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BEFORE THE PUBLIC UTILITIES COMMISSION

OF THE STATE OF CALIFORNIA

Application of California-American Water Company (U210W) for Approval of the Monterey Peninsula Water Supply Project and Authorization to Recover All Present and Future Costs in Rates.	A.12-04-019 (Filed April 23, 2012)

AMENDED APPLICATION OF CALIFORNIA-AMERICAN WATER COMPANY (U210W)

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Attorneys for Applicant

Date: March 14, 2016

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AMENDED APPLICATION OF
CALIFORNIA-AMERICAN WATER COMPANY (U210W)

I. INTRODUCTION

The *Assigned Commissioner's Ruling Directing California-American Water Company to Amend Application with New Project Description* was filed in this matter on February 22, 2016 ("February 22 Ruling"). Pursuant to the February 22 Ruling, California-American Water Company ("California American Water") submits this amended Application.

II. DISCUSSION

On April 23, 2012, California American Water filed Application No. ("A.") 12-04-019 ("April 23, 2012 Application"), requesting California Public Utilities Commission ("Commission") approval of the Monterey Peninsula Water Supply Project ("MPWSP") and authorization to recover all present and future costs for the MPWSP in rates. The April 23, 2012 Application contained "Appendix H: Updated CEQA Project Description," which contains the MPWSP Project Description, as well as other Appendices relating to the Project Description.

The February 22 Ruling notes the Commission's Energy Division and consultant are conducting the environmental review required under California's Environmental Quality Act, and, as part of that review process, California American Water recently provided the Energy Division with an amended project description.[1] The February 22 Ruling then ordered California

[1] February 22 Ruling, at pp. 1-2.

American Water to "file and serve an amended application in this proceeding that provides a project description reflecting its proposed project configuration."[2]

Through this Amended Application, California American Water provides an updated project description reflecting the proposed project configuration. California American Water does so by providing updated versions of Appendices B (Project Schedule), C (Project Map), E (Project Cost Estimate), and H (Project Description) (individually and collectively, "Updated Appendices"), which are included as Attachments hereto. California American Water previously provided the revised Project Schedule and Cost Estimate (Updated Appendices B and E) to the parties in this proceeding.[3] The Updated Appendices B, C, E, and H shall replace in their entirety the corresponding Appendices in the April 23, 2012 Application.[4] The Updated Appendices shall also supersede any portions of the April 23, 2012 Application with which the Updated Appendices are inconsistent. Finally, the Application, showing changes in red-lined and clean fashion, will be posted to the "watersupplyproject.org" website under the documents tab.

Date: March 14, 2016

By: *<u>/s/ Sarah E. Leeper</u>*

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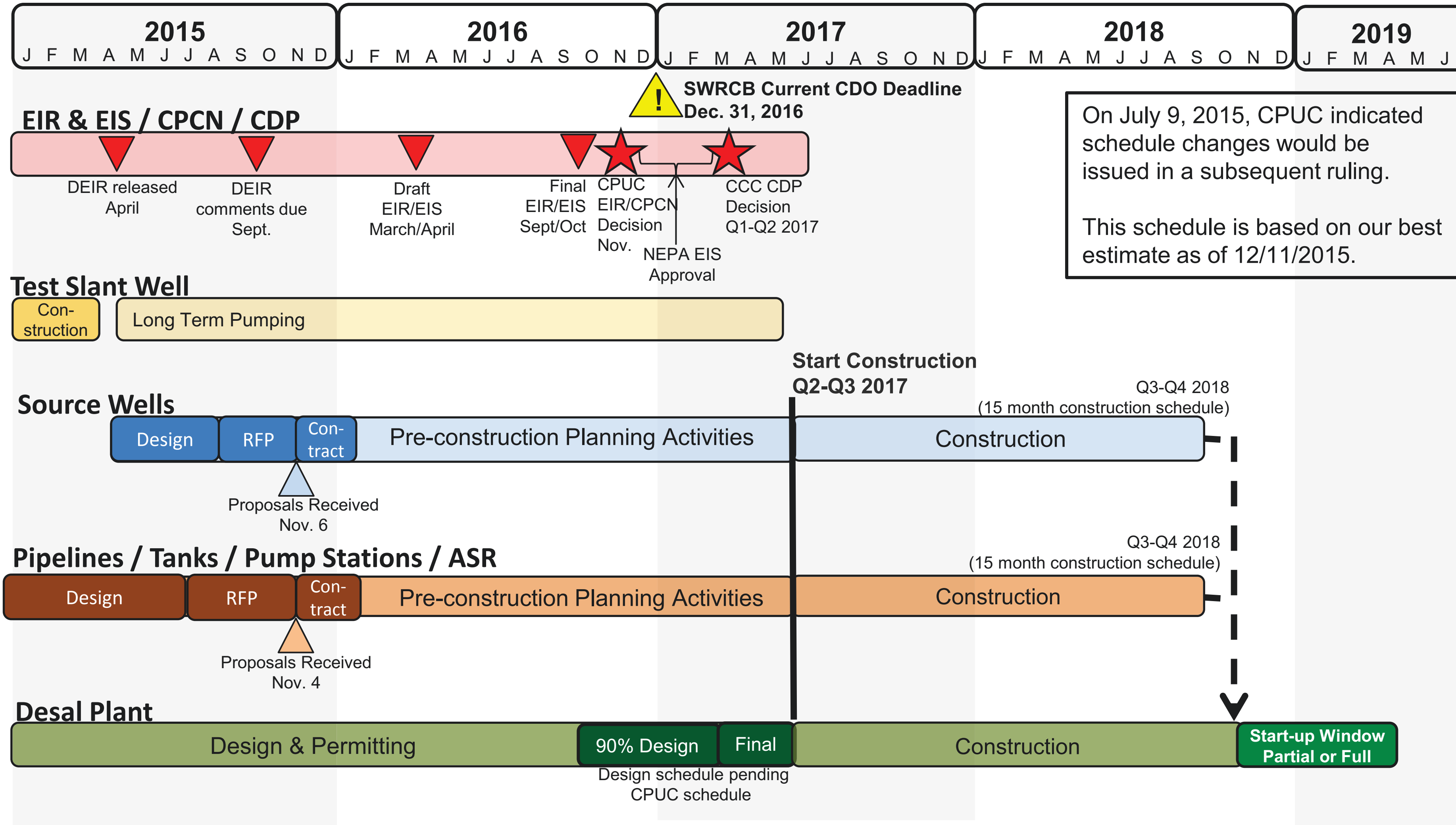
[2] February 22 Ruling, at p. 2.

[3] Specifically, (1) the Project Schedule in Updated Appendix B was provided to parties on December 15, 2015 with the Supplemental Testimony of Richard Svindland as "Attachment 2," thereto; (2) the Project Cost Estimate, Updated Appendix E, was also provided to parties on December 15, 2015, with the Supplemental Testimony of Richard Svindland, as "Attachment 1," thereto.

[4] The project cost estimates in Appendix E do not include Allowance for Funds Used During Construction ("AFUDC"). The estimated AFUDC is reflected in recent calculations provided in the Supplemental Testimony of Jeffrey T. Linam, served on January 22, 2016.

APPENDIX B
(Updated)

MPWSP Anticipated Schedule



Note: The schedule is based on the information and assumptions available at time of update and is accurate to +/-6 months.

Updated December 11, 2015

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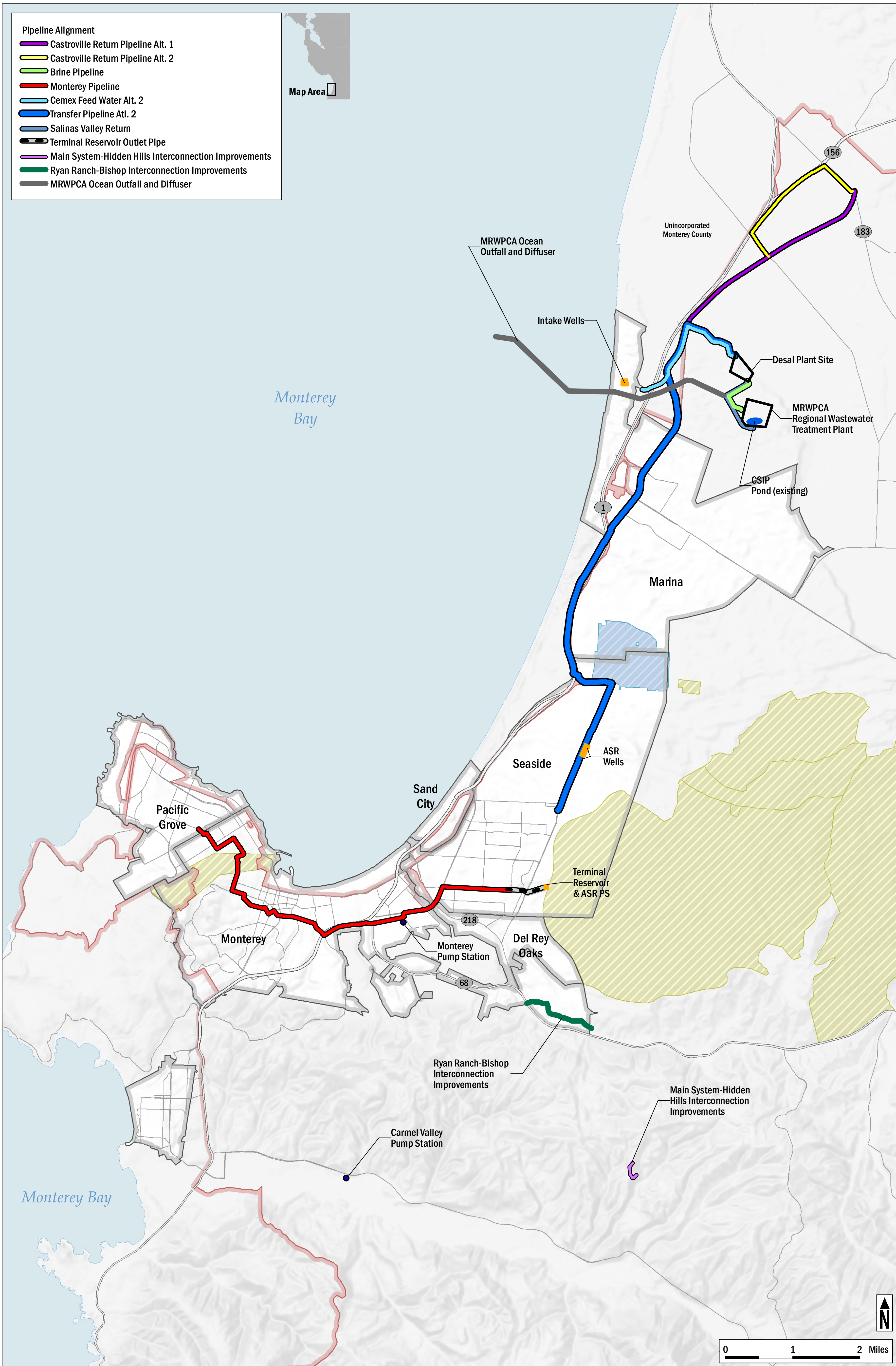
APPENDIX C
(Updated)



URS
California American Water
Transmission Mains and Aquifer Storage & Recovery (ASR) Facilities
MONTEREY PENINSULA WATER SUPPLY PROJECT, MPWSP

PROJECT OVERVIEW
Project Pipeline Alignments

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APPENDIX E
(Updated)

M E M O R A N D U M

To: Richard Svindland, CAW

From: Ian Crooks and Chris Cook, P.E., CAW

Date: December 14, 2015

Subject: Monterey Peninsula Water Supply Project (MPWSP)

Capital and O&M Cost Estimate Update

OBJECTIVE

The objective of this technical memorandum (TM) is to update the Monterey Peninsula Water Supply Project's (MPWSP, or Project) capital and operation and maintenance (O&M) estimated costs with additional information received since the previous TM prepared by RBF Consulting (RBF) dated January 9, 2013.

BACKGROUND

For background on capital and O&M cost estimating work completed prior to 2013, refer to the background section of the TM by RBF from January 9, 2013. Since the RBF report, a design build (DB) contract has been signed for the desalination plant that is currently at 60% construction documents (CD). California American Water (CAW) has also received proposals from contractors for construction of the source water slant wells and conveyance facilities which include the "CAW-Only Facilities".

PROJECT FACILITIES

The northern facilities capital cost estimates in this memorandum are based on Table 1 below. For the previous facilities description, refer to Table 2 of RBF's TM dated January 9, 2013.

Table 1
Summary Description of Northern Facilities

Facility	6.4 MGD Desalination Option	9.6 MGD Desalination Option
INTAKE WELLS & SUPPLY/RETURN FACILITIES		
Slant Test Well	790 LF, 19-Deg, 10-Inch, Diam., 2,000 gpm	
Slant Intake Wells and Pipelines	Seven 10-in. wells, 1000 LF, 14-deg,2000 gpm	Nine 10-in. wells, 1000 LF, 14-deg, 2000 gpm
Submersible Pump and Motor	Eight 2,000 gpm, 300 hp	Ten 2,000 gpm, 300 hp
Intake Electrical and I&C	RTUs, VFDs, Cable, MCCs	
Feedwater Pipeline	15,500 LF of 42-inch. diamond 30-inch HDPE	
Brine Return & SVR Pipelines	5,000 LF of 24-inch diam. & 6,200 LF of 12-inch	
Connection to Outfall	Metering Structure & outfall connection	
DESALINATION PLANT		
Granular Media Filters	7 pressure filters, 12 ft dia. x 48 ft long	10 pressure filters, 12 ft dia. X 48 ft long
Filtered Water Tanks	2 tanks x 0.3 MG circular, lined steel, above-ground	
Filtered Water Pumps	2 pumps x 7.9 MGD w/VFDs; 2 pumps x 4.0 MGD w/VFDs	2 pumps x 11.9 MGD w/VFDs; 2 pumps x 5.9 MGD w/VFDs
Cartridge Filters	5 filters	7 filters
Filter Backwash System	2 pumps x 15.6 MGD, constant speed	
Reverse Osmosis System	1st Pass + 40% to 2nd Pass 5 modules x 1.6 MGD w/VFDs; energy recovery on 1st Pass	1st Pass + 40% to 2nd Pass 7 modules x 1.6 MGD w/VFDs; energy recovery on 1st Pass
Post Treatment System	UV Disinfection, CO2, Ca(OH)2, NaOCl, NaOH, ZnPO4	UV Disinfection, CO2, Ca(OH)2, NaOCl, NaOH, ZnPO4
Chemical Storage and Feed	NaOCl (onsite generation), NaHSO3, CO2, Ca(OH)2, NaOH, ZnPO4, H2SO4, Membrane Antiscalant, Membrane Cleaning Solutions	
Filter Backwash Reclamation System	2 reclamation basins x 0.34 MG open, lined with decant; 3 reclamation pumps x 0. 5 MGD w/ VFDs	
Brine Storage and Disposal	1 equalization basin x 3 MG open, lined; 2 pumps x 6 MGD w/VFDs; dechlorination system; aeration system	
Treated Water Tanks	2 tanks x 0.75 MG circular, concrete, baffled, above-ground	
Treated Water Pump Station	2 pumps x 3.2 MG w/ VFDs; 2 pumps x 1.6 MGD w/ VFDs	2 pumps x 4.8 MGD w/ VFDs; 2 pumps x 2.4 MGD w/VFDs
Salinas Valley Pump Station	2 pumps x 1.2 MG w/ VFDs;	2 pumps x 1.2 MG w/ VFDs;
Emergency Power (for DWPS)	500 kW diesel generator	750 kW diesel generator
Admin/O&M/Lab Building	6,000 SF, single story, 18 ft high	
Filter Building	3,500 SF, single story, 24 ft high	4,000 SF, single story, 24 ft high
RO and Chemical Building	30,000 SF, single story, 30 ft high 19,200 SF, 26 Ft High	
DESALINATED WATER CONVEYANCE PIPELINE (TO CAW)		
Transfer Pipeline (desal to Seaside border)	34,000 LF of 36-inch diam.	

The project facilities south of where the Transfer Pipeline meets the Seaside border, described as the "CAW-Only Facilities", are summarized in table 2 below.

Table 2
Summary Description of Southern "CAW-Only Facilities"

Facility	6.4 MGD Desalination Option	9.6 MGD Desalination Option
CAW Conveyance System		
Transfer Pipeline (Seaside Border to Terminal Reservoir)	14,000 LF of 36-inch diam.	
Monterey Pipeline	35,000 LF of 36-inch diam.	
Monterey Pump Station	2 x 50 HP & 1 x 100 HP	
Valley Greens Pump Station	3 x 50 HP	
Terminal Reservoir		
Reservoir Structure	2 x 3 MG	
ASR System		
Wells 5 & 6	2 wells	
ASR Pipeline	13,000 LF of 16-inch diam.	

CAPITAL COST ESTIMATING METHODOLOGY AND GENERAL NOTES

Capital costs include construction costs, Land and ROW acquisition, and allowances for implementation, escalation, mitigation and contingencies. These cost estimates are built on the previous work done in RBF's January 9, 2013 technical memoranda, using similar costing spreadsheets. Base construction costs were updated with costs indicated in the desalination plant DB contract and proposals received for both the construction of source water slant wells and conveyance facilities. Additional development of the overall project design resulted in updating of configurations, process design, quantities and materials.

The following are additional cost conditions used for estimating allowances:

- **Implementation** costs were totaled to date and then a forecast estimate was added for the additional years to complete the project. The desalination plant engineering and mobilization costs were subtracted from the implementation costs to date, since they are included in the base construction DB contract. Most, if not all, of the design effort for a 9.6 MGD desalination project will be expended even if the smaller project is constructed. For this reason, the implementation costs were estimated to be the same for both the 9.6 MGD and 6.4 MGD desalination options.
- **Escalation Allowance** was added with 12.25% for the desalination plant and 4% for all other project components, except the ASR System.
- **Contingencies** were broken down between known and estimated costs with ten percent contingency for the sum of known base construction cost and twenty-five percent contingency for the sum of estimated base construction cost.
- **Mitigation** costs were reduced to zero percent since the mitigation risk has been transferred to the contractor via the plans and specification in which the contractors bid. For new mitigation items that may appear in the next version of the Draft EIR, the remaining Contingency budget will be used to cover those costs.

SUMMARY OF UPDATED CAPITAL COST ESTIMATES

The updated capital cost estimates for the 6.4 MGD and 9.6 MGD project options are summarized below and are compared with the estimated costs at the time of the Settlement. The 2012 Dollar total capital cost did not take into account the escalation allowance, which is simply indicated as "NA".

Table 3
Summary Capital Cost Estimate (2015 vs 2012 Dollars)

Item	Dec. 2015 Update (2015 Dollars)		Nov. 2013 Update (2012 Dollars)	
	6.4 MGD	9.6 MGD	6.4 MGD	9.6 MGD
Base Construction Costs				
Intake Wells/Supply/Return Facilities	$51 M	$ 58 M	$ 39 M	$ 47 M
Desalination Plant	$ 80 M	$ 87 M	$ 65 M	$ 84 M
Northern Transfer Pipeline	$14 M	$ 14 M	$ 11 M	$ 11 M
CAW Convey., Term. Reser., & ASR Systems	$ 71 M	$ 71 M	$ 53 M	$ 53 M
Base Construction Subtotal	$ 216 M	$ 229 M[1]	$ 168 M	$ 195 M
Implementation Costs	$ 52 M	$ 52 M	$ 43 M	$ 43 M
ROW/Land/Outfall	$ 15 M	$ 15 M	$ 8 M	$ 9 M
Escalation Allowance	$ 13 M	$ 15 M	NA	NA
Contingency Allowance	$ 26 M	$ 28 M	$ 42 M	$ 57 M
Mitigation Cost Allowance	NA	NA	$ 3 M	$ 3 M
Brine & Potrero Rd	see Note[2]	see Note[2]	$ 32 M	$ 32 M
Total Capital Cost	$ 322 M	$ 338 M[1]	$ 296 M	$ 338 M[1]

A further comparison breakdown of the individual base construction components are described in the following capital cost sections.

Intake Wells and Supply/Return Facilities

This category of facilities includes the facilities required to obtain and deliver raw water (feedwater) to the desalination plant, to convey intermittent pump-to-waste raw water from the intake wells to the MRWPCA outfall, to convey reverse osmosis RO concentrate (brine) from the desalination plant to the MRWPCA outfall, and to convey desalinated water from the desalination plant to the CSIP irrigation water storage basin. The expected one-time fee for connection to the MRWPCA outfall along with potential outfall improvements, have been added since the Settlement. The cost breakdown summary is indicated below in Table 4:

[1] The total does not equal the sum of the above line items due to rounding.
[2] A brine outfall modification cost has been included in the intake/discharge portion of the estimate. No further cost has been allocated for the Potrero Road pipeline due to the promising test well results. However, the budget amount is still needed to cover the increases in pipeline costs on the project.

Table 4
Intake Wells and Supply/Return Facilities Cost Estimate (2015 vs 2012 Dollars)

Item	Dec. 2015 Update (2015 Dollars)		Nov. 2013 Update (2012 Dollars)	
	6.4 MGD	9.6 MGD	6.4 MGD	9.6 MGD
Base Construction Costs				
Slant Test Well	$ 5.7 M	$ 5.7 M	$ 5.0 M	$ 5.0 M
Slant Intake Wells	$ 19.8 M	$ 25.1 M	$ 16.2 M	$21.6 M
Intake Pump Station	NA	NA	$ 2.9 M	$ 4.2 M
Well Mech. Vault & Assembly	$ 0.4 M	$ 0.5 M	NA	NA
Submersible Pump and Motor	$ 2.0 M	$ 2.5 M	NA	NA
Intake Electrical and I&C	$ 1.6 M	$ 2.0 M	NA	NA
Beach Facilities	NA	NA	$ 5.4 M	$ 6.1 M
Tunnel Under Dunes	NA	NA	$ 5.0 M	$ 5.0 M
Comparison Subtotal	$ 29.5 M	$ 35.8 M	$ 34.5 M	$ 41.9 M
Feedwater Pipeline	$ 10.6 M	$ 10.6 M	$ 2.7 M	$ 3.1 M
Brine, SVR Pipeline, & Outfall Connection	$ 4.2 M	$ 4.2 M	$ 1.9 M	$ 1.9 M
Outfall Improvements	$ 7.0 M	$ 7.0 M	NA	NA
Base Construction Subtotal	$ 51.3 M	$ 57.6 M	$ 39.1 M	$ 46.9 M
Implementation Costs	$ 13.7 M	$ 13.7 M	$ 9.4 M	$ 9.4 M
ROW/Land/Outfall	$ 5.1 M	$ 5.1 M	$ 2.9 M	$ 3.7 M
Escalation Allowance	$ 2.0 M	$ 2.2 M	NA	NA
Contingency Allowance	$ 7.1 M	$ 7.9 M	$ 10.0 M	$ 15.0 M
Mitigation Cost Allowance	NA	NA	$ 0.7 M	$ 0.7 M
Total Capital Cost	$ 79.2 M	$ 86.5 M	$ 62.1 M	$ 75.7 M

The items indicated as 'NA' are based on design updates or changes in governmental agency requirements.

Desalination Plant

This category of facilities includes the facilities required to receive, filter, and desalinate the feedwater pumped from the intake wells; condition and disinfect the desalinated water; process and/or recycle residual streams from the process; store and pump desalinated water; and house equipment and personnel.

Table 5
Desalination Plant Cost Estimate (2015 vs 2012 Dollars)

Item	Dec. 2015 Update (2015 Dollars)		Nov. 2013 Update (2012 Dollars)	
	6.4 MGD	9.6 MGD	6.4 MGD	9.6 MGD
Base Construction Costs				
Plant Inlet and Pretreatment	Included in DB	Included in DB	$ 5.4 M	$ 7.2 M
Reverse Osmosis System	Included in DB	Included in DB	$ 21.0 M	$ 29.3 M
Post Treatment System	Included in DB	Included in DB	$ 1.1 M	$ 1.3 M
Residuals Handling and Treatment	Included in DB	Included in DB	$ 1.1 M	$ 1.1 M
Clearwell PS, Clearwells and DWPS	Included in DB	Included in DB	$ 4.9 M	$ 6.2 M
Plant Infrastructure	Included in DB	Included in DB	$ 21.6 M	$ 26.4 M
Engineering, Mobilization/Demob.	$ 11.0 M	$ 11.2 M	$ 9.4 M	$ 12.1 M
Base Construction Subtotal	$ 79.8 M	$ 87.0 M	$ 64.5 M	$ 83.6 M
Implementation Costs	$ 18.0 M	$ 18.0 M	$ 16.7 M	$ 16.7 M
ROW/Land	$ 0.6 M	$ 0.6 M	$ 0.6 M	$ 0.6 M
Escalation Allowance	$ 8.4 M	$ 9.3 M	NA	NA
Contingency Allowance	$ 8.0 M	$ 8.7 M	$ 16.0 M	$ 25.2 M
Mitigation Cost Allowance	NA	NA	$ 1.0 M	$ 1.0 M
Total Capital Cost	$ 114.8 M	$ 123.6 M	$ 98.8 M	$ 127.1 M

The Updated Project Cost estimate has several cells indicating 'included in DB'. This is because CAW has a DB contract for the desalination plant, so the Base Construction Subtotal is fixed and not dependent on the breakdown of subcomponents.

The 2015 Dollar escalation allowance is based off of 3.5% over 3.5 years (12.25% total). This escalation allowance is multiplied by the difference of the Base Construction Subtotal and the Engineering, Mobilization/Demobilization cost.

Northern Transfer Pipeline

Table 6 shows the transfer pipeline from the Desalination Plant to the border of Seaside.

Table 6
Northern Transfer Pipeline Cost Estimate (2015 vs 2012 Dollars)

Item	Dec. 2015 Update (2015 Dollars)		Nov. 2013 Update (2012 Dollars)	
	6.4 MGD	9.6 MGD	6.4 MGD	9.6 MGD
Base Construction Costs	$ 13.9 M	$ 13.9 M	$ 10.9 M	$ 10.9 M
Implementation Costs	$ 3.3 M	$ 3.3 M	$ 2.2 M	$ 2.2 M
ROW/Land	$ 6.1 M	$ 6.1M	$ 1.5 M	$ 1.5 M
Escalation Allowance	$ 0.5 M	$ 0.5 M	NA	NA
Contingency Allowance	$ 1.4 M	$ 1.4 M	$ 3.7 M	$ 3.7 M
Mitigation Cost Allowance	NA	NA	$ 0.2 M	$ 0.2 M
Total Capital Cost	$ 25.2 M	$ 25.2 M	$ 18.5 M	$ 18.5 M

Facilities in CAW Service Area

Table 7 shows the Facilities in the CAW Service Area (aka "CAW-Only Facilities"). This includes pipelines, pump stations, and terminal reservoir.

Table 7
Southern Transfer Pipeline Cost Estimate (2015 Dollars)

Item	Dec. 2015 Update (2015 Dollars)		Nov. 2013 Update (2012 Dollars)	
	6.4 MGD	9.6 MGD	6.4 MGD	9.6 MGD
Base Construction Costs				
Transfer Pipeline (Seaside to Term. Res.)	$ 9.7 M	$ 9.7 M	$ 7.1 M	$ 7.1 M
So. Trans. Pipeline (1st to Seaside Turnout)			$ 6.2 M	$ 6.2 M
Monterey Pipeline	$ 32.9 M	$ 32.9 M	$ 13.2 M	$ 13.2 M
Monterey Transfer Pump Station	$ 2.5 M	$ 2.5 M	$ 1.5 M	$ 1.5 M
Valley Greens Pump Station	$ 1.9 M	$ 1.9 M	$ 0.3 M	$ 0.3 M
Terminal Reservoir	$ 11.8 M	$ 11.8 M	$ 9.2 M	$ 9.2 M
ASR Wells 5 & 6	$ 8.0 M	$ 8.0 M	$ 6.6 M	$ 6.6 M
ASR Pipeline	$ 4.0 M	$ 4.0 M	$ 3.4 M	$ 3.4 M
Base Construction Subtotal	$ 70.8 M	$ 70.8 M	$ 53.4 M	$ 53.4 M
Implementation Costs	$ 16.8 M	$ 16.8 M	$ 14.5 M	$ 14.5 M
ROW/Land	$ 2.8 M	$ 2.8 M	$ 3.4 M	$ 3.4 M
Escalation Allowance	$ 2.5 M	$ 2.5 M	NA	NA
Contingency Allowance	$ 9.7 M	$ 9.7 M	$ 12.7 M	$ 12.7 M
Mitigation Cost Allowance	NA	NA	$ 1 M	$ 1 M
Total Capital Cost	$ 102.6 M	$ 102.6 M	$ 85.0 M	$ 85.0 M

Refer to summary table 3 for a comparison of overall 2012 Dollars to 2015 Dollars.

O&M COST ESTIMATING METHODOLOGY AND GENERAL NOTES

The annual O&M costs for the MPWSP consist primarily of the following components:

- Energy;
- Chemicals;
- Labor;
- Membrane and Media Replacement; and
- General Repair and Replacement (R&R)

O&M cost estimates for Membrane and Media Replacement and General Repair and Replacement are presented here as annual expenses; however, a portion or all of these costs may be treated as capital expenditures in financial analysis.

Generally, the methodology to estimate O&M Costs follows the methodology described in RBF's cost report dated January 9, 2013, using updated unit cost information. The following sections within explain any differences in the cost estimating method from that used in the previous work.

SUMMARY OF UPDATED O&M COST ESTIMATES

A summary of the O&M cost estimates for the 6.4 MGD and 9.6 MGD options is shown in Table 8 and discussed in the paragraphs that follow. Detailed worksheets are also attached.

Table 8
Summary of MPWSP Annual O&M Costs (2015 vs 2012 Dollars)

Item	Dec. 2015 Update (2015 Dollars)		Nov. 2013 Update (2012 Dollars)	
	6.4 MGD	**9.6 MGD**	**6.4 MGD**	**9.6 MGD**
Energy	$4,580,000	$6,090,000	$4,950,000	$6,600,000
Chemicals	$920,000	$1,200,000	$630,000	$770,000
Labor & Miscellaneous*	$3,360,000	$3,680,000	$2,730,000	$3,090,000
Membrane and Media Replacement	$90,000	$120,000	$410,000	$550,000
General Repair and Replacement	$1,570,000	$1,950,000	$1,580,000	$1,960,000
Purchased GWR Water ($2500/AF)	$8,750,000	NA	$8,750,000	NA
Total O&M Annual Cost	**$19,270,000**	**$13,040,000**	**$19,050,000**	**$12,970,000**

* Added cost for Ocean and Basin Monitoring

Energy Costs

Energy costs were developed for the following components:

- Pumping (intake well pump and motors, Monterey pump station, Valley Greens Pump Station, ASR wells and Seaside wells extraction);
- Treatment process (Desal Plant and Begonia Iron Removal Plant);
- Miscellaneous facility power usage

Pump headloss and flow rates were updated based on new design parameters which resulted in changes in energy consumption.

The electrical rates from 2012 were increased based on a PG&E average tarrif rate increase from December 2012 to December 2015 by 13% for summer and 9% for winter.

Chemical Costs

Several chemicals are required during the pretreatment, desalination, and post- treatment processes. The chemicals that are assumed to be required during the treatment process consist of:

- Sodium Hypochlorite (Iron oxidant, Disinfection)
- Sodium Bisulfite (Dechlorination)
- Carbon Dioxide (Alkalinity addition)
- Lime (calcite) (Remineralization)
- Sodium Hydroxide (pH adjustment)
- Various chemicals used in the Clean-in-Place (CIP) process for the RO membranes

Chemical costs were updated based on the CAW and CDM Smith actual $/lb chemical costs. Additionally updates in chemical costs related to the desalination plant were provided in CDM Smith's 2013 report on estimated O&M costs.

Labor Costs & Miscellaneous

The labor rates that were used in the 2012 analysis were determined to still be accurate for 2015 Dollars. Additional costs were added for Ocean and Basin Monitoring.

Media/Membrane Replacement Costs

Media and membrane replacement costs associated with reverse osmosis membranes are included in the annual O&M cost. It assumes the following:

- Media replacement of 0.5 inches loss per vessel per year
- CIP cartridge filter replacement for each train and stage, 2 per year

General Repair and Replacement

An general Repair and Replacement (R&R) cost is included in the annual O&M costs for both projects. The R&R cost is a budgeted amount based on a long term average of expenditures for the repair and/or replacement of mechanical equipment (pumps, etc.), electrical equipment, instrumentation and controls, and basic facility maintenance. As mentioned previously, some portion of these costs may be treated as capital expenses. Industry standard assumptions for this type of cost range from one percent to three percent per year as a percentage of construction cost, with the higher percentages occurring as the facilities approach the end of their useful life.

Purchased GWR Water

For now an initial value of $2500 / AF is being used. This value may change based on new information to be filed in January 2016.

APPENDIX H
(Updated)

Attachment H
Monterey Peninsula Water Supply Project
Project Description
March 2016

PROJECT DESCRIPTION OVERVIEW

The Monterey Peninsula Water Supply Project (MPWSP) will produce desalinated water and convey it to the existing California American Water Company (CalAm) distribution system. The MPWSP supplements portions of CalAm's existing water sources on the Carmel River and Seaside Basin so their use may be reduced to stay within legal limits. The MPWSP consists of the construction of up to ten subsurface slant wells and a desalination plant to produce on average approximately 10,627 acre feet per year (afy) of desalinated water to meet service area demand and return water requirements to the Salinas Valley Groundwater Basin. The production capacity of the proposed MPWSP desalination plant is 9.6 million gallons per day (mgd). The proposed MPWSP consists of several components: a seawater intake system; a desalination plant; a brine discharge system; product water conveyance pipelines; water storage facilities; and an Aquifer Storage and Recovery (ASR) system. Refer to **Figure 1**, *Project Overview and Index Map*.

The MPWSP also includes a variation of the proposed action that combines a reduced-capacity desalination plant with a water purchase agreement for 3,500 afy product water from the Monterey Regional Water Pollution Control Agency's (MRWPCA) proposed Pure Water Monterey Groundwater Replenishment (GWR) Project. The MPWSP variant consists of the construction of up to eight subsurface slant wells and a desalination plant to produce on average approximately 6,752 acre feet per year (afy) of desalinated water to meet service area demand and return water requirements to the Salinas Valley Groundwater Basin. The MPWSP variant would change the desalination facility to a 6.4 mgd.

Construction of the MPWSP is anticipated to commence in second half of 2017 and be completed by mid-2019 (approximately twenty-four months). Additional Project Description information and technical studies are available on the MPWSP's website (*www.watersupplyproject.org*).

PROJECT OBJECTIVES

The primary objectives of the Monterey Peninsula Water Supply Project are to:

- Satisfy CalAm's obligations to meet the requirements of SWRCB Order 95-10;
- Diversify and create a reliable drought-proof water supply;
- Protect the Seaside Groundwater Basin for long-term reliability;
- Protect the local economy from the effects of an uncertain water supply;
- Minimize water rate increases by creating a diversified water supply portfolio;
- Minimize energy requirements and greenhouse gas (GHG) emissions per unit of water delivered to the extent possible;
- Explore opportunities for regional partnerships;
- Provide flexibility to incorporate alternative water supply sources, such as GWR; and

- To eliminate the hydraulic trough that exists between Seaside and Monterey in an energy efficient manner.

SEAWATER INTAKE SYSTEM

The proposed MPWSP would employ subsurface slant wells to produce the seawater source water for the desalination plant. The slant wells are located primarily within the City of Marina, in the active mining area of the CEMEX sand mining facility, with intake well tips located below the Mean Higher High Water line of Monterey Bay and beneath the Monterey Bay National Marine Sanctuary (MBNMS). The slant well intake system will consist of 10 subsurface slant wells (eight active and two on stand-by), which includes conversion of existing test slant well to a production well. The slant wells are approximately 700 to 1,000 feet long and slant downwards and towards the Monterey Bay, with the end of each well approximately 200 to 220 feet below mean sea level. Each well screen is approximately 400 to 800 linear feet long at depths corresponding to both the Dune Sand Aquifer and the underlying 180 foot equivalent aquifer of the Salinas Valley Groundwater Basin (SVGB).

The eight operating slant wells and two redundant wells (10 total) will typically pump approximately 24.1 mgd of source water to a proposed desalination plant 24 hours a day, 365 days per year. The slant wells will be constructed using a telescoping drill casing of various sizes of diameter, from 36-inch to 22-inches, depending on the final design length. All ground disturbing activities from construction occur above the mean higher high water line and within a previously disturbed area. Refer to **Figure 2**, *Subsurface Slant Wells at CEMEX Active Mining Area.*

The 10 slant wells will be arranged into six wellhead sites as shown in **Figure 2**. Wellhead Site 1 is the existing test slant wellhead. Site 2 and Site 6 have three slant wells each and Sites 3, 4, and 5 have one slant well each. Site 1, the northernmost well site, is located approximately 50 feet southeast of the CEMEX settling basins. Site 2, consisting of three new permanent wells, will be located roughly 650 feet south of Site 1. Site 6, consisting of three new slant wells will be located roughly 1,500 feet south of Site 1. The three separate new wells (Sites 3, 4, and 5) will be spaced approximately 250 feet apart between Sites 2 and 3. Each of the wellheads will be located above the mean higher high tide elevation, outside of predicted coastal hazard zones and in an existing disturbed area of the CEMEX sand mining site.

Each well site will consist of: wellhead(s), submersible well pump, protective enclosure, mechanical piping (i.e., mag meter, gate valve, check valve), electrical equipment (i.e., VFD and MCC), and ingress and egress access. Each slant well is designed to convey approximately 2,500 gpm using a 300 hp rated submersible motor. Protective fiberglass enclosures will house the electrical equipment, protecting it from trespassers and the corrosive ocean environment (i.e., sand, wind, salt air, etc.). The enclosures at the single well sites are approximately 16 feet x 12 feet x 8 ft high. The two enclosures at Sites 2 and 6 (3 wells each) are approximately 18 feet x 24 feet x 8 ft high. The fiberglass enclosures will have flat sloped roofs and be colored to blend into the surrounding environment. The enclosures will be located approximately 10 to 15 feet from the wellheads to provide adequate access for future well maintenance (i.e., pulling the pump). The mechanical piping will be located in a below grade concrete vault approximately 8 feet x 8 feet x 6 feet deep.

A pump-to-waste concrete below-grade basin is required at each well Site. When a slant well is operated after not pumping for some time, the well must be pumped-to-waste to flush undesirable initial water quality (silt/sand) rather than convey that to the desalination plant. The well could pump for up to 3 minutes to the waste basin at start-up. The proposed pump-to-waste basins would be approximately 1500-square-foot, 6 to 8 -foot-deep basin on located at each well site cluster or each single well location. Each basin will discharge with an air gap through a fiberglass/aluminum open grate into the vaults for natural percolation. The basin is assumed to not require periodic maintenance since seawater and sand would be discharged to a sand basin.

MPWSP DESALINATION PLANT

The MPWSP Desalination Plant would be constructed on approximately 25 acres of a 46-acre vacant parcel owned by CalAm on Charles Benson Road, northwest of the MRWPCA Regional Treatment Plant and the Monterey Regional Environmental Park. The proposed MPWSP Desalination Plant at this location would include a pretreatment system, a Reverse Osmosis (RO) system, a post-treatment system, backwash supply and filtered water equalization tanks, desalinated product water storage and conveyance facilities, brine storage and disposal facilities, and an administration building and laboratory facility. Existing roads would provide access to the site. The proposed construction and operation of the Desalination Plant would occur at a nearly level marine terrace and create approximately 15 acres of impervious surfaces associated with the desalination facilities, buildings, driveways, parking, and maintenance areas. No U.S. Army Corps of Engineers' jurisdictional wetlands would be affected.

The MPWSP Desalination Plant would have a rated production capacity of 9.6 mgd and a maximum production capacity of 11.2 mgd. The MPWSP Desalination Plant would operate at an approximate overall recovery rate of 42 percent. Approximately 24.1 mgd of raw seawater would be needed to produce 9.6 mgd of desalinated product water. Components of the proposed Desalination Plant are discussed below.

Pretreatment System: Seawater (source water) from the subsurface intake wells would be conveyed directly through an on-site pre-treatment system (pressure filters) to prevent the RO membranes from becoming fouled or scaled due to microbial contamination, turbidity, and other contaminants. The pretreatment system would have the capacity to process 24.1 mgd of seawater. The majority of the pretreated source water would then be pumped directly to the RO system.

The pressure filters would be located within the MPWSP Desalination Plant site. Pretreatment filters would require routine backwashing (approximately once per day). The pretreated source water would be conveyed to two 300,000-gallon backwash supply and filtered water equalization tanks.

Waste effluent produced during routine backwashing would flow via gravity from the pretreatment filters to two 0.25-acre, 6-foot-deep open backwash settling basins lined with an impermeable liner to prevent the waste effluent from infiltrating into the ground. Suspended solids in the waste effluent would settle to the bottom of the basins, and the clarified water would be decanted. Approximately 0.4 mgd of decanted and dechlorinated backwash water might be pumped to the Brine Discharge Pipeline, blended with brine produced by the RO system, and discharged to the existing MRWPCA ocean outfall. Alternatively, the decanted backwash water could be blended with source water before undergoing pretreatment and the RO process. Sludge formed by the solids in the waste effluent would be periodically removed from the backwash settling basins and disposed of at a sanitary landfill.

A multi-purpose pump station located near the center of the proposed plant would be integral to the operation of facility. The pump station would be constructed on an outdoor concrete pad with an approximate area of 8,000 square feet. Equipment would include: seven cartridge filters; four Filtered Water Pumps (two 12 MGD and 350 HP each; and two 6 MGD and 200 HP each); two Backwash Supply Pumps (16 MGD and 150 HP each); four Treated Water Pumps (two 4.8 MGD and 600 HP each; and two 2.4 MGD and 300 HP each); two Salinas Valley Pumps (1.4 MGD and 10 HP each); and associated piping, valves, instruments and appurtenances.

Approximately 9.5 mgd of desalinated product water would be produced during the RO process. Waste effluent produced during the RO process would be diverted to the brine waste stream and discharged via the existing MRWPCA outfall and diffuser.

Reverse Osmosis System: Reverse osmosis is an ion separation process that uses semipermeable membranes to remove salts and other minerals from saline water. Pretreated source water is forced at very high pressures through RO membranes. Water molecules, which are smaller than salt and many other impurities, are able to pass through the membranes. A portion of the source water passes through the RO membranes to produce "permeate," or product water; source water that does not pass through the membranes increases in salt concentration and is discharged as brine. The RO system would be housed in an approximately 30-foot-tall, 30,000-square-foot process and electrical building located in the central portion of the MPWSP Desalination Plant site. This building would also house the UV disinfection system (if required) and the cleaning system for the RO membranes.

The RO process would incorporate an energy recovery system that utilizes pressure-exchange technologies. The use of high-pressure pumps to force saline water through the RO membranes would produce a concentrated brine solution (referred to as RO concentrate) in a continuous stream that contains a large amount of high-pressure energy. Pressure exchangers would be employed to transfer the energy from the high-pressure brine stream to the source water stream to reduce energy demand and operating costs. The accumulation of salts or scaling on the RO membranes causes fouling, which reduces membrane performance. The RO system is expected to require cleaning two to three times per year. The RO cleaning system would be housed in the same building as the RO system and would include chemical storage, chemical feedlines, and a collection tank.

For back-up power to power a portion of the facility, CalAm would install a 750-kilowatt (kW) (1,000 horsepower (hp)) emergency diesel fuel-powered generator and a 2,000-gallon double-walled, aboveground diesel storage tank adjacent to the process and electrical building.

Post-treatment System: After leaving the RO system, the desalinated water would pass through a post-treatment system to make the water more compatible with the other water supply sources in the CalAm system and provide adequate disinfection prior to distribution to customers. It is expected that post-treatment facilities would include chemical feedlines and injection systems for lime and carbon dioxide. The final design of post-treatment facilities would be based on the water quality data collected during operation of the test slant well and pilot program and the results of a geochemical mixing study.

Chemical Use and Storage: Facility operators would use various chemicals to treat the water as it passes through the pretreatment, RO, and post-treatment processes to ensure the water meets drinking water quality requirements and is compatible with native groundwater in the Seaside Groundwater Basin. The various chemicals used during the desalination process would be stored onsite in accordance with applicable regulatory requirements, and storage facilities would include secondary concrete containment, alarm notification systems, and fire sprinklers.

Brine Storage and Disposal: The RO process would generate approximately 14 mgd of brine (including 0.4 mgd of decanted backwash water). The brine storage and disposal system would consist of: 1) one Brine Storage Basin with a storage capacity of 3-million gallons that is uncovered and lined with two impermeable liners; 2) two Brine Discharge pumps, 6-mgd capacity each, 40-hp each; and 3) an aeration system to maintain 5 mg/L dissolved oxygen levels in the brine. Under continuous brine disposal scenarios, the brine from the RO system would be conveyed directly through the 1-mile-long, 30-inch diameter Brine Discharge Pipeline to a proposed connection with the existing MRWPCA outfall. Under intermittent brine discharge operating scenarios, the brine would be directed to the brine storage basin. The brine would be stored for approximately 5 hours, and then pumped to the Brine Discharge Pipeline at a rate of 6-mgd where it would combine with approximately 14 mgd of brine from the RO process and be discharged at a total flow of approximately 20 mgd. Further evaluation of the proposed brine dilution through the MRWPCA outfall could require modifications to the proposed brine storage and disposal system. Such modifications could include, but may not be limited to a larger brine storage basin or basins (open and lined, steel or concrete), greater brine pumping capacity and larger pumps, a larger aeration system and/or a larger diameter pipeline.

Administrative Building: A 6,000-square-foot single-story administrative building at the MPWSP Desalination Plant site would house visitor reception, offices, restrooms, locker rooms, break rooms, conference rooms, a control room, a laboratory, an equipment storage and maintenance area, and monitoring and control systems for the RO system, post-treatment system, chemical feed systems, and related facilities.

BRINE DISCHARGE SYSTEM

The reverse osmosis system at the MPWSP desalination plant generates approximately 14 million gallons per day (MGD) of brine, including 0.4 MGD of decanted backwash water. The brine is initially conveyed to a three million gallon lined open brine storage basin, then pumped through a 36-inch diameter brine discharge pipeline to a new connection with the existing MRWPCA outfall and diffuser located at the wastewater facility.

During the dry/irrigation season that typically extends from April through October, treated wastewater from MRWPCA's Regional Wastewater Treatment Plant is diverted to the Salinas Valley Reclamation Project's tertiary treatment facility for advanced treatment and is used for crop irrigation. During the wet/non-irrigation season that typically extends from November through March, the brine stream blends with treated wastewater from MRWPCA's Regional Wastewater Treatment Plant before being discharged into the Monterey Bay. During other times, the brine stream will discharge into Monterey Bay without blending.

The MRWPCA's existing outfall pipeline extends into the Monterey Bay about two miles offshore along the ocean floor. The diffuser is about 1,100 feet long with 172 2-inch diameter active ports (fifty two ports are closed) that are spaced 8 feet apart, which disperse the brine stream at the discharge point. This minimizes differences in salinity and other water quality parameters between the discharge brine and the surrounding seawater.

CONVEYANCE AND STORAGE FACILITIES

Water Conveyance: The proposed MPWSP consists of water conveyance and storage facilities, such as pipelines, pump stations, and treated water storage at a proposed Terminal Reservoir and at existing and proposed Aquifer Storage and Recovery (ASR) well sites. Various transmission pipeline segments would convey feed water from the intake wells to the Desalination Plant, while product water from the Desalination Plant site would be conveyed to storage and distribution systems as shown on **Figure 2** and further described below. No U.S. Army Corps of Engineers' jurisdictional wetlands would be affected.

Feedwater Pipeline: The CEMEX Feed Water Alternative would convey seawater pumped from the seawater intake system to the Desalination Plant for a distance of approximately 11,469 LF. The conveyance of seawater from the proposed CEMEX Feed Water intake well site would traverse eastward beneath the private CEMEX access road and cross under the Highway 1 overpass and right-of-way. It would continue northeast into an abandoned railroad spur to Lapis Road, north into the Transportation Agency for Monterey County (TAMC) Right-of-Way (ROW) and onto Charles Benson Road to the desalination plant site.

An alternative alignment is identical to the previously described alignment, but turns east off of Del Monte Boulevardonto Nepsonet Road, which is the direct access road for the farms along it, to the desalination plant site .

Transfer Pipeline: For product water conveyance from the CalAm Desalination Plant to the CalAm water system, the desalinated water pump station would pump desalinated product water through the proposed Desalinated Water Pipeline and Transmission Main. From the Plant site pump station, the 9.5-mile-long, 36-inch-diameter desalinated product water pipeline would extend west for approximately 0.8 mile along Charles Benson Road (and/or Neponset Road), parallel to the proposed Feedwater Pipeline. At Del Monte Boulevard, the product water pipeline would cross Del Monte Boulevard and turn south and continue along the TAMC ROW for approximately 5.7 miles to just north of the interchange between Highway 1/Lightfighter Drive. The pipeline would traverse beneath Highway 1 via jack and bore and then continue south-easterly into land owned by the City of Seaside until it meets Lightfighter Drive. The pipeline would then continue east along Lightfighter Drive to General Jim Moore Boulevard, where it would turn south, continue beneath General Jim Moore Boulevard to just south of Coe Avenue, where it would connect to an existing pipeline.

Monterey Pipeline: The Monterey Pipeline, approximately 6.5 miles of 36-inch pipe, would continue from General Jim Moore Boulevard westward beneath Hilby Avenue, and turn south on Fremont Boulevard where it would cross Canyon del Rey Boulevard (Route 218) at the City of Monterey to Airport Road (or Casa Verde Way), where it would turn south and then turn west again along Fairgrounds Road. The pipeline would then be attached to the Fairgrounds Road/Mark Thomas Drive bridge over Highway 68 or a new pipe carrier bridge will be installed and continue onto Mark Thomas Drive turning northwest on to Fremont Street. The alignment travels west beneath Fremont Street, continuing beneath Webster Street, then turning north onto Hartnell Street and then west onto Madison Street. From Madison Street, the alignment turns north along Monroe Street and then west along Jefferson Street. The Monterey Pipeline then turns north onto Clay Street, then north onto W. Franklin St, and then north on High St. where it crosses the Presidio of Monterey (POM) along Stillwell Avenue. From POM, the pipeline alignment would exit on to Spencer Street, and then southwest to Hoffman Ave, northwest onto Cypress Ave, southwest onto Withers Avenue and finally north on Sinex Avenue connecting to an existing 30-inch pipeline in Sinex Avenue, near the Eardley Pump Station in the City of Pacific Grove. This pipeline route also improves the hydraulics of the existing system by eliminating the existing hydraulic though in the system that is located in the vicinity of Canyon Del Ray & 218 area and allows for maximum use of ASR and Carmel River excess diversion rights.

Terminal Reservoir: The Terminal Reservoir and related facilities will be located east of General Jim Moore Boulevard, north side of Watkins Gate Road, within former Fort Ord property in the City of Seaside. The Terminal Reservoir would consist of two 33-foot-tall, 130-foot-diameter aboveground concrete tanks. Each tank would have a storage capacity of 3 million gallons, for a total storage capacity of 6 million gallons. The Terminal Reservoir tanks would be constructed on an approximately 0.5-acre concrete pad. Security fencing would enclose a 4.5-acre area around the Terminal Reservoir. In order to reduce visual impacts, it may be required through the City of Seaside land development approval to partially bury (bermed) or fully bury the reservoirs.

ASR Facilities: The ASR Facilities include two injection/extraction wells (Wells ASR-5 and ASR-6), and supporting pipelines. The two additional ASR wells would be located immediately east of General Jim Moore Boulevard in the area of Fitch Park. These ASR wells will provide storage capacity in the winter, by injecting water into the Seaside Groundwater Basin, and support peak water supply in the summer by drawing on the stored water, thus reducing the need for surface water diversions from Carmel River.

Salinas Return Pipeline: From 1.0 to 1.6 mgd of product water may be used to replenish aquifers from which seawater is extracted at the intakes. The pipeline would be operated between May and October of each year and deliver product water to the existing Castroville Seawater Intrusion Project (CSIP) infiltration pond located at the MRWPCAWastewater Treatment Plant. The Salinas Return Line would be approximately 1.1 miles in length.

Castroville Salinas Valley Return Pipeline: In addition to the Salinas Return Line, return flow requirements of product water may be conveyed to the Castroville Water District. The Salinas Valley Return Pipeline to Castroville will be a 8 to 12-inch diameter pipe approximately 4 miles long. . The route alternatives are depicted on **Figure 1**.

Pump Stations: In addition to pump stations at the intake wellheads and at the desalination plant site, conveyance pump stations are also proposed on the Monterey County Fairgrounds property, and at the CalAm owned Rancho San Carlos Well Site in Carmel Valley, locations are depicted in **Figure 1**. The proposed Monterey Pump Station, located at the County Fairgrounds, would be equipped with one, 400 horsepower (hp) and two, 200 hp pumps, with a combined pumping capacity of 6,400 gallons per minute (gpm) and 3,200 gpm, respectively. The proposed Valley Greens Pump Station would be equipped with three, 60 hp, 1,400 gpm pumps. The mechanical appurtenances would be enclosed in an approximately 1300-square-foot pump house for both sites.

Highway 68 Satellite Water System Interconnect Pipelines: CalAm Monterey District includes five small satellite water located along the Highway 68 corridor. Three of these systems depend on groundwater from the adjudicated Seaside basin whose allocation will be reduced to zero by 2018. This project proposes two small water main extensions that allow MPWSP to provide adequate water supply to these systems, the extensions are shown in **Figure 1**.

PIPELINE CONSTRUCTION METHODS

Pipeline installation would generally progress at a rate of 150 to 250 feet per day. The majority of the pipeline installation would be through an open-cut trench construction method. However, where it is not feasible or desirable to perform open-cut trenching, trenchless methods would be used. Pipeline depth would vary depending on pipe size and topography but will be typically have 4 feet of cover. Installation would use conventional equipment such as flatbed trucks, backhoes, excavators, pipe cutting and welding equipment, haul trucks for spoils transport, trucks for materials delivery, compaction equipment, Baker tanks, pickup trucks, arch welding machines, generators, air compressors, cranes, drill rigs, and skip loaders.

Pipeline segments would typically be delivered and installed in 16 to 40-foot-long sections. Soil removed from trenches and pits would be stockpiled and reused, to the extent feasible, or hauled away for offsite disposal. Under typical circumstances, the width of the disturbance corridor for pipeline construction would vary from 50 to 100 feet, depending on the size of the pipe being installed. Trenchless technologies could require wider corridors at entry and exit pits. Pipeline installation would be ongoing throughout the entire 24-month construction period, with multiple pipelines being installed simultaneously. Pipeline installation would be sequenced to minimize land use disturbance and disruption to the extent possible.

Construction equipment and materials associated with pipeline installation would be stored along the pipeline easements and at nearby designated staging areas. Staging areas would not be sited in sensitive areas such as riparian or critical habitat for protected species. To the extent feasible, parking for construction equipment and worker vehicles would be accommodated within the construction work areas and on adjacent roadways.

Roadways and rail tracks disturbed during pipeline installation would be restored to existing or improved condition. A pre-construction and post-construction evaluation would be conducted to assess on-site conditions. Generally, trench spoils in the TAMC ROW would be temporarily stockpiled within the construction easement, then backfilled into the trench after pipeline installation. Any excess spoils would be disposed of at an appropriate facility. Locations for permanent removal of uncontaminated spoils would be coordinated with the selected contractor in coordination with the local jurisdiction.

The final location of pipelines within public ROWs, based on existing utilities, will determine whether certain traffic lanes or streets require closure during construction activities. Traffic Control Plans will be prepared in coordination with affected municipalities or Caltrans for temporary lane closures.

Open-Trench Construction: For pipeline segments to be installed using open-trench methods, the construction sequence would typically include clearing and grading the ground surface along the pipeline alignments; excavating the trench; preparing and installing pipeline sections; installing vaults, manhole risers, manifolds, and other pipeline components; backfilling the trench with non-expansive fills; restoring preconstruction contours; and revegetating or paving the pipeline alignments, as appropriate. A conventional backhoe, excavator, or other mechanized equipment would be used to excavate trenches. The typical trench width would be 6 feet; however, vaults, manhole risers, and other pipeline components could require wider excavations. Work crews would install trench boxes or shoring or would lay back and bench the slopes to stabilize the pipeline trenches and prevent the walls from collapsing during construction. After excavating the trenches, the contractor would line the trench with pipe bedding (sand or other appropriate material shaped to support the pipeline). Construction workers would then place pipe sections (and pipeline components, where applicable) into the trench, join the sections together as trenching proceeded, and then backfill the trench. Steel plates would be placed over trenches to maintain access to private driveways.

Trenchless Technologies: Where it is not feasible or desirable to perform open-cut trenching, trenchless methods such as jack-and-bore, drill-and-burst, horizontal directional drilling, and/or microtunneling would be employed. Pipeline segments located within heavily congested underground utility areas or in sensitive habitat areas may be installed using horizontal directional drilling or microtunneling. Jack-and-bore methods would also be used for pipeline segments that cross beneath Highway 1 or drainages.

Jack-and-Bore and Microtunneling Methods: The jack-and-bore and microtunneling methods entail excavating an entry pit and a receiving pit at either end of the pipe segment. A horizontal boring machine or auger is used to drill a hole, and a hydraulic jack is used to push a casing through the hole to the opposite pit. As the boring proceeds, a steel casing is jacked into the hole and pipe is installed in the casing.

Drill-and-Burst Method: The drill-and-burst method involves drilling a small pilot hole at the desired depth through a substrate, and then pulling increasingly larger reamers multiple times through the pilot hole until the hole reaches the desired diameter.

Horizontal Directional Drilling: Horizontal directional drilling requires the excavation of a pit on either end of the pipe alignment. A surface-launched drilling rig is used to drill a small horizontal boring at the desired depth between the two pits. The boring is filled with drilling fluids and enlarged by a back reamer or hole opener to the required diameter. The pipeline is then pulled into position through the boring. Entry and receiving pits range in size depending on the length of the crossing, but typically have dimensions of approximately 50 by 50 feet.

MPWSP VARIANT

The project includes a variation (Variant) that potentially combines a reduced-capacity desalination plant with a water purchase agreement for product water from the MRWPCA's proposed Pure Water Monterey Groundwater Replenishment Project. The Pure Water Monterey Groundwater Replenishment Project has its own separate environmental compliance documentation and otherwise has independent utility from the MPWSP (refer to the Draft Environmental Impact Report for the Pure Water Monterey Groundwater Replenishment Project, prepared by Denise Duffy & Associates, Inc. (dated April 2015), available on the Monterey Regional Water Pollution Control Agency website (http://www.mrwpca.org/).

The Variant, if approved, reduces the size of desalination plant capacity from 9.6 MGD to 6.4 MGD and the number of source wells is reduced to eight (six active and 2 standby), which includes conversion of existing test slant well to a production well, to produce up to 15.5 MGD of source water. Additionally, the volume of brine waste discharge is reduced. The remaining MPWSP proposed facilities are the same under the MPWSP and the Variant scenarios.

The primary objectives of the MPWSP Variant are the same as those for the proposed project. In order to provide 9,752 afy of additional water supplies to meet the estimated total annual demand in the Monterey District of 15,296 afy, the MPWSP Variant would provide 6,252 afy with a reduced sized desalination plant (6.4 mgd). The remaining 3,500 afy would be provided through a water purchase agreement between CalAm and the GWR project sponsors (in addition to existing Carmel River diversions, Aquifer Storage and Recovery [ASR], the Seaside Groundwater Basin and the Sand City Coastal Desalination Plant). **The table below** summarizes the future supplies for the Monterey District with and without the implementation of the MPWSP Variant.

Future Water Supplies for the Monterey District with Implementation of the MPWSP

Source	MPWSP with GWR Average Annual Yield (afy)a	MPWSP without GWR Average Annual Yield (afy)a
MPWSP Desalination Plant (Proposed)	6,252	9,752
GWR Project Water	3,500b	--
Carmel River Diversions (Existing)	3,376	3,376
ASR Project (Existing)	1,300	1,300
Seaside Groundwater Basin (Existing)	774c	774c
Sand City Coastal Desalination Plant (Existing)	94	94
Total	**15,296**	**15,296**

a. Average annual yields are rounded to the closest whole number.
b. CalAm would enter into a water purchase agreement with MPWMD for 3,500 afy of GWR project supply.
c. After CalAm has fulfilled its replenishment obligations to the Seaside Groundwater Basin (assumed to take 25 years at a replenishment rate of 700 afy), CalAm would increase pumping to its adjudicated right of 1,474 afy.
SOURCE: ESA Associates, 2015.

FIGURE 1

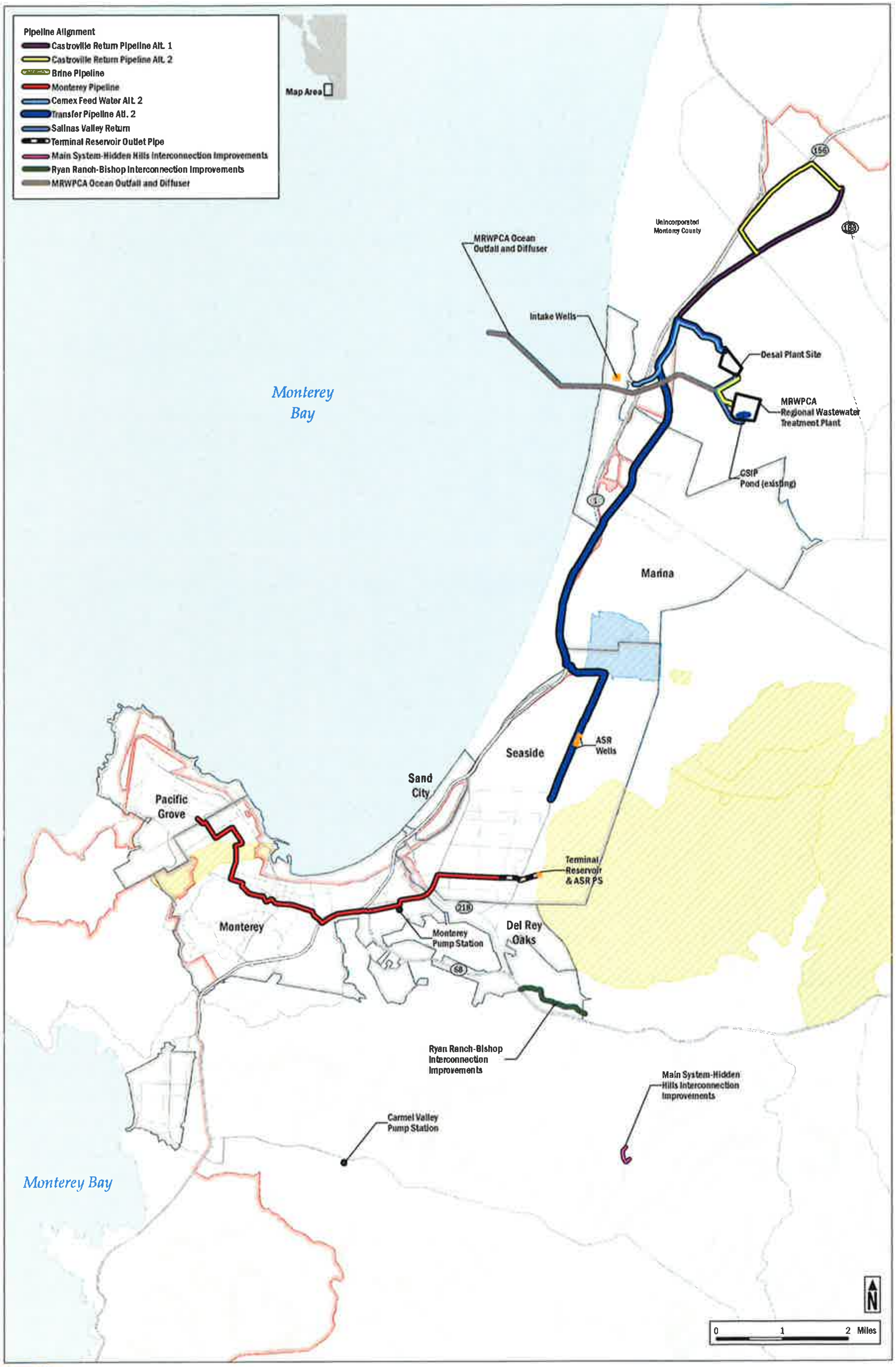
MPWSP FACILITIES OVERVIEW

FIGURE 2

SUBSURFACE SLANT WELL LAYOUT

FIGURE 1

MPWSP FACILITIES OVERVIEW

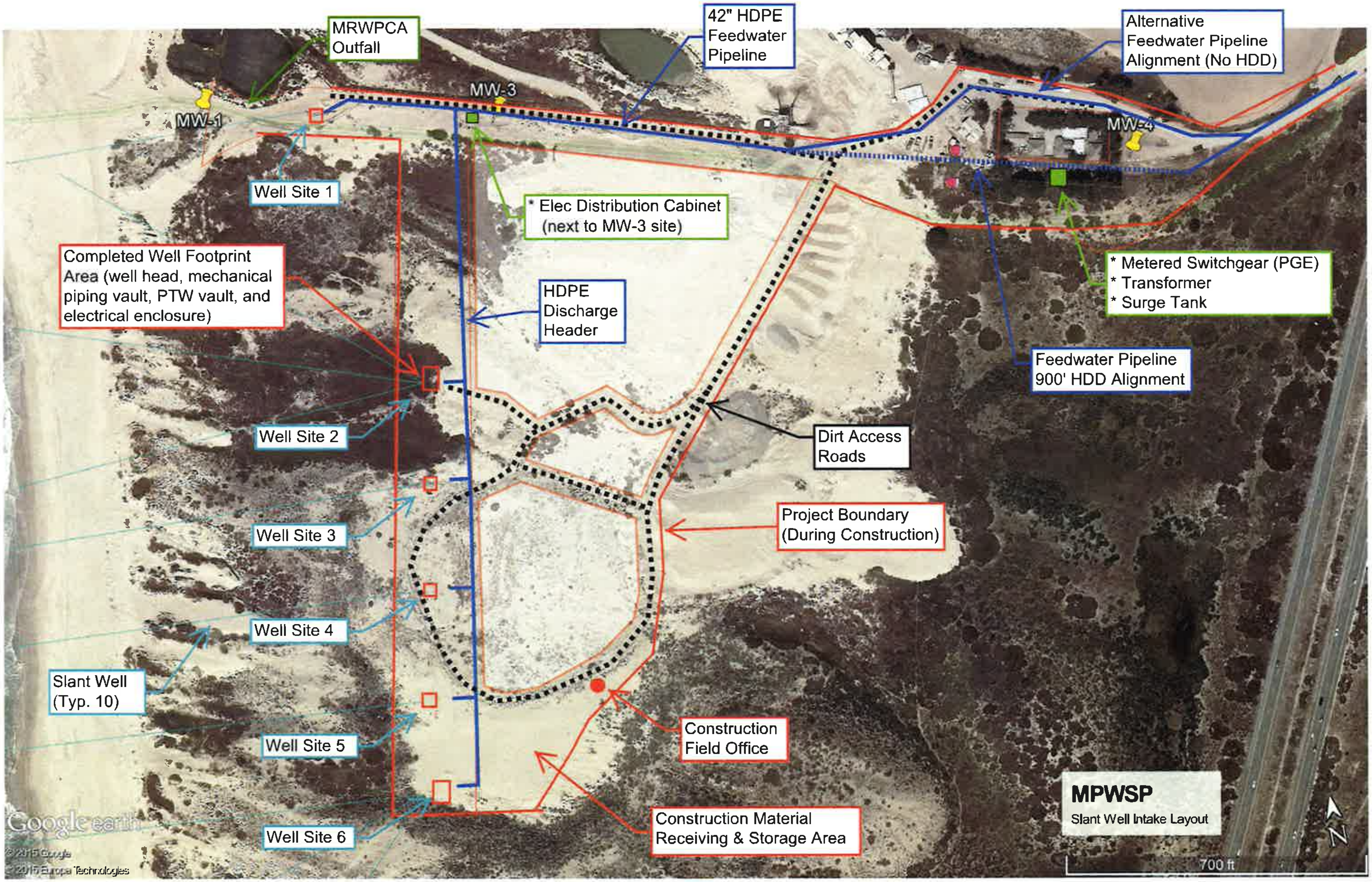


URS
California American Water
Transmission Mains and Aquifer Storage & Recovery (ASR) Facilities
MONTEREY PENINSULA WATER SUPPLY PROJECT, MPWSP

PROJECT OVERVIEW
Project Pipeline Alignments

FIGURE 2

SUBSURFACE SLANT WELL LAYOUT


MRWPCA Outfall
42" HDPE Feedwater Pipeline
Alternative Feedwater Pipeline Alignment (No HDD)
MW-1
MW-3
MW-4
Well Site 1
* Elec Distribution Cabinet (next to MW-3 site)
Completed Well Footprint Area (well head, mechanical piping vault, PTW vault, and electrical enclosure)
HDPE Discharge Header
* Metered Switchgear (PGE)
* Transformer
* Surge Tank
Feedwater Pipeline 900' HDD Alignment
Well Site 2
Dirt Access Roads
Well Site 3
Project Boundary (During Construction)
Well Site 4
Slant Well (Typ. 10)
Construction Field Office
Well Site 5
MPWSP
Slant Well Intake Layout
Well Site 6
Construction Material Receiving & Storage Area
700 ft
N
Google earth

APPENDIX H
(Updated)

Attachment H

Monterey Peninsula Water Supply Project

Project Description

March 2016

PROJECT DESCRIPTION OVERVIEW

The Monterey Peninsula Water Supply Project (MPWSP) will produce desalinated water and convey it to the existing California American Water Company (CalAm) distribution system. The MPWSP supplements portions of CalAm's existing water sources on the Carmel River and Seaside Basin so their use may be reduced to stay within legal limits. The MPWSP consists of the construction of up to ten subsurface slant wells and a desalination plant to produce on average approximately 10,627 acre feet per year (afy) of desalinated water to meet service area demand and return water requirements to the Salinas Valley Groundwater Basin. The production capacity of the proposed MPWSP desalination plant is 9.6 million gallons per day (mgd). The proposed MPWSP consists of several components: a seawater intake system; a desalination plant; a brine discharge system; product water conveyance pipelines; water storage facilities; and an Aquifer Storage and Recovery (ASR) system. Refer to **Figure 1**, *Project Overview and Index Map*.

The MPWSP also includes a variation of the proposed action that combines a reduced-capacity desalination plant with a water purchase agreement for 3,500 afy product water from the Monterey Regional Water Pollution Control Agency's (MRWPCA) proposed Pure Water Monterey Groundwater Replenishment (GWR) Project. The MPWSP variant consists of the construction of up to eight subsurface slant wells and a desalination plant to produce on average approximately 6,752 acre feet per year (afy) of desalinated water to meet service area demand and return water requirements to the Salinas Valley Groundwater Basin. The MPWSP variant would change the desalination facility to a 6.4 mgd.

Construction of the MPWSP is anticipated to commence in second half of 2017 and be completed by mid-2019 (approximately twenty-four months). Additional Project Description information and technical studies are available on the MPWSP's website (www.watersupplyproject.org).

PROJECT OBJECTIVES

The primary objectives of the Monterey Peninsula Water Supply Project are to:

- Satisfy CalAm's obligations to meet the requirements of SWRCB Order 95-10;
- Diversify and create a reliable drought-proof water supply;
- Protect the Seaside Groundwater Basin for long-term reliability;
- Protect the local economy from the effects of an uncertain water supply;
- Minimize water rate increases by creating a diversified water supply portfolio;
- Minimize energy requirements and greenhouse gas (GHG) emissions per unit of water delivered to the extent possible;
- Explore opportunities for regional partnerships;
- Provide flexibility to incorporate alternative water supply sources, such as GWR; and

- To eliminate the hydraulic trough that exists between Seaside and Monterey in an energy efficient manner.

SEAWATER INTAKE SYSTEM

The proposed MPWSP would employ subsurface slant wells to produce the seawater source water for the desalination plant. The slant wells are located primarily within the City of Marina, in the active mining area of the CEMEX sand mining facility, with intake well tips located below the Mean Higher High Water line of Monterey Bay and beneath the Monterey Bay National Marine Sanctuary (MBNMS). The slant well intake system will consist of 10 subsurface slant wells (eight active and two on stand-by), which includes conversion of existing test slant well to a production well. The slant wells are approximately 700 to 1,000 feet long and slant downwards and towards the Monterey Bay, with the end of each well approximately 200 to 220 feet below mean sea level. Each well screen is approximately 400 to 800 linear feet long at depths corresponding to both the Dune Sand Aquifer and the underlying 180 foot equivalent aquifer of the Salinas Valley Groundwater Basin (SVGB).

The eight operating slant wells and two redundant wells (10 total) will typically pump approximately 24.1 mgd of source water to a proposed desalination plant 24 hours a day, 365 days per year. The slant wells will be constructed using a telescoping drill casing of various sizes of diameter, from 36-inch to 22-inches, depending on the final design length. All ground disturbing activities from construction occur above the mean higher high water line and within a previously disturbed area. Refer to **Figure 2**, *Subsurface Slant Wells at CEMEX Active Mining Area.*

The 10 slant wells will be arranged into six wellhead sites as shown in **Figure 2**. Wellhead Site 1 is the existing test slant wellhead. Site 2 and Site 6 have three slant wells each and Sites 3, 4, and 5 have one slant well each. Site 1, the northernmost well site, is located approximately 50 feet southeast of the CEMEX settling basins. Site 2, consisting of three new permanent wells, will be located roughly 650 feet south of Site 1. Site 6, consisting of three new slant wells will be located roughly 1,500 feet south of Site 1. The three separate new wells (Sites 3, 4, and 5) will be spaced approximately 250 feet apart between Sites 2 and 3. Each of the wellheads will be located above the mean higher high tide elevation, outside of predicted coastal hazard zones and in an existing disturbed area of the CEMEX sand mining site.

Each well site will consist of: wellhead(s), submersible well pump, protective enclosure, mechanical piping (i.e., mag meter, gate valve, check valve), electrical equipment (i.e., VFD and MCC), and ingress and egress access. Each slant well is designed to convey approximately 2,500 gpm using a 300 hp rated submersible motor. Protective fiberglass enclosures will house the electrical equipment, protecting it from trespassers and the corrosive ocean environment (i.e., sand, wind, salt air, etc.). The enclosures at the single well sites are approximately 16 feet x 12 feet x 8 ft high. The two enclosures at Sites 2 and 6 (3 wells each) are approximately 18 feet x 24 feet x 8 ft high. The fiberglass enclosures will have flat sloped roofs and be colored to blend into the surrounding environment. The enclosures will be located approximately 10 to 15 feet from the wellheads to provide adequate access for future well maintenance (i.e., pulling the pump). The mechanical piping will be located in a below grade concrete vault approximately 8 feet x 8 feet x 6 feet deep.

A pump-to-waste concrete below-grade basin is required at each well Site. When a slant well is operated after not pumping for some time, the well must be pumped-to-waste to flush undesirable initial water quality (silt/sand) rather than convey that to the desalination plant. The well could pump for up to 3 minutes to the waste basin at start-up. The proposed pump-to-waste basins would be approximately 1500-square-foot, 6 to 8 -foot-deep basin on located at each well site cluster or each single well location. Each basin will discharge with an air gap through a fiberglass/aluminum open grate into the vaults for natural percolation. The basin is assumed to not require periodic maintenance since seawater and sand would be discharged to a sand basin.

MPWSP DESALINATION PLANT

The MPWSP Desalination Plant would be constructed on approximately 25 acres of a 46-acre vacant parcel owned by CalAm on Charles Benson Road, northwest of the MRWPCA Regional Treatment Plant and the Monterey Regional Environmental Park. The proposed MPWSP Desalination Plant at this location would include a pretreatment system, a Reverse Osmosis (RO) system, a post-treatment system, backwash supply and filtered water equalization tanks, desalinated product water storage and conveyance facilities, brine storage and disposal facilities, and an administration building and laboratory facility. Existing roads would provide access to the site. The proposed construction and operation of the Desalination Plant would occur at a nearly level marine terrace and create approximately 15 acres of impervious surfaces associated with the desalination facilities, buildings, driveways, parking, and maintenance areas. No U.S. Army Corps of Engineers' jurisdictional wetlands would be affected.

The MPWSP Desalination Plant would have a rated production capacity of 9.6 mgd and a maximum production capacity of 11.2 mgd. The MPWSP Desalination Plant would operate at an approximate overall recovery rate of 42 percent. Approximately 24.1 mgd of raw seawater would be needed to produce 9.6 mgd of desalinated product water. Components of the proposed Desalination Plant are discussed below.

Pretreatment System: Seawater (source water) from the subsurface intake wells would be conveyed directly through an on-site pre-treatment system (pressure filters) to prevent the RO membranes from becoming fouled or scaled due to microbial contamination, turbidity, and other contaminants. The pretreatment system would have the capacity to process 24.1 mgd of seawater. The majority of the pretreated source water would then be pumped directly to the RO system.

The pressure filters would be located within the MPWSP Desalination Plant site. Pretreatment filters would require routine backwashing (approximately once per day). The pretreated source water would be conveyed to two 300,000-gallon backwash supply and filtered water equalization tanks.

Waste effluent produced during routine backwashing would flow via gravity from the pretreatment filters to two 0.25-acre, 6-foot-deep open backwash settling basins lined with an impermeable liner to prevent the waste effluent from infiltrating into the ground. Suspended solids in the waste effluent would settle to the bottom of the basins, and the clarified water would be decanted. Approximately 0.4 mgd of decanted and dechlorinated backwash water might be pumped to the Brine Discharge Pipeline, blended with brine produced by the RO system, and discharged to the existing MRWPCA ocean outfall. Alternatively, the decanted backwash water could be blended with source water before undergoing pretreatment and the RO process. Sludge formed by the solids in the waste effluent would be periodically removed from the backwash settling basins and disposed of at a sanitary landfill.

A multi-purpose pump station located near the center of the proposed plant would be integral to the operation of facility. The pump station would be constructed on an outdoor concrete pad with an approximate area of 8,000 square feet. Equipment would include: seven cartridge filters; four Filtered Water Pumps (two 12 MGD and 350 HP each; and two 6 MGD and 200 HP each); two Backwash Supply Pumps (16 MGD and 150 HP each); four Treated Water Pumps (two 4.8 MGD and 600 HP each; and two 2.4 MGD and 300 HP each); two Salinas Valley Pumps (1.4 MGD and 10 HP each); and associated piping, valves, instruments and appurtenances.

Approximately 9.5 mgd of desalinated product water would be produced during the RO process. Waste effluent produced during the RO process would be diverted to the brine waste stream and discharged via the existing MRWPCA outfall and diffuser.

Reverse Osmosis System: Reverse osmosis is an ion separation process that uses semipermeable membranes to remove salts and other minerals from saline water. Pretreated source water is forced at very high pressures through RO membranes. Water molecules, which are smaller than salt and many other impurities, are able to pass through the membranes. A portion of the source water passes through the RO membranes to produce "permeate," or product water; source water that does not pass through the membranes increases in salt concentration and is discharged as brine. The RO system would be housed in an approximately 30-foot-tall, 30,000-square-foot process and electrical building located in the central portion of the MPWSP Desalination Plant site. This building would also house the UV disinfection system (if required) and the cleaning system for the RO membranes.

The RO process would incorporate an energy recovery system that utilizes pressure-exchange technologies. The use of high-pressure pumps to force saline water through the RO membranes would produce a concentrated brine solution (referred to as RO concentrate) in a continuous stream that contains a large amount of high-pressure energy. Pressure exchangers would be employed to transfer the energy from the high-pressure brine stream to the source water stream to reduce energy demand and operating costs. The accumulation of salts or scaling on the RO membranes causes fouling, which reduces membrane performance. The RO system is expected to require cleaning two to three times per year. The RO cleaning system would be housed in the same building as the RO system and would include chemical storage, chemical feedlines, and a collection tank.

For back-up power to power a portion of the facility, CalAm would install a 750-kilowatt (kW) (1,000 horsepower (hp)) emergency diesel fuel-powered generator and a 2,000-gallon double-walled, aboveground diesel storage tank adjacent to the process and electrical building.

Post-treatment System: After leaving the RO system, the desalinated water would pass through a post-treatment system to make the water more compatible with the other water supply sources in the CalAm system and provide adequate disinfection prior to distribution to customers. It is expected that post-treatment facilities would include chemical feedlines and injection systems for lime and carbon dioxide. The final design of post-treatment facilities would be based on the water quality data collected during operation of the test slant well and pilot program and the results of a geochemical mixing study.

Chemical Use and Storage: Facility operators would use various chemicals to treat the water as it passes through the pretreatment, RO, and post-treatment processes to ensure the water meets drinking water quality requirements and is compatible with native groundwater in the Seaside Groundwater Basin. The various chemicals used during the desalination process would be stored onsite in accordance with applicable regulatory requirements, and storage facilities would include secondary concrete containment, alarm notification systems, and fire sprinklers.

Brine Storage and Disposal: The RO process would generate approximately 14 mgd of brine (including 0.4 mgd of decanted backwash water). The brine storage and disposal system would consist of: 1) one Brine Storage Basin with a storage capacity of 3-million gallons that is uncovered and lined with two impermeable liners; 2) two Brine Discharge pumps, 6-mgd capacity each, 40-hp each; and 3) an aeration system to maintain 5 mg/L dissolved oxygen levels in the brine. Under continuous brine disposal scenarios, the brine from the RO system would be conveyed directly through the 1-mile-long, 30-inch diameter Brine Discharge Pipeline to a proposed connection with the existing MRWPCA outfall. Under intermittent brine discharge operating scenarios, the brine would be directed to the brine storage basin. The brine would be stored for approximately 5 hours, and then pumped to the Brine Discharge Pipeline at a rate of 6-mgd where it would combine with approximately 14 mgd of brine from the RO process and be discharged at a total flow of approximately 20 mgd. Further evaluation of the proposed brine dilution through the MRWPCA outfall could require modifications to the proposed brine storage and disposal system. Such modifications could include, but may not be limited to a larger brine storage basin or basins (open and lined, steel or concrete), greater brine pumping capacity and larger pumps, a larger aeration system and/or a larger diameter pipeline.

Administrative Building: A 6,000-square-foot single-story administrative building at the MPWSP Desalination Plant site would house visitor reception, offices, restrooms, locker rooms, break rooms, conference rooms, a control room, a laboratory, an equipment storage and maintenance area, and monitoring and control systems for the RO system, post-treatment system, chemical feed systems, and related facilities.

BRINE DISCHARGE SYSTEM

The reverse osmosis system at the MPWSP desalination plant generates approximately 14 million gallons per day (MGD) of brine, including 0.4 MGD of decanted backwash water. The brine is initially conveyed to a three million gallon lined open brine storage basin, then pumped through a 36-inch diameter brine discharge pipeline to a new connection with the existing MRWPCA outfall and diffuser located at the wastewater facility.

During the dry/irrigation season that typically extends from April through October, treated wastewater from MRWPCA's Regional Wastewater Treatment Plant is diverted to the Salinas Valley Reclamation Project's tertiary treatment facility for advanced treatment and is used for crop irrigation. During the wet/non-irrigation season that typically extends from November through March, the brine stream blends with treated wastewater from MRWPCA's Regional Wastewater Treatment Plant before being discharged into the Monterey Bay. During other times, the brine stream will discharge into Monterey Bay without blending.

The MRWPCA's existing outfall pipeline extends into the Monterey Bay about two miles offshore along the ocean floor. The diffuser is about 1,100 feet long with 172 2-inch diameter active ports (fifty two ports are closed) that are spaced 8 feet apart, which disperse the brine stream at the discharge point. This minimizes differences in salinity and other water quality parameters between the discharge brine and the surrounding seawater.

CONVEYANCE AND STORAGE FACILITIES

Water Conveyance: The proposed MPWSP consists of water conveyance and storage facilities, such as pipelines, pump stations, and treated water storage at a proposed Terminal Reservoir and at existing and proposed Aquifer Storage and Recovery (ASR) well sites. Various transmission pipeline segments would convey feed water from the intake wells to the Desalination Plant, while product water from the Desalination Plant site would be conveyed to storage and distribution systems as shown on **Figure 2** and further described below. No U.S. Army Corps of Engineers' jurisdictional wetlands would be affected.

Feedwater Pipeline: The CEMEX Feed Water Alternative would convey seawater pumped from the seawater intake system to the Desalination Plant for a distance of approximately 11,469 LF. The conveyance of seawater from the proposed CEMEX Feed Water intake well site would traverse eastward beneath the private CEMEX access road and cross under the Highway 1 overpass and right-of-way. It would continue northeast into an abandoned railroad spur to Lapis Road, north into the Transportation Agency for Monterey County (TAMC) Right-of-Way (ROW) and onto Charles Benson Road to the desalination plant site.

An alternative alignment is identical to the previously described alignment, but turns east off of Del Monte Boulevardonto Nepsonet Road, which is the direct access road for the farms along it, to the desalination plant site .

Transfer Pipeline: For product water conveyance from the CalAm Desalination Plant to the CalAm water system, the desalinated water pump station would pump desalinated product water through the proposed Desalinated Water Pipeline and Transmission Main. From the Plant site pump station, the 9.5-mile-long, 36-inch-diameter desalinated product water pipeline would extend west for approximately 0.8 mile along Charles Benson Road (and/or Neponset Road), parallel to the proposed Feedwater Pipeline. At Del Monte Boulevard, the product water pipeline would cross Del Monte Boulevard and turn south and continue along the TAMC ROW for approximately 5.7 miles to just north of the interchange between Highway 1/Lightfighter Drive. The pipeline would traverse beneath Highway 1 via jack and bore and then continue south-easterly into land owned by the City of Seaside until it meets Lightfighter Drive. The pipeline would then continue east along Lightfighter Drive to General Jim Moore Boulevard, where it would turn south, continue beneath General Jim Moore Boulevard to just south of Coe Avenue, where it would connect to an existing pipeline.

Monterey Pipeline: The Monterey Pipeline, approximately 6.5 miles of 36-inch pipe, would continue from General Jim Moore Boulevard westward beneath Hilby Avenue, and turn south on Fremont Boulevard where it would cross Canyon del Rey Boulevard (Route 218) at the City of Monterey to Airport Road (or Casa Verde Way), where it would turn south and then turn west again along Fairgrounds Road. The pipeline would then be attached to the Fairgrounds Road/Mark Thomas Drive bridge over Highway 68 or a new pipe carrier bridge will be installed and continue onto Mark Thomas Drive turning northwest on to Fremont Street. The alignment travels west beneath Fremont Street, continuing beneath Webster Street, then turning north onto Hartnell Street and then west onto Madison Street. From Madison Street, the alignment turns north along Monroe Street and then west along Jefferson Street. The Monterey Pipeline then turns north onto Clay Street, then north onto W. Franklin St, and then north on High St. where it crosses the Presidio of Monterey (POM) along Stillwell Avenue. From POM, the pipeline alignment would exit on to Spencer Street, and then southwest to Hoffman Ave, northwest onto Cypress Ave, southwest onto Withers Avenue and finally north on Sinex Avenue connecting to an existing 30-inch pipeline in Sinex Avenue, near the Eardley Pump Station in the City of Pacific Grove. This pipeline route also improves the hydraulics of the existing system by eliminating the existing hydraulic though in the system that is located in the vicinity of Canyon Del Ray & 218 area and allows for maximum use of ASR and Carmel River excess diversion rights.

Terminal Reservoir: The Terminal Reservoir and related facilities will be located east of General Jim Moore Boulevard, north side of Watkins Gate Road, within former Fort Ord property in the City of Seaside. The Terminal Reservoir would consist of two 33-foot-tall, 130-foot-diameter aboveground concrete tanks. Each tank would have a storage capacity of 3 million gallons, for a total storage capacity of 6 million gallons. The Terminal Reservoir tanks would be constructed on an approximately 0.5-acre concrete pad. Security fencing would enclose a 4.5-acre area around the Terminal Reservoir. In order to reduce visual impacts, it may be required through the City of Seaside land development approval to partially bury (bermed) or fully bury the reservoirs.

ASR Facilities: The ASR Facilities include two injection/extraction wells (Wells ASR-5 and ASR-6), and supporting pipelines. The two additional ASR wells would be located immediately east of General Jim Moore Boulevard in the area of Fitch Park. These ASR wells will provide storage capacity in the winter, by injecting water into the Seaside Groundwater Basin, and support peak water supply in the summer by drawing on the stored water, thus reducing the need for surface water diversions from Carmel River.

Salinas Return Pipeline: From 1.0 to 1.6 mgd of product water may be used to replenish aquifers from which seawater is extracted at the intakes. The pipeline would be operated between May and October of each year and deliver product water to the existing Castroville Seawater Intrusion Project (CSIP) infiltration pond located at the MRWPCAWastewater Treatment Plant. The Salinas Return Line would be approximately 1.1 miles in length.

Castroville Salinas Valley Return Pipeline: In addition to the Salinas Return Line, return flow requirements of product water may be conveyed to the Castroville Water District. The Salinas Valley Return Pipeline to Castroville will be a 8 to 12-inch diameter pipe approximately 4 miles long. . The route alternatives are depicted on **Figure 1**.

Pump Stations: In addition to pump stations at the intake wellheads and at the desalination plant site, conveyance pump stations are also proposed on the Monterey County Fairgrounds property, and at the CalAm owned Rancho San Carlos Well Site in Carmel Valley, locations are depicted in **Figure 1**. The proposed Monterey Pump Station, located at the County Fairgrounds, would be equipped with one, 400 horsepower (hp) and two, 200 hp pumps, with a combined pumping capacity of 6,400 gallons per minute (gpm) and 3,200 gpm, respectively. The proposed Valley Greens Pump Station would be equipped with three, 60 hp, 1,400 gpm pumps. The mechanical appurtenances would be enclosed in an approximately 1300-square-foot pump house for both sites.

Highway 68 Satellite Water System Interconnect Pipelines: CalAm Monterey District includes five small satellite water located along the Highway 68 corridor. Three of these systems depend on groundwater from the adjudicated Seaside basin whose allocation will be reduced to zero by 2018. This project proposes two small water main extensions that allow MPWSP to provide adequate water supply to these systems, the extensions are shown in **Figure 1**.

PIPELINE CONSTRUCTION METHODS

Pipeline installation would generally progress at a rate of 150 to 250 feet per day. The majority of the pipeline installation would be through an open-cut trench construction method. However, where it is not feasible or desirable to perform open-cut trenching, trenchless methods would be used. Pipeline depth would vary depending on pipe size and topography but will be typically have 4 feet of cover. Installation would use conventional equipment such as flatbed trucks, backhoes, excavators, pipe cutting and welding equipment, haul trucks for spoils transport, trucks for materials delivery, compaction equipment, Baker tanks, pickup trucks, arch welding machines, generators, air compressors, cranes, drill rigs, and skip loaders.

Pipeline segments would typically be delivered and installed in 16 to 40-foot-long sections. Soil removed from trenches and pits would be stockpiled and reused, to the extent feasible, or hauled away for offsite disposal. Under typical circumstances, the width of the disturbance corridor for pipeline construction would vary from 50 to 100 feet, depending on the size of the pipe being installed. Trenchless technologies could require wider corridors at entry and exit pits. Pipeline installation would be ongoing throughout the entire 24-month construction period, with multiple pipelines being installed simultaneously. Pipeline installation would be sequenced to minimize land use disturbance and disruption to the extent possible.

Construction equipment and materials associated with pipeline installation would be stored along the pipeline easements and at nearby designated staging areas. Staging areas would not be sited in sensitive areas such as riparian or critical habitat for protected species. To the extent feasible, parking for construction equipment and worker vehicles would be accommodated within the construction work areas and on adjacent roadways.

Roadways and rail tracks disturbed during pipeline installation would be restored to existing or improved condition. A pre-construction and post-construction evaluation would be conducted to assess on-site conditions. Generally, trench spoils in the TAMC ROW would be temporarily stockpiled within the construction easement, then backfilled into the trench after pipeline installation. Any excess spoils would be disposed of at an appropriate facility. Locations for permanent removal of uncontaminated spoils would be coordinated with the selected contractor in coordination with the local jurisdiction.

The final location of pipelines within public ROWs, based on existing utilities, will determine whether certain traffic lanes or streets require closure during construction activities. Traffic Control Plans will be prepared in coordination with affected municipalities or Caltrans for temporary lane closures.

Open-Trench Construction: For pipeline segments to be installed using open-trench methods, the construction sequence would typically include clearing and grading the ground surface along the pipeline alignments; excavating the trench; preparing and installing pipeline sections; installing vaults, manhole risers, manifolds, and other pipeline components; backfilling the trench with non-expansive fills; restoring preconstruction contours; and revegetating or paving the pipeline alignments, as appropriate. A conventional backhoe, excavator, or other mechanized equipment would be used to excavate trenches. The typical trench width would be 6 feet; however, vaults, manhole risers, and other pipeline components could require wider excavations. Work crews would install trench boxes or shoring or would lay back and bench the slopes to stabilize the pipeline trenches and prevent the walls from collapsing during construction. After excavating the trenches, the contractor would line the trench with pipe bedding (sand or other appropriate material shaped to support the pipeline). Construction workers would then place pipe sections (and pipeline components, where applicable) into the trench, join the sections together as trenching proceeded, and then backfill the trench. Steel plates would be placed over trenches to maintain access to private driveways.

Trenchless Technologies: Where it is not feasible or desirable to perform open-cut trenching, trenchless methods such as jack-and-bore, drill-and-burst, horizontal directional drilling, and/or microtunneling would be employed. Pipeline segments located within heavily congested underground utility areas or in sensitive habitat areas may be installed using horizontal directional drilling or microtunneling. Jack-and-bore methods would also be used for pipeline segments that cross beneath Highway 1 or drainages.

Jack-and-Bore and Microtunneling Methods: The jack-and-bore and microtunneling methods entail excavating an entry pit and a receiving pit at either end of the pipe segment. A horizontal boring machine or auger is used to drill a hole, and a hydraulic jack is used to push a casing through the hole to the opposite pit. As the boring proceeds, a steel casing is jacked into the hole and pipe is installed in the casing.

Drill-and-Burst Method: The drill-and-burst method involves drilling a small pilot hole at the desired depth through a substrate, and then pulling increasingly larger reamers multiple times through the pilot hole until the hole reaches the desired diameter.

Horizontal Directional Drilling: Horizontal directional drilling requires the excavation of a pit on either end of the pipe alignment. A surface-launched drilling rig is used to drill a small horizontal boring at the desired depth between the two pits. The boring is filled with drilling fluids and enlarged by a back reamer or hole opener to the required diameter. The pipeline is then pulled into position through the boring. Entry and receiving pits range in size depending on the length of the crossing, but typically have dimensions of approximately 50 by 50 feet.

MPWSP VARIANT

The project includes a variation (Variant) that potentially combines a reduced-capacity desalination plant with a water purchase agreement for product water from the MRWPCA's proposed Pure Water Monterey Groundwater Replenishment Project. The Pure Water Monterey Groundwater Replenishment Project has its own separate environmental compliance documentation and otherwise has independent utility from the MPWSP (refer to the Draft Environmental Impact Report for the Pure Water Monterey Groundwater Replenishment Project, prepared by Denise Duffy & Associates, Inc. (dated April 2015), available on the Monterey Regional Water Pollution Control Agency website (http://www.mrwpca.org/).

The Variant, if approved, reduces the size of desalination plant capacity from 9.6 MGD to 6.4 MGD and the number of source wells is reduced to eight (six active and 2 standby), which includes conversion of existing test slant well to a production well, to produce up to 15.5 MGD of source water. Additionally, the volume of brine waste discharge is reduced. The remaining MPWSP proposed facilities are the same under the MPWSP and the Variant scenarios.

The primary objectives of the MPWSP Variant are the same as those for the proposed project. In order to provide 9,752 afy of additional water supplies to meet the estimated total annual demand in the Monterey District of 15,296 afy, the MPWSP Variant would provide 6,252 afy with a reduced sized desalination plant (6.4 mgd). The remaining 3,500 afy would be provided through a water purchase agreement between CalAm and the GWR project sponsors (in addition to existing Carmel River diversions, Aquifer Storage and Recovery [ASR], the Seaside Groundwater Basin and the Sand City Coastal Desalination Plant). **The table below** summarizes the future supplies for the Monterey District with and without the implementation of the MPWSP Variant.

Future Water Supplies for the Monterey District with Implementation of the MPWSP

Source	**MPWSP with GWR Average Annual Yield (afy)a**	**MPWSP without GWR Average Annual Yield (afy)a**
MPWSP Desalination Plant (Proposed)	6,252	9,752
GWR Project Water	3,500b	--
Carmel River Diversions (Existing)	3,376	3,376
ASR Project (Existing)	1,300	1,300
Seaside Groundwater Basin (Existing)	774c	774c
Sand City Coastal Desalination Plant (Existing)	94	94
Total	**15,296**	**15,296**

a. Average annual yields are rounded to the closest whole number.
b. CalAm would enter into a water purchase agreement with MPWMD for 3,500 afy of GWR project supply.
c. After CalAm has fulfilled its replenishment obligations to the Seaside Groundwater Basin (assumed to take 25 years at a replenishment rate of 700 afy), CalAm would increase pumping to its adjudicated right of 1,474 afy.
SOURCE: ESA Associates, 2015.

FIGURE 1

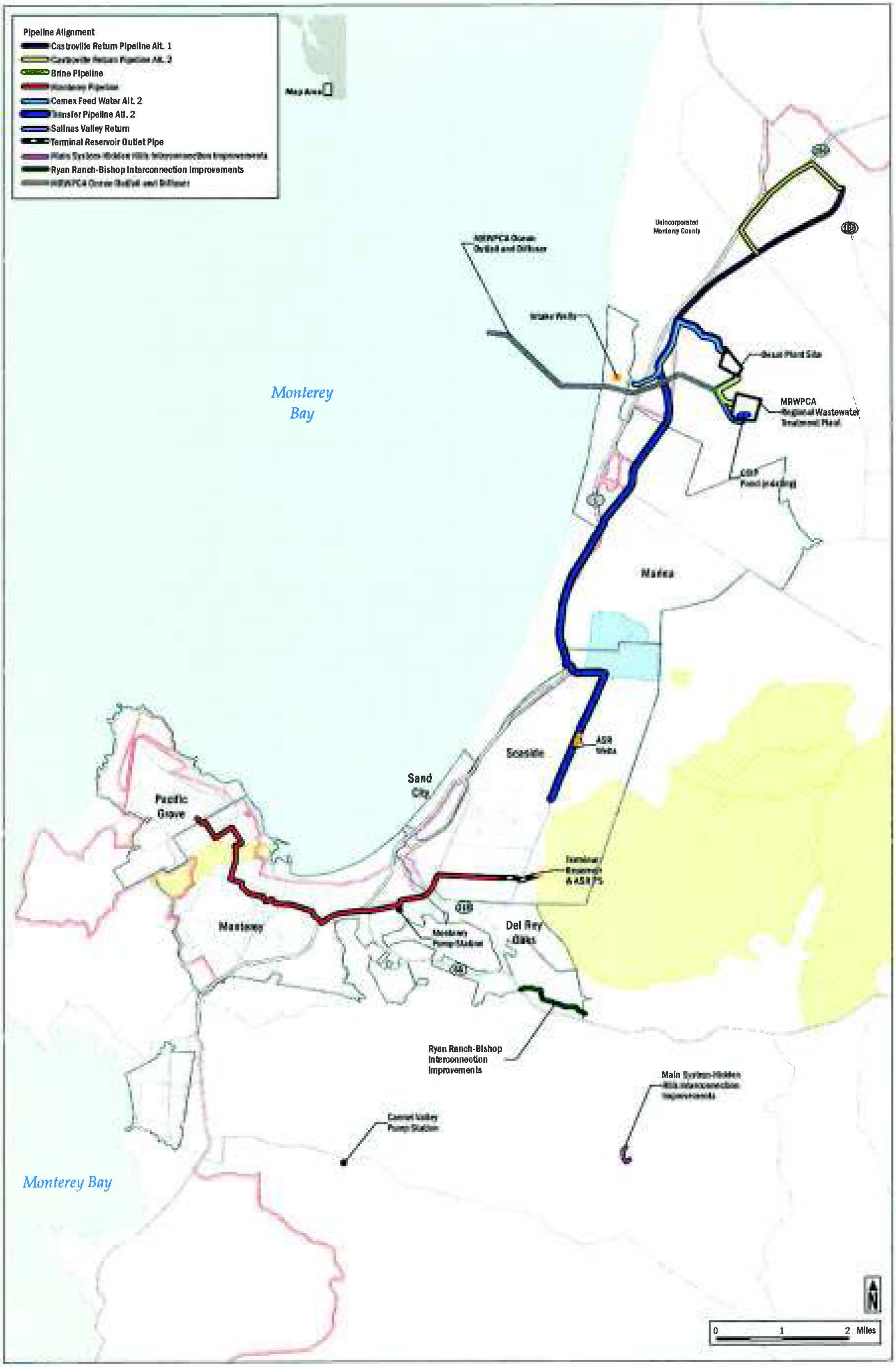
MPWSP FACILITIES OVERVIEW

FIGURE 2

SUBSURFACE SLANT WELL LAYOUT

FIGURE 1

MPWSP FACILITIES OVERVIEW

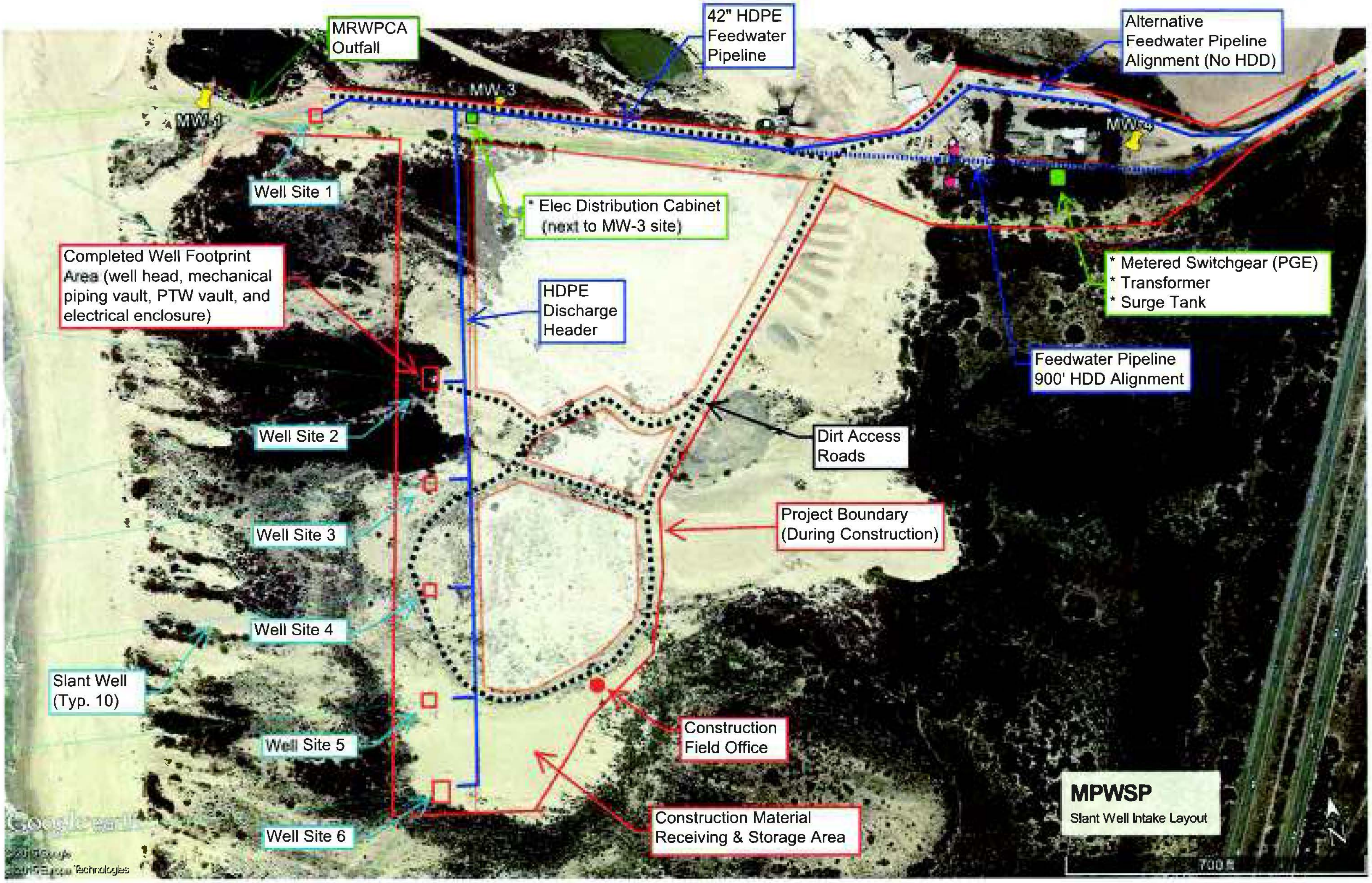


PROJECT OVERVIEW

Project Pipeline Alignments

FIGURE 2

SUBSURFACE SLANT WELL LAYOUT


MRWPCA Outfall
42" HDPE Feedwater Pipeline
Alternative Feedwater Pipeline Alignment (No HDD)
MW-3
MW-1
MW-4
Well Site 1
* Elec Distribution Cabinet (next to MW-3 site)
Completed Well Footprint Area (well head, mechanical piping vault, PTW vault, and electrical enclosure)
HDPE Discharge Header
* Metered Switchgear (PGE)
* Transformer
* Surge Tank
Feedwater Pipeline 900' HDD Alignment
Well Site 2
Dirt Access Roads
Well Site 3
Project Boundary (During Construction)
Well Site 4
Slant Well (Typ. 10)
Construction Field Office
Well Site 5
MPWSP
Slant Well Intake Layout
Construction Material Receiving & Storage Area
Well Site 6
700 ft