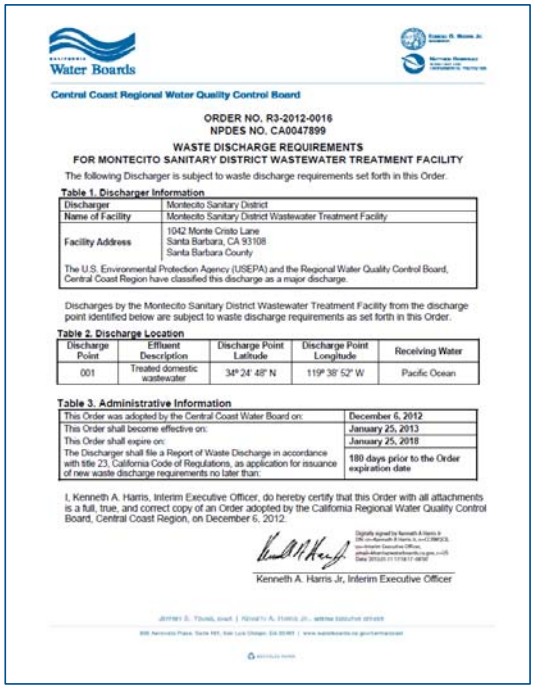
1 MGD = 1,100 AFY



- Flow values used to set treatment and conveyance infrastructure for all water reuse options
- Some large Peak Flow events incorporated, providing some comfort about future climate change related impacts to stormflows

TM 1 – MSD Flow and NPDES Permit Analysis

- Both NPDES and Ocean Plan water quality targets were evaluated
- The only potential parameter to warrant further investigation, related to a future water reuse project and resulting effluent discharge to the ocean, is copper.
- For a future project, to better understand potential copper impacts, dilution modeling in the ocean outfall can be conducted and is expected to result in increased dilution credits and regulatory approval.



Water Boards

Central Coast Regional Water Quality Control Board

ORDER NO. R3-2012-0016
NPDES NO. CA0047899

WASTE DISCHARGE REQUIREMENTS
FOR MONTECITO SANITARY DISTRICT WASTEWATER TREATMENT FACILITY

The following Discharger is subject to waste discharge requirements set forth in this Order.

Table 1. Discharger Information

Discharger	Montecito Sanitary District
Name of Facility	Montecito Sanitary District Wastewater Treatment Facility
Facility Address	1042 Monte Cristo Lane Santa Barbara, CA 93108 Santa Barbara County

The U.S. Environmental Protection Agency (USEPA) and the Regional Water Quality Control Board, Central Coast Region have classified this discharge as a major discharge.

Discharges by the Montecito Sanitary District Wastewater Treatment Facility from the discharge point identified below are subject to waste discharge requirements as set forth in this Order.

Table 2. Discharge Location

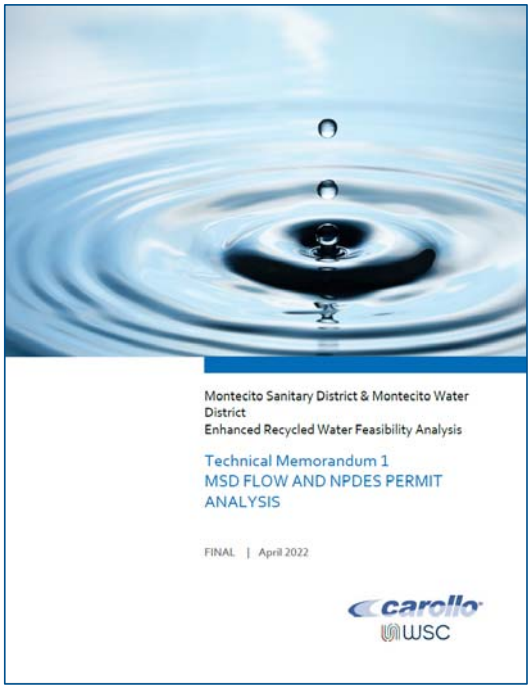
Discharge Point	Effluent Description	Discharge Point Latitude	Discharge Point Longitude	Receiving Water
001	Treated domestic wastewater	34° 24' 48" N	119° 38' 52" W	Pacific Ocean

Table 3. Administrative Information

This Order was adopted by the Central Coast Water Board on:	December 6, 2012
This Order shall become effective on:	January 25, 2013
This Order shall expire on:	January 25, 2018
The Discharger shall file a Report of Waste Discharge in accordance with title 23, California Code of Regulations, as application for issuance of new waste discharge requirements no later than:	180 days prior to the Order expiration date

I, Kenneth A. Harris, Interim Executive Officer, do hereby certify that this Order with all attachments is a full, true, and correct copy of an Order adopted by the California Regional Water Quality Control Board, Central Coast Region, on December 6, 2012.

Kenneth A. Harris Jr, Interim Executive Officer



Montecito Sanitary District & Montecito Water District
Enhanced Recycled Water Feasibility Analysis

Technical Memorandum 1
MSD FLOW AND NPDES PERMIT ANALYSIS

FINAL | April 2022

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TM 1 – MSD Flow and NPDES Permit Analysis

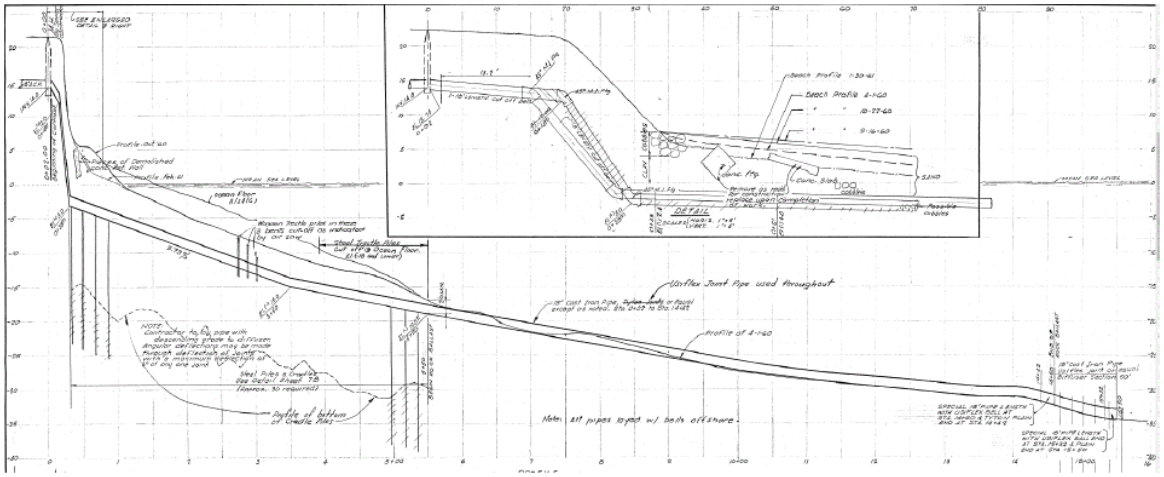
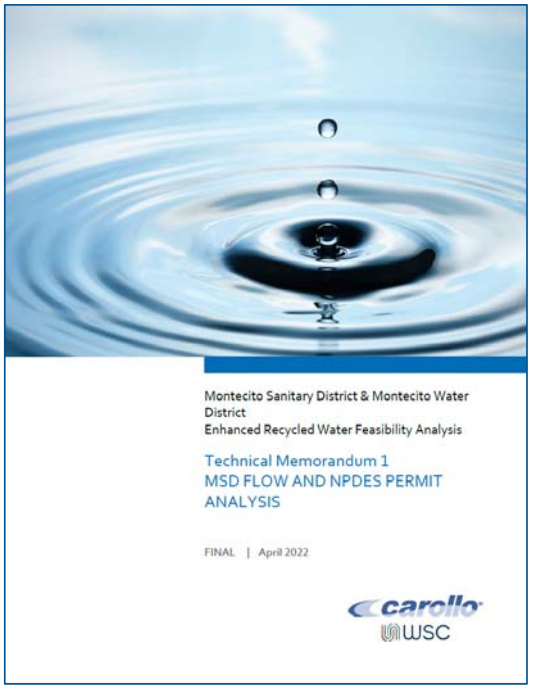


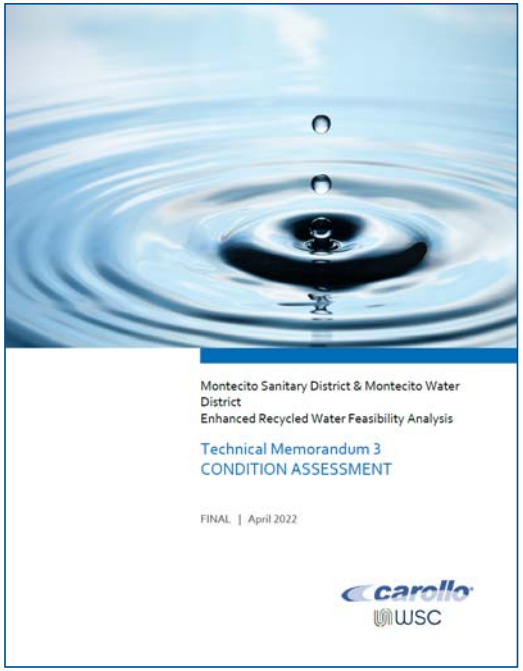
Figure 1.7 MSD As-Built Outfall Section View



- Low flow (20% of ADWF) due to water reuse will not impact outfall operation
- Scaling of the outfall related to the high concentration of minerals in RO concentrate (future) is not expected to be a concern

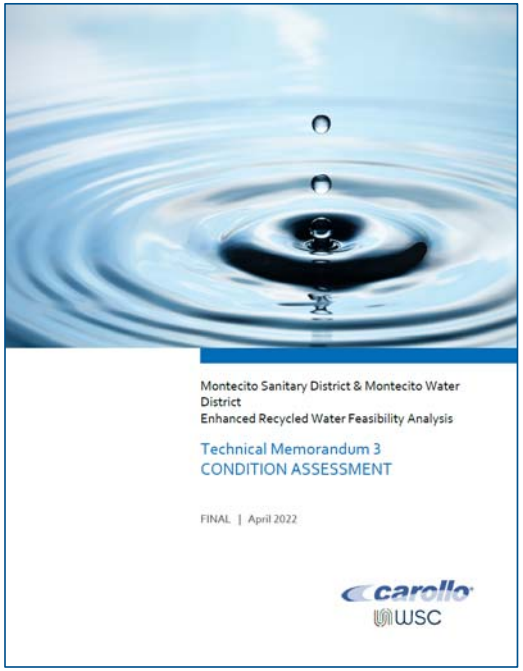
TM 3 – MSD Condition Assessment

- Assess critical infrastructure at the MSD WWTP
  - One day detailed on-site assessment
  - Mechanical and process equipment
  - Electrical equipment
  - Structures
  - With numerous follow-on meetings and discussions

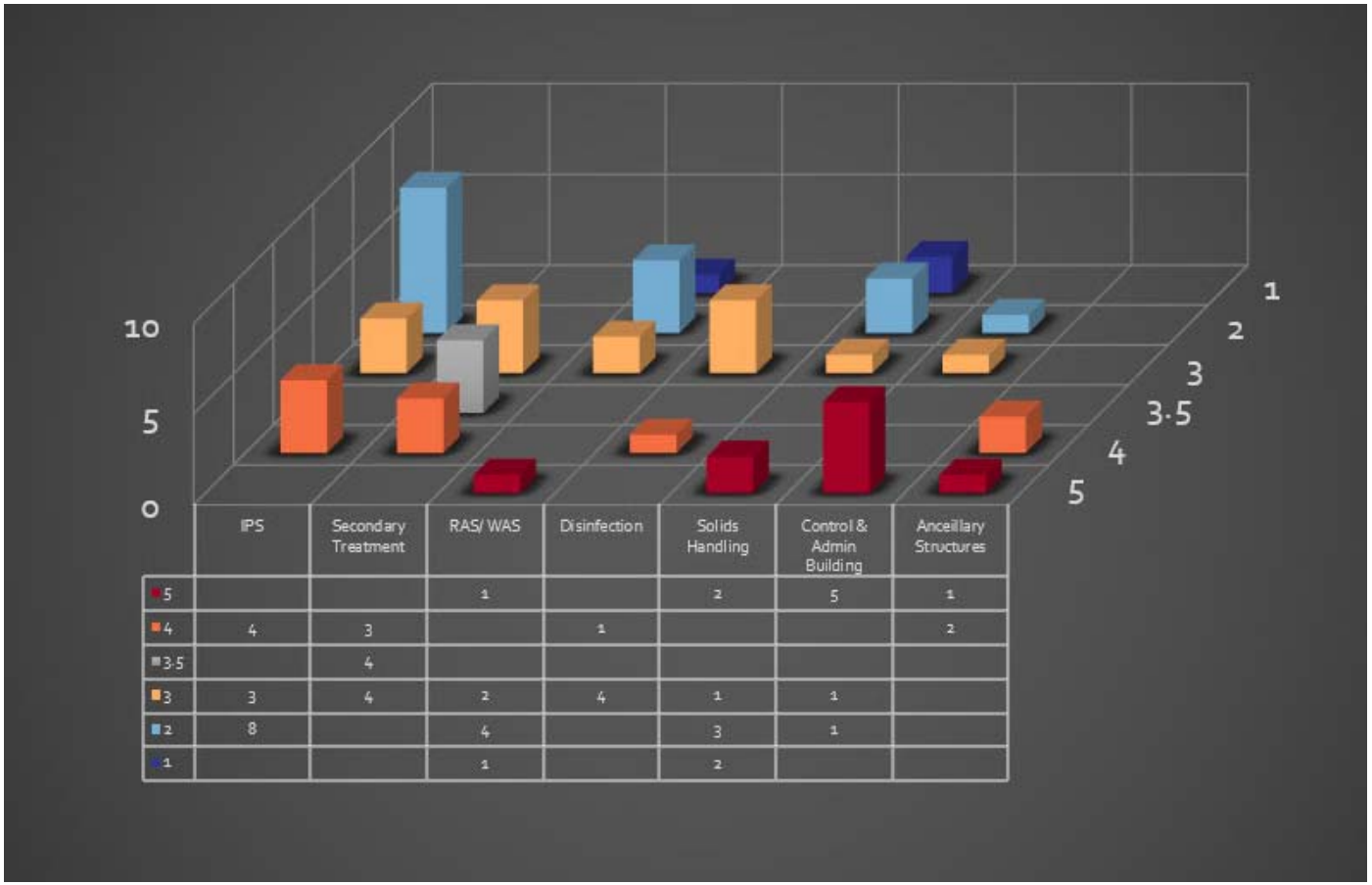


TM 3 – MSD Condition Assessment

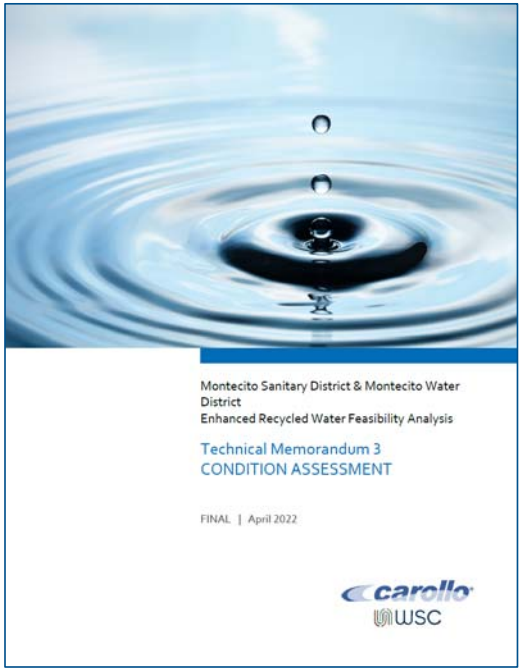
Condition Score	General Description[1]
1 (Best)	Excellent Installed with very little wear. Fully operable, well maintained, and consistent with current standards. Little wear shown and no further action required.
2	Good Sound and well maintained but may be showing slight signs of wear. Delivering full efficiency with little or no performance deterioration. Only minor renewal or rehabilitation may be needed.
3	Moderate Functionally sound and acceptable and showing normal signs of wear. May have minor failures or diminished efficiency and with some performance deterioration or increase in maintenance cost. Moderate renewal or rehabilitation needed.
4	Poor Functions but requires a high level of maintenance to remain operational. Shows abnormal wear and is likely to cause significant performance deterioration in the near term. Replacement or major rehabilitation needed.
5	Very Poor Effective life exceeded and/or excessive maintenance cost incurred. A high risk of breakdown or imminent failure with serious impact on performance. No additional life expectancy with immediate replacement required.



TM 3 – MSD Condition Assessment



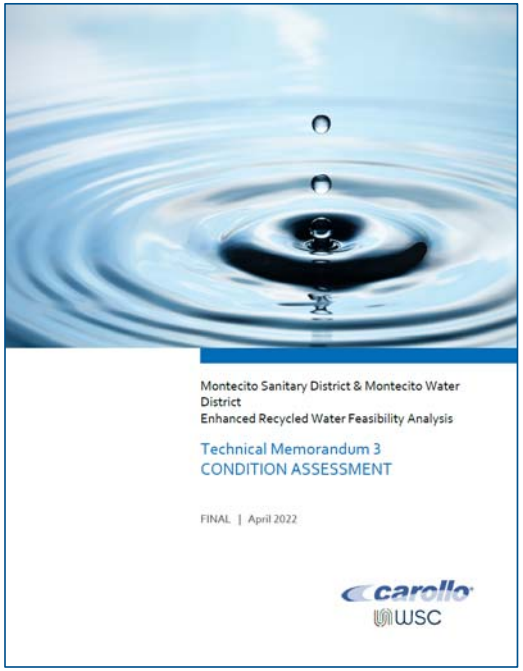
	IPS	Secondary Treatment	RAS/ WAS	Disinfection	Solids Handling	Control & Admin Building	Ancillary Structures
5			1		2	5	1
4	4	3		1			2
3.5		4					
3	3	4	2	4	1	1	
2	8		4		3	1	
1			1		2		



TM 3 – MSD Condition Assessment

Influent Channel

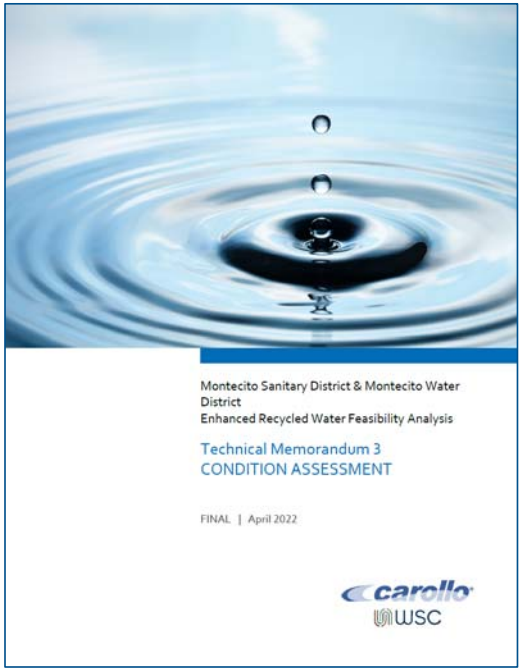
IPS Pump Room Baseplate



TM 3 – MSD Condition Assessment

Aeration Basin 1

Aeration Basin 2



TM 4 – Evaluation of MSD Performance and Capacity

- Evaluation of treatment system performance of the MSD WWTP

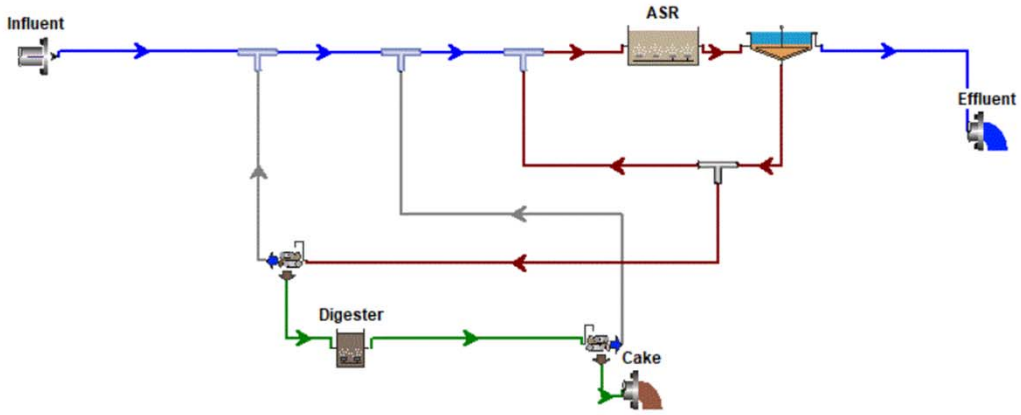
- Evaluation of treatment system capacity of the MSD WWTP

TM 4

TM 4 – Evaluation of MSD Performance and Capacity

- MSD historical flows and loads were reviewed and BioWin model has been developed
- MDS plant staff performed an extensive water quality QA/QC to verify influent characteristics
- Model is being recalibrated with the new data to assess the plant's capacity and TM is being drafted

TM 4

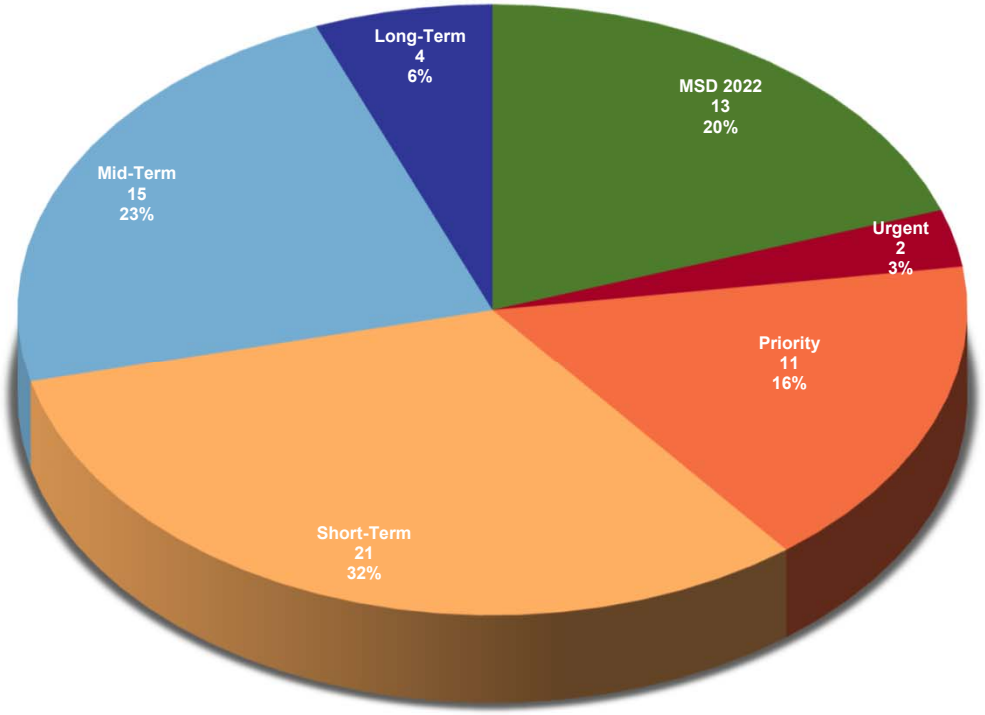


TM 5 – Cost for Rehabilitation and 30-Year Operations

- Develop a prioritized capital improvement plan (CIP)
- Develop operating costs

TM 5

TM 5 – Cost for Rehabilitation and 30-Year Operations

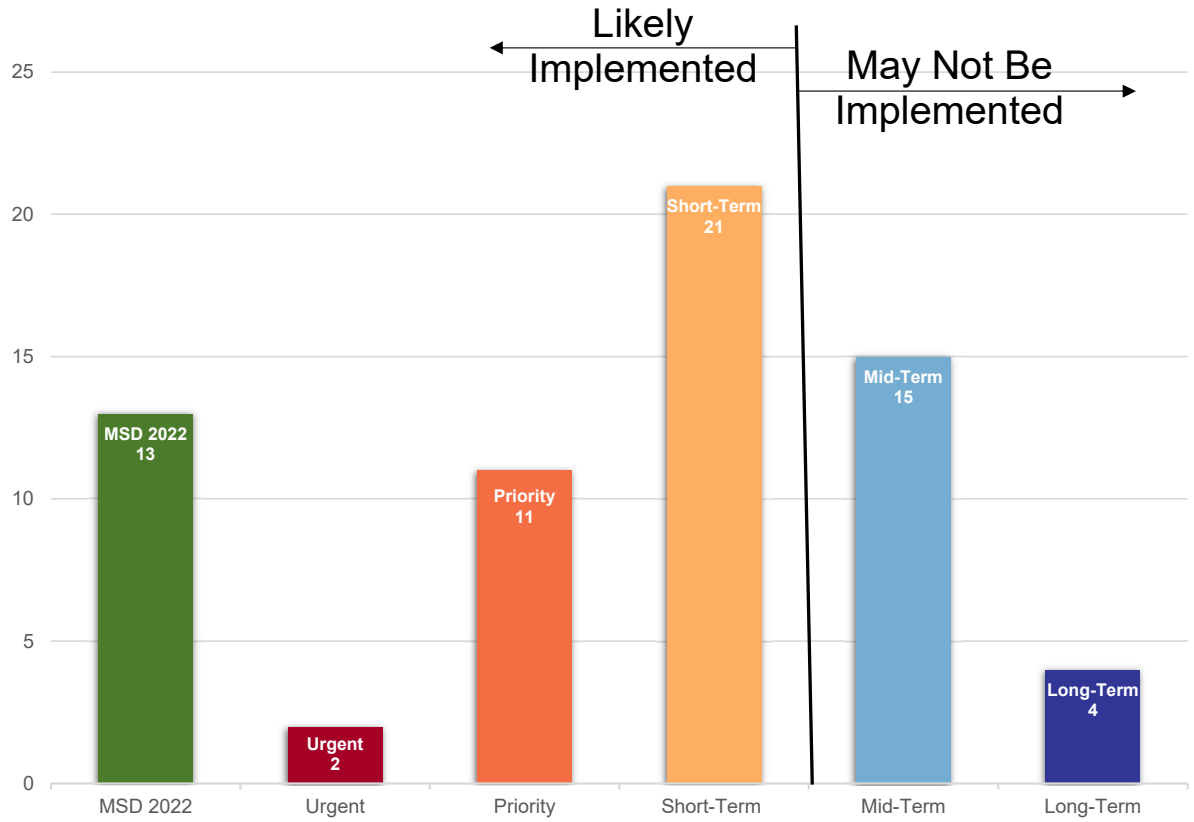


TM 5

Planning Category	Timeline (Years)
MSD 2022	2022
Urgent	0-2
Priority	3-5
Short-Term	6-10
Mid-Term	11-20
Long-Term	20+

- Electrical and instrumentation and control have highest concentration of assets in very poor condition and comprise most of the MSD 2022 capital planning group assets.

TM 5 – Cost for Rehabilitation and 30-Year Operations

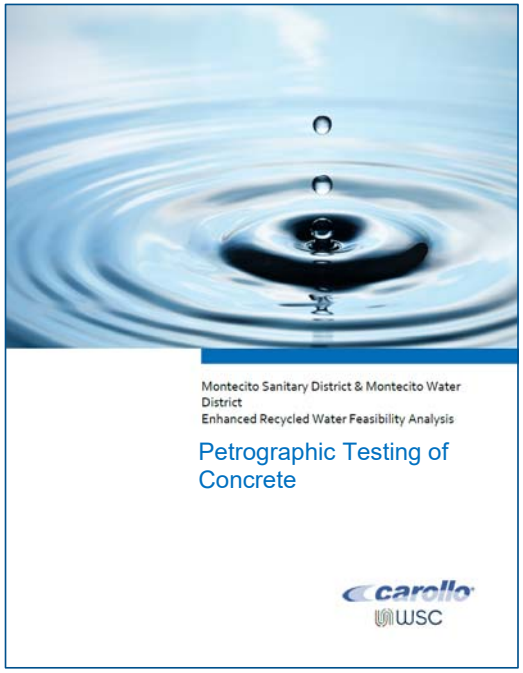


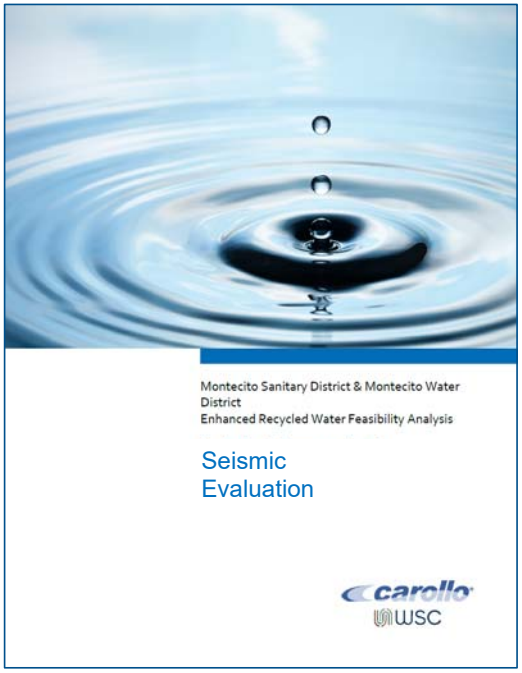
TM 5

Planning Category	Timeline (Years)
MSD 2022	2022
Urgent	0-2
Priority	3-5
Short-Term	6-10
Mid-Term	11-20
Long-Term	20+

- Projects on the 0 to 10-year horizon will likely be implemented regardless of study outcome.
- Projects on 10+ year horizon will be dependent on study outcome.

TM 5 – Cost for Rehabilitation and 30-Year Operations



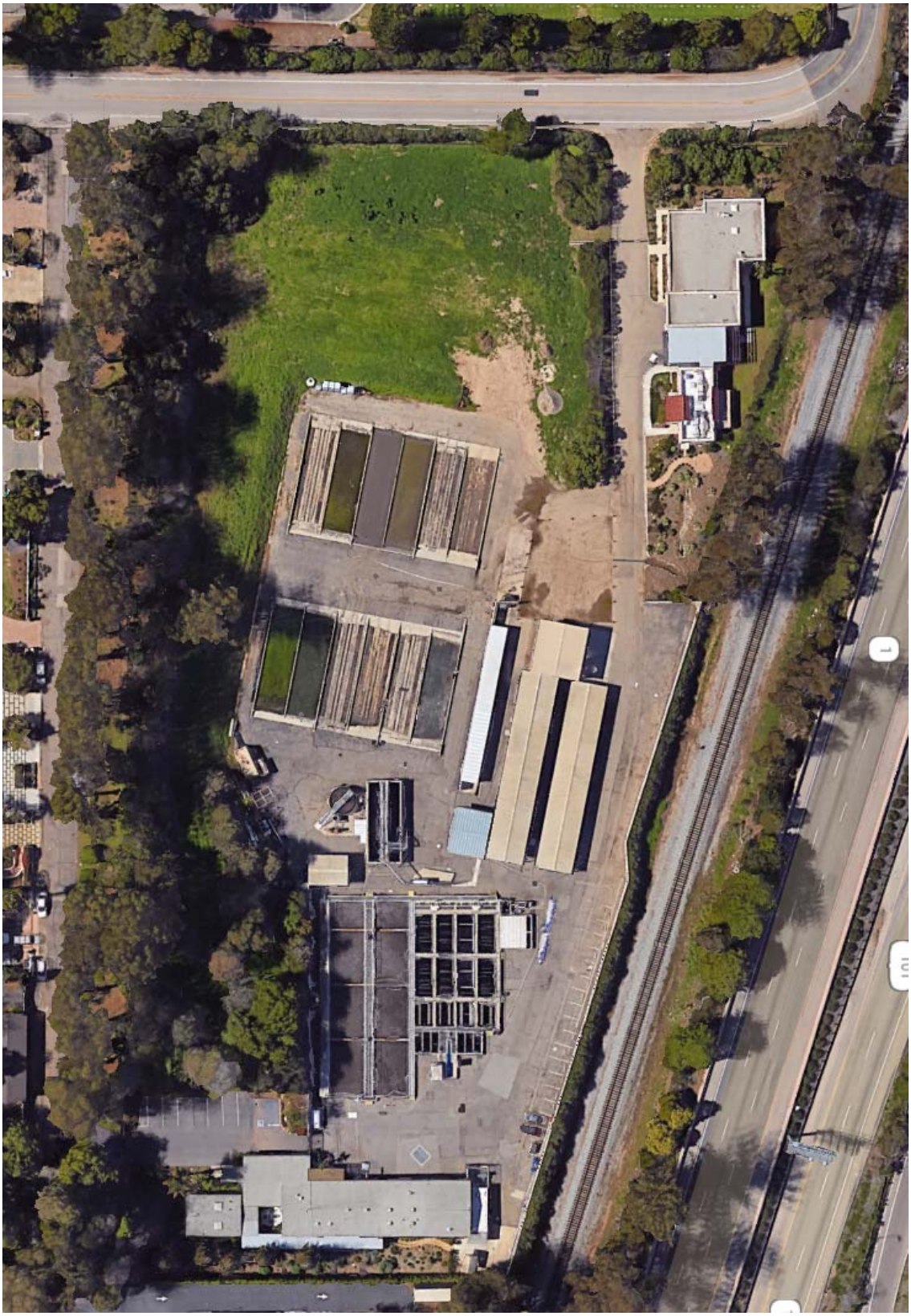


Recommended **Future** Additional Evaluation

- Petrographic Testing of Concrete
- Seismic Evaluation

TM 6 – MBR Construction and 30-year Operations

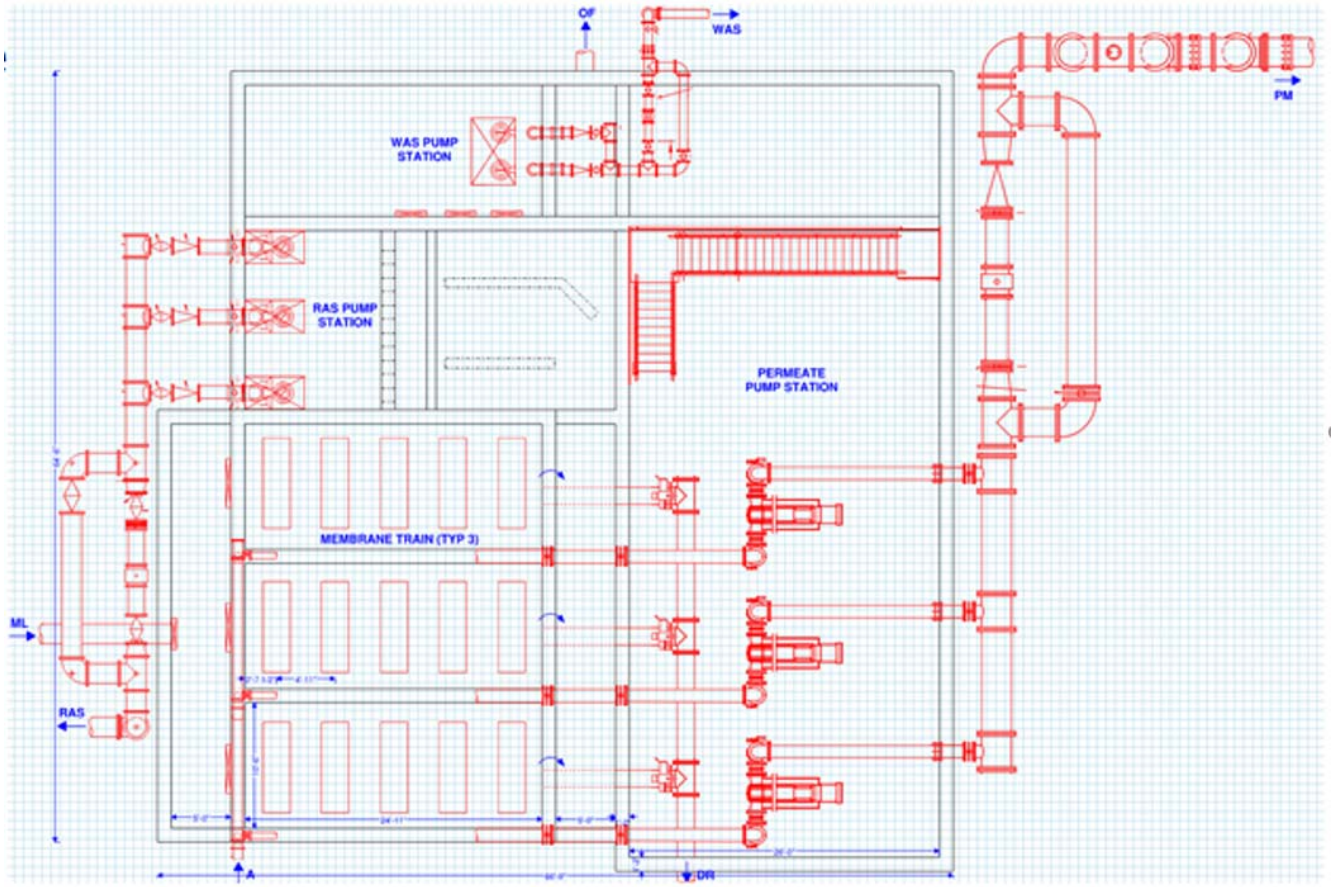
- Evaluate MBR systems and set membrane design criteria
- Lay out “Greenfield” and Retrofit MBR systems
  - Includes construction sequencing
- Develop construction and operational costs for a new MBR WWTP




Future AWPF
MBR and Auxillaries
Recycled Water Storage
Storage for DPR Dilution
Raw Wastewater Equalization
New Screening


Future AWPF
New Chem
Membrane Tank
Recycled Water Storage
Bioreactor
Storage for DPR Dilution
EQ
New Screening

TM 6 – MBR Construction and 30-year Operations



TM 6

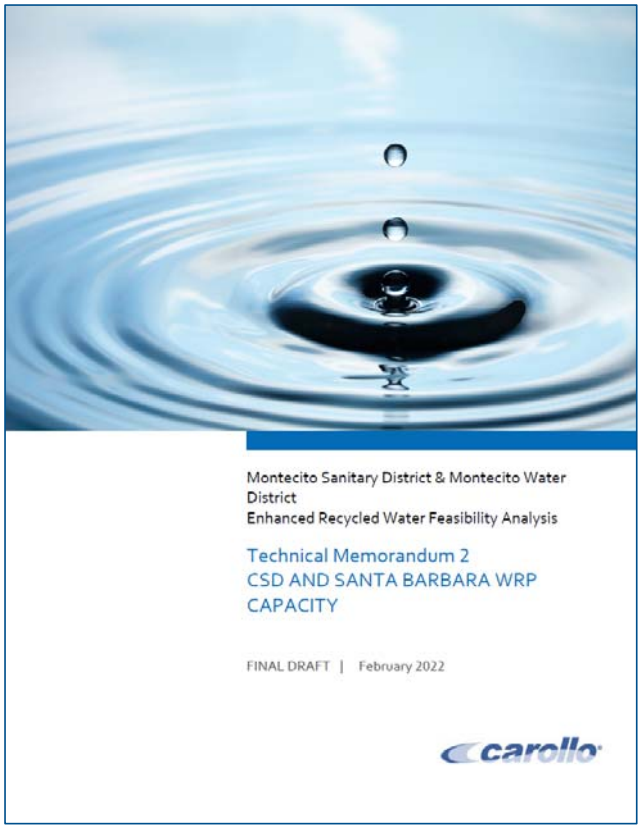
Water Reuse Tasks

- TM 2 – CSD and Santa Barbara WRP Capacity
- TM 7 – O&G Treatment at MSD
- TM 8 – Recycled Water Treatment Options
- TM 9 – Infrastructure Analysis

Discussion

TM 2 – CSD and Santa Barbara Capacity Analysis

- Review influent wastewater flows for Santa Barbara and CSD
- Consider if there is available capacity at both locations for MSD flows, either equalized or unequalized



TM 2 – CSD and Santa Barbara Capacity Analysis

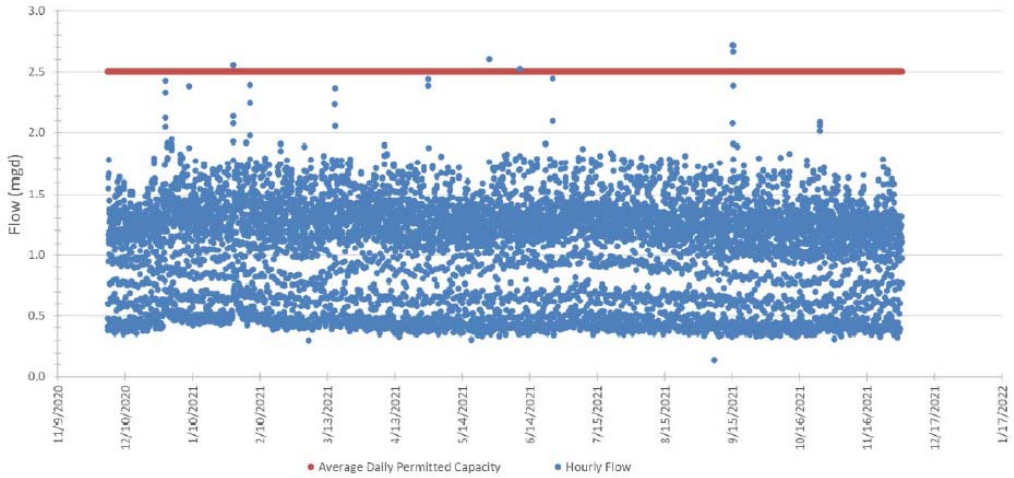
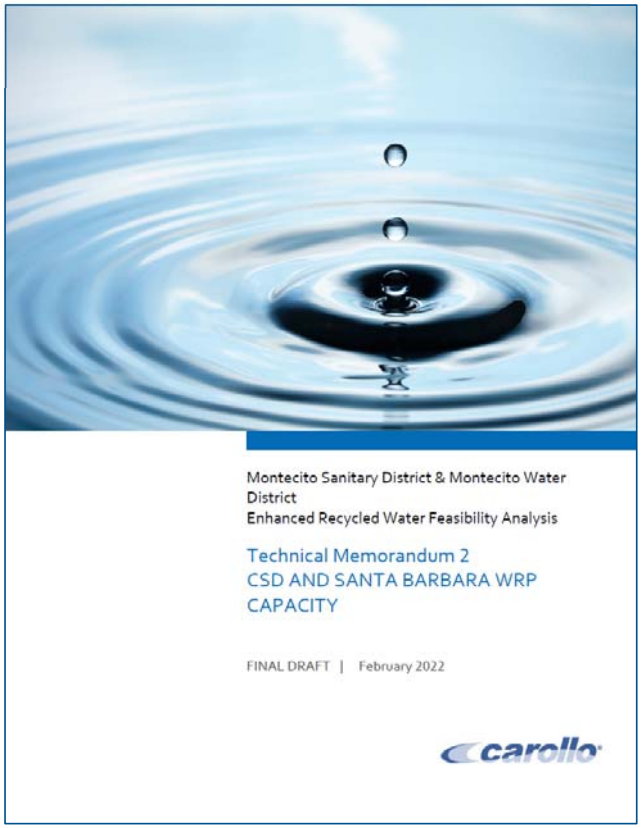


Figure 2.2 Hourly Influent Flow to Carpinteria WWTP – December 2020 to December 2021

- CSD has some limited additional capacity
- Incorporation of MSD flows would require 100% equalization, if it is deemed acceptable by CSD
- Connection costs not (yet) estimated



TM 2 – CSD and Santa Barbara Capacity Analysis

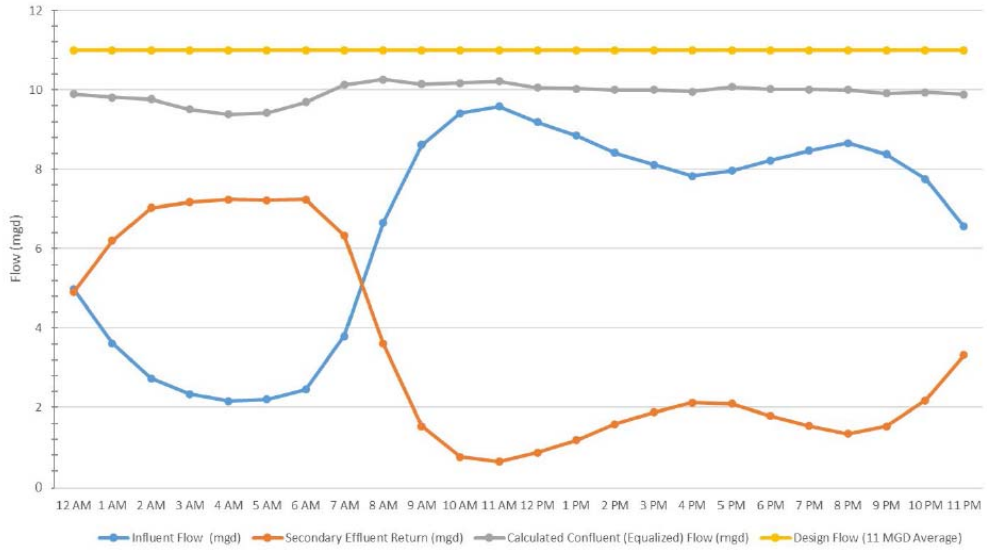
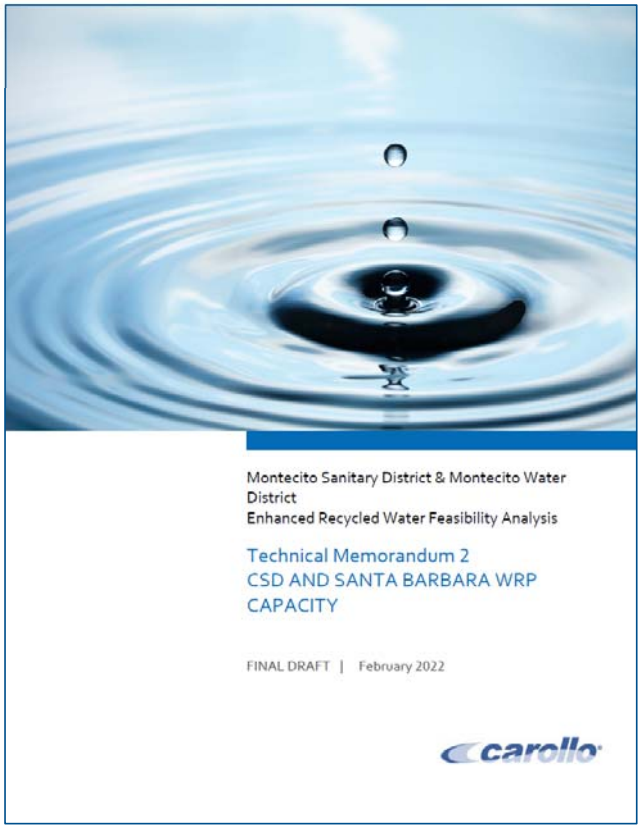


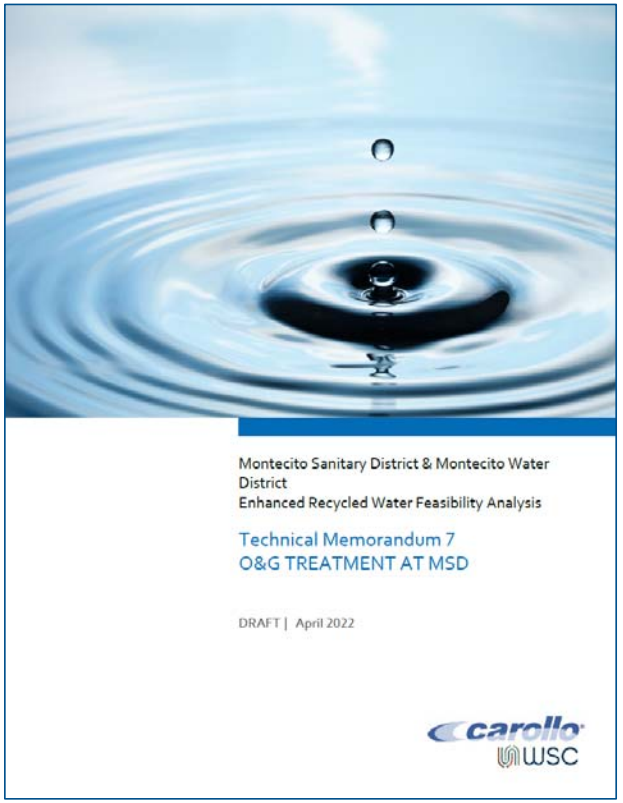
Figure 2.4 Average Influent Flow to El Estero WRP – October 2021

- SB El Estero has capacity to take MSD flow.
- Some equalization is needed due to conveyance limitations and also brings added value to SB



TM 7 – O&G Treatment at MSD

- O&G impacts membrane treatment…and membrane treatment is needed for TDS reduction
- Review of O&G data
- Develop and evaluate primary DAF ahead of MSD biological treatment
- Develop and evaluate tertiary DAF downstream of MSD biological treatment



TM 7 – O&G Treatment at MSD

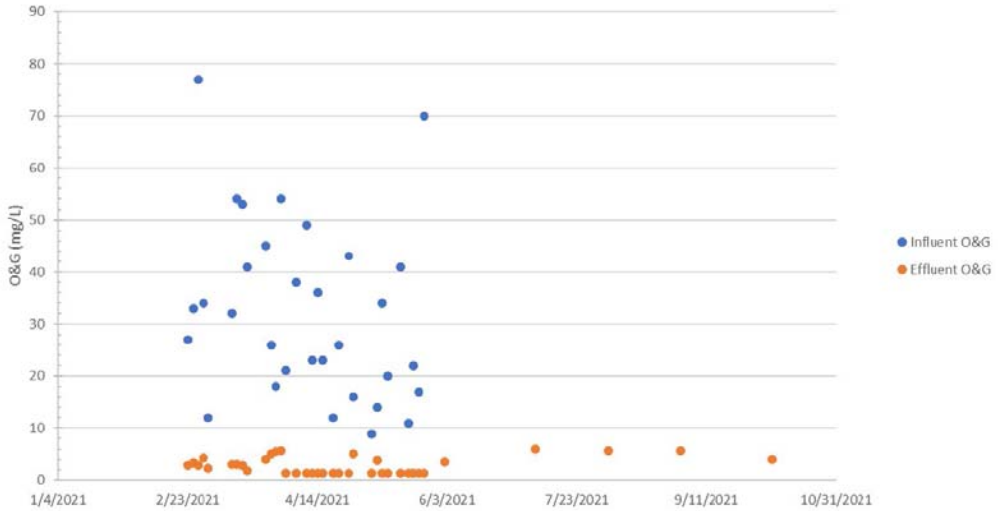
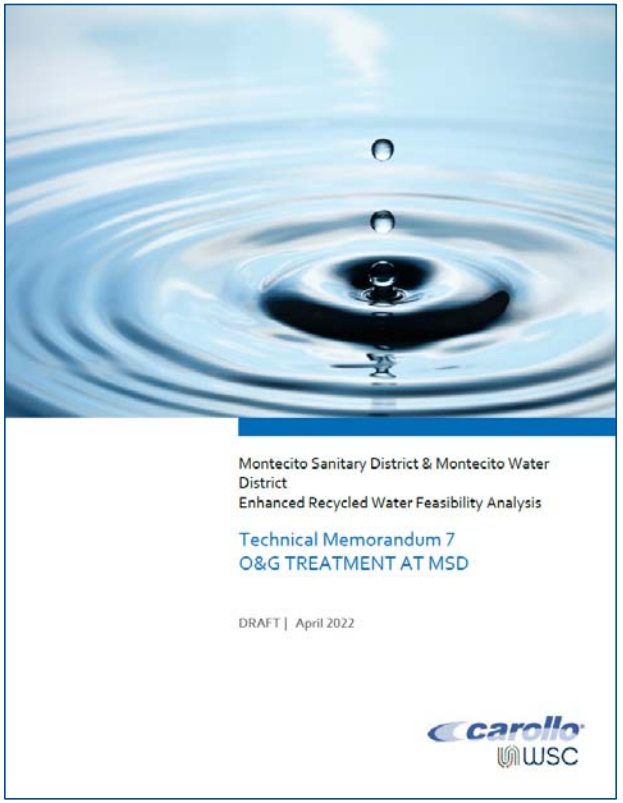


Figure 7.2 MSD WWTP O&G Data from February 2021 to October 2021



- Variable O&G into the WWTP
- Low level (but significant) O&G after the WWTP

TM 7 – O&G Treatment at MSD

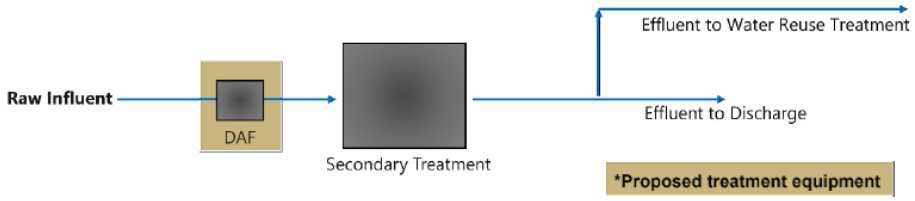


Figure 7.8 Alternative 1: Primary DAF Full Flow Simplified PFD

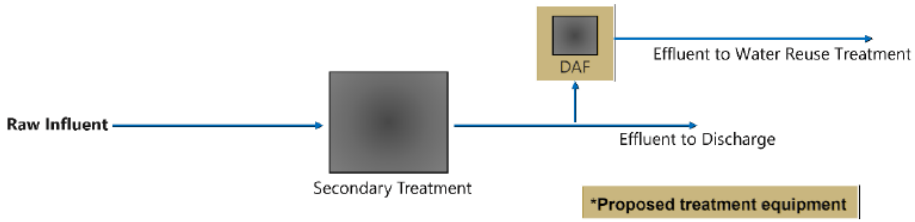


Figure 7.9 Alternative 2: Secondary DAF Simplified PFD

$6M to $6.7M

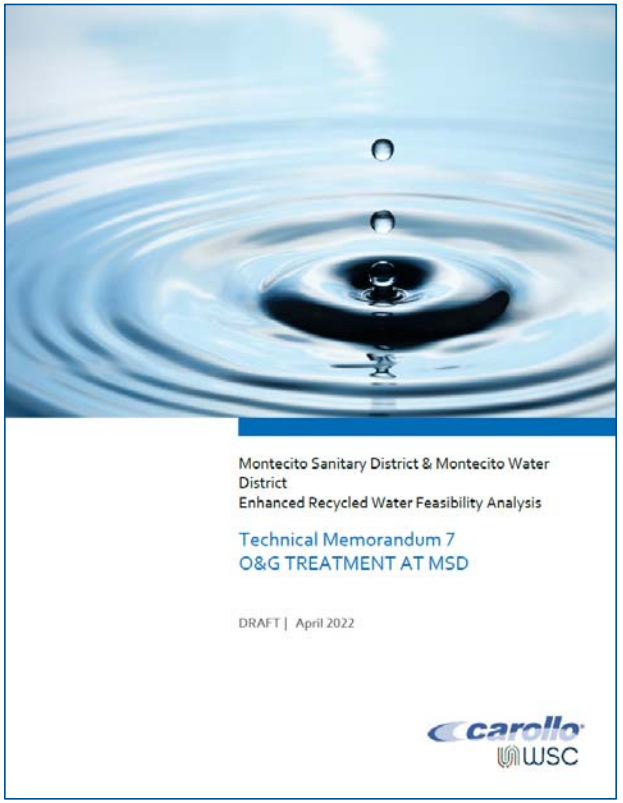
$1.3M to 1.4M

Construction Costs

Table 7.2 DAF Treatment Criteria

Treatment Criteria	Units	Alternative 1: Primary DAF Full Flow	Alternative 2: Secondary DAF ADWF
Max Instantaneous Flow	mgd (gpm)	8.76	0.7
Max Hourly Flow	mgd (gpm)	6.29	0.7
Effluent O&G Goal	mg/L	<1.4	<1.4

Notes:
Abbreviation: gpm - gallons per minute.

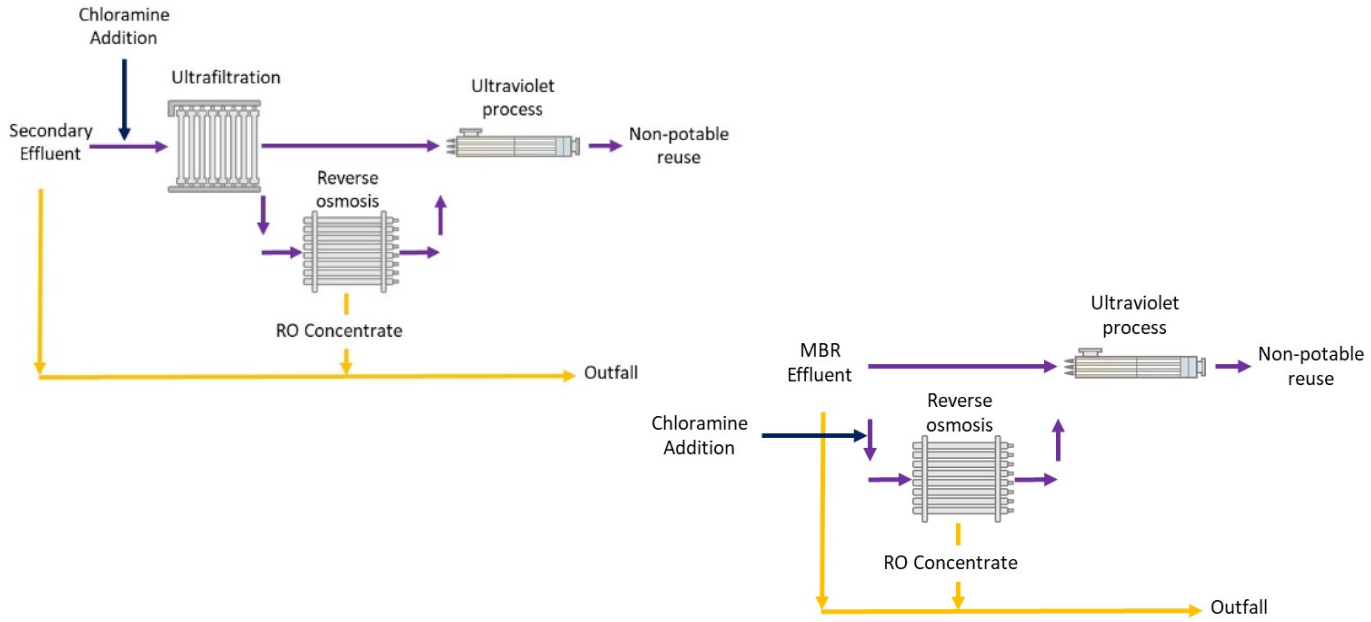


TM 8 – Recycled Water Treatment Options

- Evaluate NPR, IPR, and DPR Treatment at MSD
- Evaluates DPR treatment at Santa Barbara
- Includes integration of WTPs into DPR efforts

TM 8

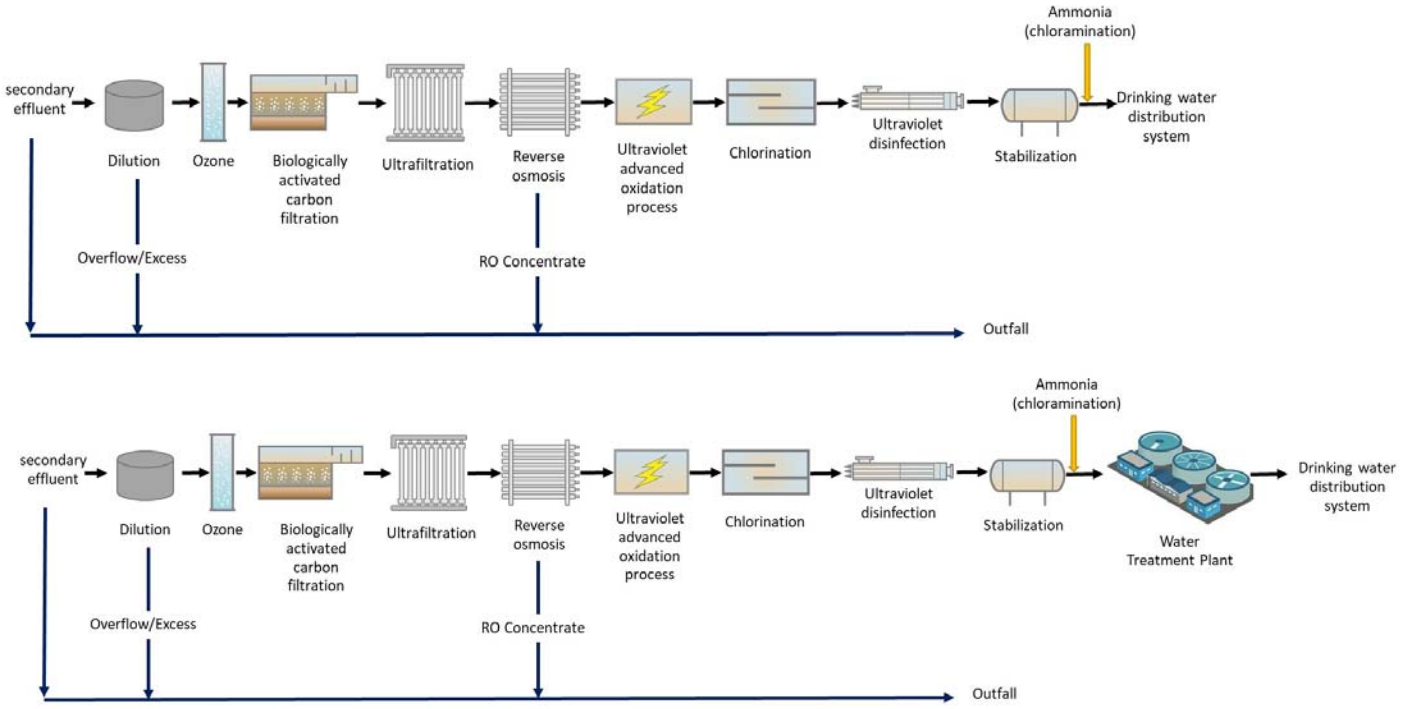
TM 8 – Recycled Water Treatment Options



TM 8

- NPR targeting 50% reduction in TDS (from 1,400 to 700 mg/L), along with reduction of chlorides
- System readily expandable for IPR
- Analysis can include no RO if acceptable for irrigation

TM 8 – Recycled Water Treatment Options



TM 8

- DPR can, but does not need to, include the existing WTPs
- Additional treatment lifecycle costs for DPR can be lower than NPR/IPR conveyance infrastructure

TM 9 – Infrastructure Analysis

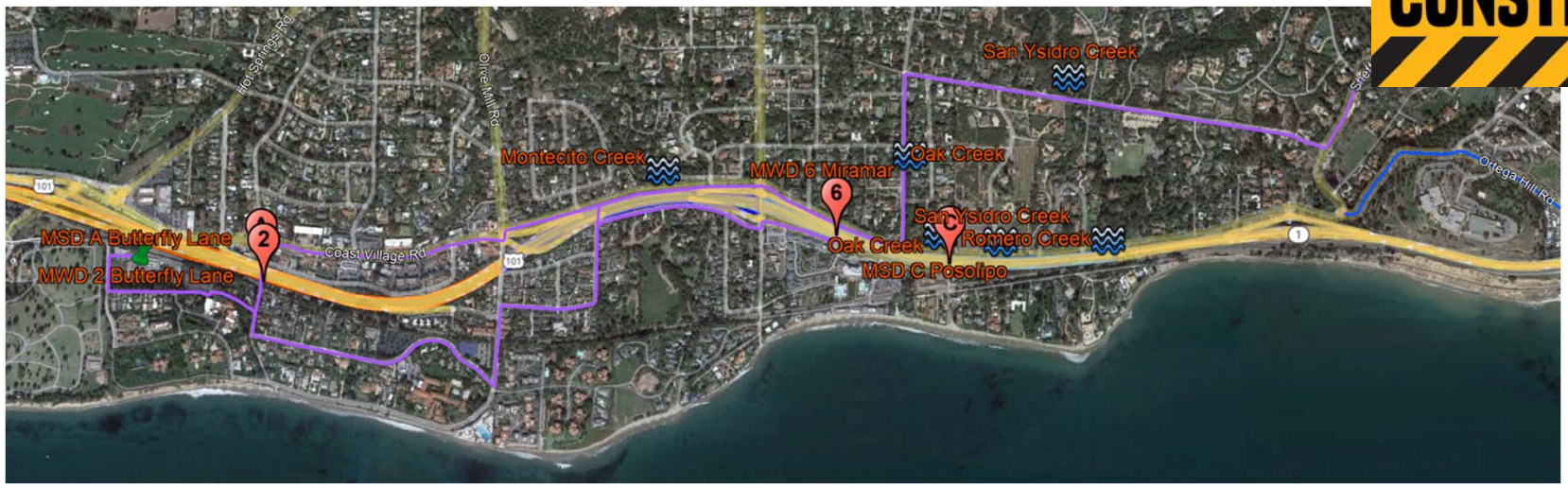
TM9 addresses infrastructure for:

- NPR in Montecito (pipelines, customers)
- IPR in Carpinteria (equalization, pipelines, wells, exchange)
- DPR in Montecito (pipelines)
- DPR in Santa Barbara (equalization, sewers)

TM 9

Status

- Evaluated Highway 101 crossings (applies to all alternatives except City DPR)

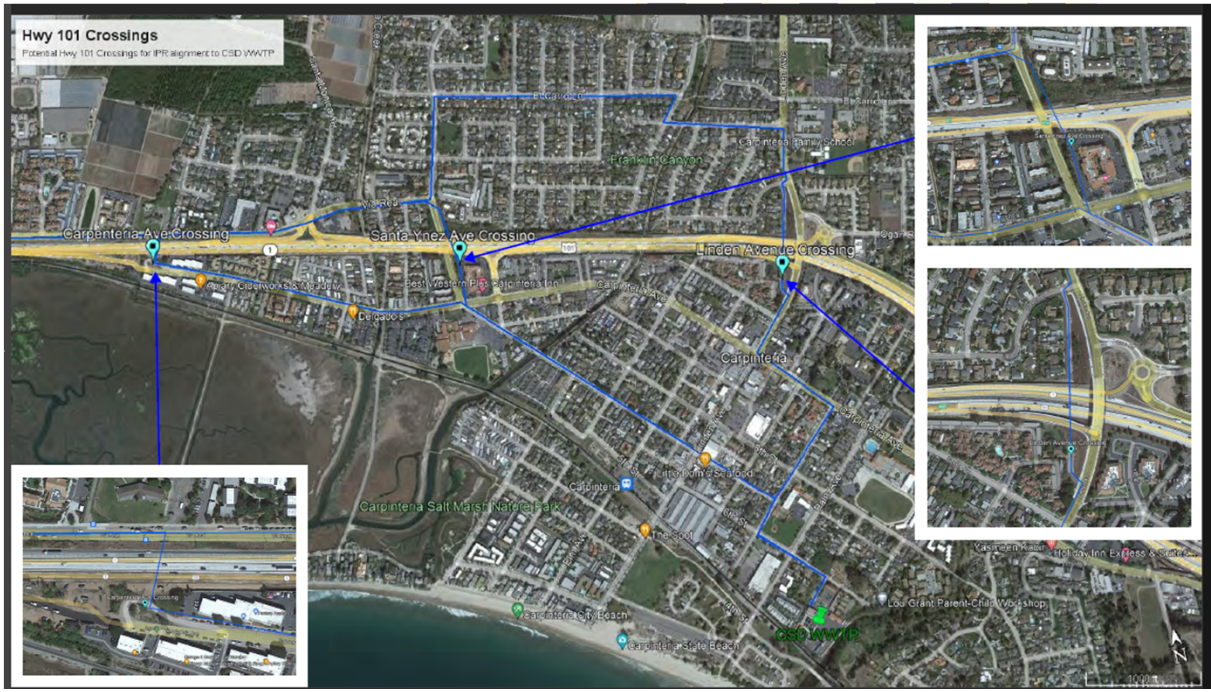


TM 9 – Infrastructure Analysis

TM 9

Status (cont.)

- NPR in Montecito
  - Met with Valley Club; Facility sizing pending Birnam Woods meeting
  - Recycled water quality assumptions drive treatment assumptions
- IPR in Carpinteria
  - Preliminary alignments and well locations defined



TM 9 – Infrastructure Analysis

TM 9

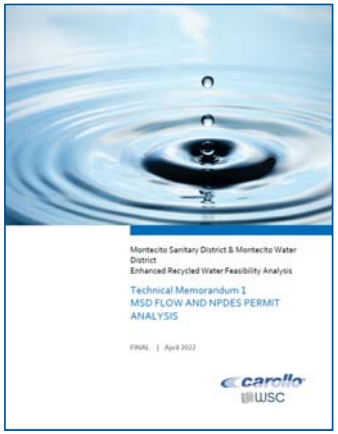
Status (cont.)

- DPR in Montecito
  - Pipelines assumed similar to RWFP
- DPR in Santa Barbara:
  - Defined multiple options to convey water to City WRF
    - Raw wastewater – with and without equalization at CSD WWTF
    - Secondary effluent – with and without releasing at night (per City request)
    - City is interested in potential conveyance partnership to address their collection system issues

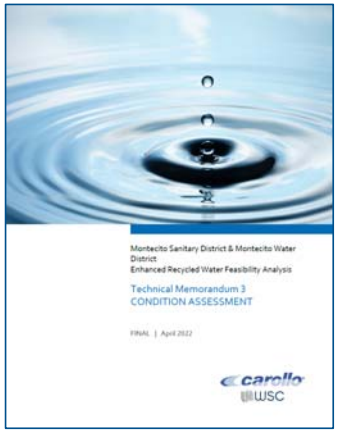
“Mini” Master Plan

- TM 1 – MSD Flow and NPDES Permit Analysis
- TM 3 – MSD Condition Assessment
- TM 4 – Evaluation of MSD Performance and Capacity
- TM 5 – Cost for Rehabilitation and 30-year Operations
- TM 6 – Cost for MBR Construction and 30-year Operations

Mini Master Plan Looking at Performance and Capacity of MSD WWTP



- TM1
- Flows & Loads
- NPDES
- Outfall



- TM3
- Assess critical infrastructure at the MSD WWTP

TM 4

- TM4
- Evaluation of treatment system performance of the MSD WWTP
- Evaluation of treatment system capacity of the MSD WWTP

TM 5

- TM5
- Prioritized capital improvement plan (CIP) for MSD WWTP
- Develop operating costs for MSD WWTP

TM 6

- TM6
- Evaluate MBR systems and set membrane design criteria
- Lay out “Greenfield” and Retrofit MBR systems
- Develop construction and operational costs for a new MBR WWTP

Mini Master Plan details to be provided in the 4/28/22 (Thursday) MSD Board Meeting