II. Hazardous Materials Inventory

The following table is a summary of the hazardous materials anticipated to be present on site. Included in the table is the anticipated storage location, method of delivery, and maximum amount of each hazardous material.

Material	Anticipated max quantity on site	Method of delivery to site	Storage location	Associated BMPs
Petroleum fuels for equipment and vehicles	1,200 gallons	By fuel delivery company or procured by site workers for use on site.	Only in vehicles and equipment fuel tanks. May be stored in 5-gallon OSHA approved containers for fueling equipment. No storage in above or below ground tanks.	▪ All fuel not in vehicles or equipment fuel tanks must be maintained in DOT approved containers and, when not actively fueling a piece of equipment, it must be stored in the approved area in the project storage yard
Lubricants, oils, and grease	300 gallons	Within 1-quart to 5-gallon retail containers or 55-gallon DOT-approved drums brought to the site.	Only in vehicles and equipment or stored in the approved storage area in the project storage yard.	▪ Proper storage of materials must be maintained between use
Paint	100 gallons	Within 1-quart to 5-gallon retail containers and 18 oz spray cans brought to the site.	While not in use, stored in the approved storage area in the project storage yard.	▪ Paint containers will be allowed to dry and then properly disposed of ▪ Only what is needed for the active task will be taken from the storage area
Solvent, glues, adhesives, cleaners, and other chemicals	10 gallons	Within retail containers brought to the site.	While not in use, stored in the approved storage area in the project storage yard.	▪ Empty containers will be placed in a satellite accumulation drum/lab-pack for proper disposal ▪ Only what is needed for the active task will be taken from the contained and covered storage
Hazardous waste and universal waste	Unknown	Hauled off site by an approved and licensed HAZWASTE hauler.	Within the project storage yard.	▪ Weekly inspection of haz-waste storage ▪ Secondary containment and covered / closed ▪ Labeling and signage conforming to County OES, State and Federal regulations
Treatment Chemicals	100,000 gallons	By chemical company in bulk trucks.	Double contained storage tanks (permanent installation).	▪ Secondary containment ▪ Labeling and signage ▪ Eye wash showers

III. Hazardous Materials Handling

A. Unloading and Loading Procedures

The unloading and loading of hazardous materials will only be performed within the designated project equipment storage yard. Hazardous materials not actively being used will be placed immediately within the appropriate storage area.

CDM Smith

B. Fueling Procedures

The following are the procedures for the delivery of fuel and the fueling of vehicles and equipment:

- The delivery person will estimate and determine the amount of fuel to be delivered
- The delivery person makes a connection to electrically ground the fuel delivery truck and system before fueling begins
- The delivery person will constantly monitor the filling activity
- A spill kit will be readily available to those performing the fueling operations

C. Storage Locations and Methods

When not in use, hazardous materials will be stored within an approved area located within the project storage yard (green areas outlined on attached map). Liquid hazardous materials and hazardous wastes will be kept within this storage unit on secondary containment pallets large enough to capture the volume of the largest container stored on the pallet. All containers must be labeled and in good condition. A material safety data sheet (MSDS) must be maintained on site for each hazardous material that is being stored.

D. Employee Training

1. Preliminary Spill Prevention and Control Plan

Spill prevention awareness training will be conducted by the individual contractors for their employees. During the site orientation, workers will be made aware of the location of the Material Safety Data Sheets (MSDS) library, as well as their responsibility to notify their supervisor of the spill or release of chemicals on site. Workers tasked with fueling vehicles will be aware of the location of and procedures for using the site spill response kits.

2. Hazard Communications Training

The training requirements for Cal/OSHA's hazard communication standard, found in 8CCR §5194(h), require employers to "provide employees with effective information and training on hazardous substances in their work area at the time of their initial assignment, and whenever a new hazard is introduced into their work area." Initial training will be provided by each employer as described in their Written Hazard Communication Program; a copy of which will be kept on site and available at all times. Information regarding new hazards introduced in to the work area will be provided to workers and documented as part of tailgate meetings, or Activity Hazard Analysis (AHA) review which is part of our quality control plan and the safety plan.

E. Hazardous Materials Identification

1. Hazard Information and Identification

If it is determined that the new material meets the definition of a hazardous substance the following information sources will be maintained on site:

- An inventory of all hazardous materials will be prepared and maintained on site by the individual contractors and the Site Health and Safety Officer (SHSO). The list will include the name of all hazardous materials using the name that is referenced on the appropriate MSDS and the container label. The list will include the average and maximum volume of the material stored on site as well as the location(s) where the material is stored on site
- An MSDS will be readily accessible on site for all hazardous materials stored on site
- All original containers and portable containers will be labeled with the identification of the hazardous materials. The identification will match the name included on the inventory and the materials safety data sheet. The label will also include hazard warnings applicable to the hazardous material
- All hazardous materials containment areas will have signage posted identifying it as a hazardous materials storage area

IV. Spill Prevention, Control, and Countermeasures

A. Secondary containment

1. For storage of liquid hazardous materials

All liquid hazardous materials that are not in active use or used within a piece of equipment or vehicle must be maintained within a secondary containment structure (i.e., containment pallet) capable of containing the entire volume of the stored container. The secondary containment structure must be covered with a rain-proof covering.

2. For fueling and maintenance operations

All portable equipment and vehicles must be placed within a portable secondary containment device/structure while they are being fueled adjacent to active waterways. All equipment being serviced and refueled will be watched for leaks, drips, and other signs of potential leaks; these leaks will be reported and immediate action will be taken to collect the material before it contaminates the area.

B. Spill Response Resources

1. Spill response equipment list

The following spill response equipment and resources will be maintained on site at all times during the construction project:

- Hydrocarbon absorbing pads
- Granular oil absorbent
- Collection container (from 5 to 30 gallon capacity)
- A copy of the SPCP
- A copy of the emergency contacts list
- A copy of all MSDS
- A current copy of the North American Emergency Response Guidebook

Site contractors, equipment maintenance vehicles, and delivery drivers will be required to maintain their own equipment or individual clean up kits on site, but will be permitted to use the site kit as a supplement as necessary.

C. Spill Reporting Requirements

All significant releases or threatened releases of a hazardous material, including oil, require emergency notification to government agencies.

State and local notification must include

- Identity of caller
- Location, date and time of spill, release, or threatened release
- Location of threatened or involved waterway or storm drains
- Substance, quantity involved, and isotope if necessary
- Chemical name (if known, it should be reported if the chemical is extremely hazardous)
- Description of what happened

Federal notification requires additional information for spills (CERCLA chemicals) that exceed federal reporting requirements, which includes:

- Medium or media impacted by the release
- Time and duration of the release
- Proper precautions to take
- Known or anticipated health risks
- Name and phone number for more information

Agency	Phone Number	When to Call
City of Marina Fire Department	(831) 758-7261	Following the Releases of a hazardous materials.
California State Warning Center	(800) 852-7550	Following the Releases of a hazardous materials.
National Response Center	(800) 424-8802	If the spill equals or exceeds CERCLA Federal Reportable Quantities.
Department of Fish and Game, Office of Spill Prevention and Response	(707) 944-5500	When a spill that may escape to waters of the U.S.
Cal/OSHA District office Sacramento	(916) 263-2803	For more than 3 people jured or a fatality: Cal/OSHA District Office.
Owner Representative	Contact TBD	Following the Releases of a hazardous materials.
CDM Constructors Inc.	Kenny Vassar 562-755-3075	Following the Releases of a hazardous materials.

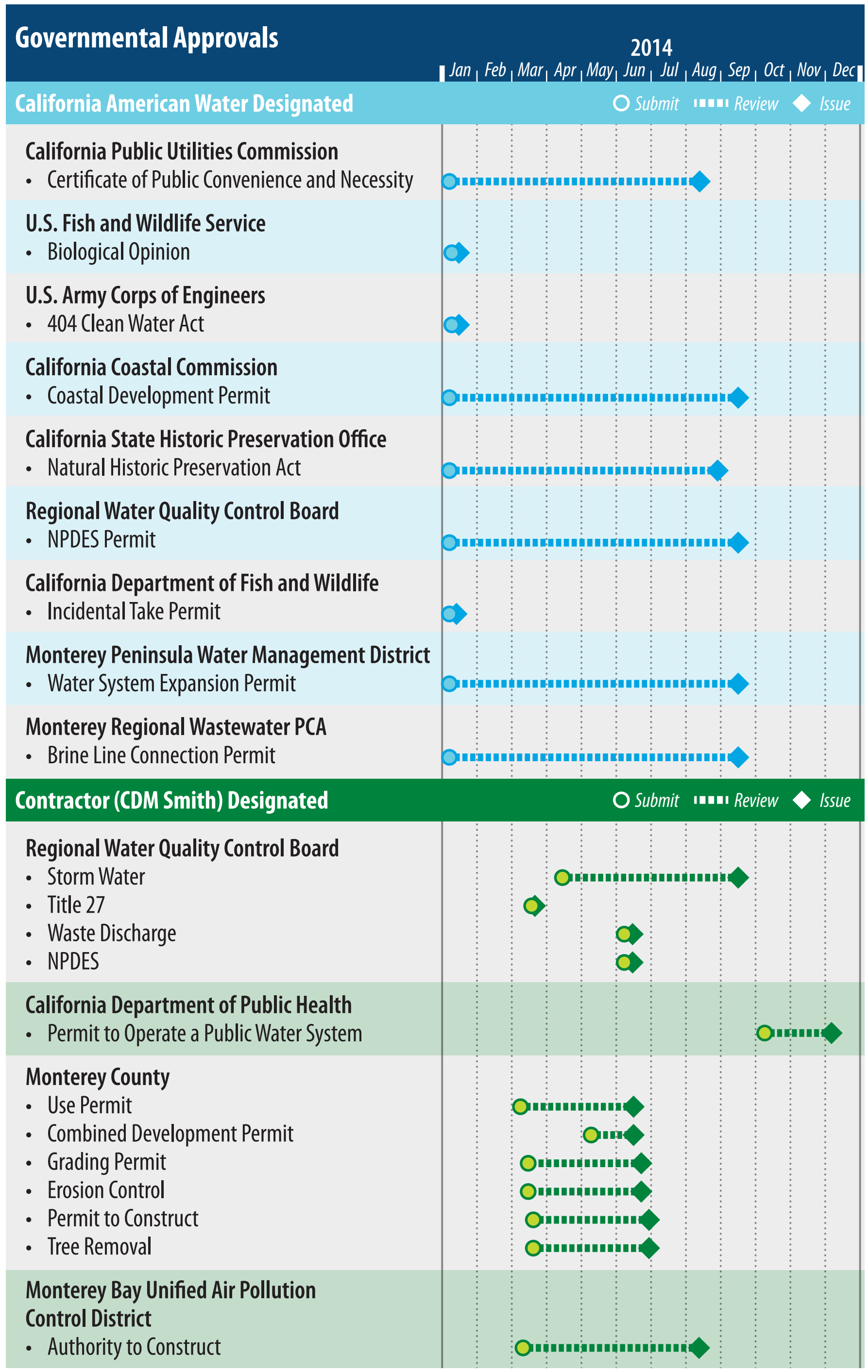
12) Approach to Obtaining Governmental Approvals

Approach to Obtaining Governmental Approvals needed to Construct and Operate the Design-Build Improvements

Permitting requires coordination by the team with other utility entities and federal, state and local agencies to secure approvals to facilitate design completion and expedite construction startup. Our team includes two companies that specialize in permitting assistance:

- Locally based Denise Duffy & Associates, Inc. (DDA) to prepare and submit all Monterey County permits and other local area permits such as MPWMD. DDA has successfully completed expedited permitting applications for large complex infrastructure projects in Monterey County on many projects with the most recent being the San Clemente Dam Removal project.
- The San Francisco Bay area based EOA, Inc. with 30 years of regulatory experience. They will assist with CDPH and NPDES permitting. Their long-term experience and relationships with the Regional Water Quality Control Board (RWQCB) and the California Department of Public Health (CDPH) will result in collaboration and successful completion of permitting that will not delay the project.

CAW has identified the governmental approvals that will be led by CAW and the governmental approvals that will be led by our team in Appendix 3. Below is a permitting timeline showing anticipated approval dates for all of the permits.



Additional Permit

We have identified an additional permit that is necessary per the RWQCB Waste Discharge Requirements per Porter-Cologne Water Quality Control Act. The storage of waste brine at the MPWSP Desalination Plant site prior to disposal in the wastewater ocean outfall will require permitting under California Code of Regulations Title 27 (Cal.Code Regs., tit.27) as a waste discharge unit. The waste brine is classified as a non-hazardous "designated waste". This waste has the potential to degrade surface and or groundwater quality if released from the storage ponds. Designated waste liquids per Title 27 require a dual, impermeable-barrier waste discharge unit, and other requirements as listed below, to protect surface and groundwater quality.

Our fee includes the costs associated with obtaining this permit and our construction costs include the necessary equipment's and materials for the required monitoring.

Although the RWQCB has a statutory obligation to protect water resources through enforcement of Title 27, it does have discretion over the magnitude and type of monitoring. Waste discharge units above shallow, high-quality potable groundwater will have more stringent monitoring requirements imposed than units overlying deep groundwater of poor quality. At a minimum Title 27 requires:

- Dual impermeable-containment
- Leachate collection and recapture system with a maximum leakage rate
- Vadose zone monitoring directly beneath the waste discharge unit (extent and type varies per unit conditions)
- Up-gradient and down-gradient monitoring of the groundwater (three wells minimum but extent varies with the unit conditions)
- Submission of a Report of Waste Discharge to the Regional Board that includes a monitoring plan, corrective action plan, closure plan, and financial assurances
- Annual reporting requirements

The MPWSP Desalination Infrastructure site is located in the Salinas Groundwater Basin (see the figure below) which has a highly engaged public on the subject of groundwater protection. The Basin is the primary source of water for Salinas Valley irrigators and has experience saline intrusion along its coastal margin. The upper two aquifer units in the Basin beneath the site are the Dune Sands and the 180-foot aquifer. The Dune Sands are in direct hydraulic communication with the ocean and can be highly variable in quality; it is not a potable source in the Basin. Below the site the Dune Sands is at a depth of approximately 30 to 40 feet and water is likely of moderate to good quality as a result of surface water infiltration. The RWQCB would develop contamination thresholds (concentration limits) based upon the back ground quality of the Dune Sands. The deeper 180-foot aquifer is a potable aquifer and is one of the primary aquifers used for water supply in the Salinas Basin.

Because groundwater quality and flow conditions have varied over time in the Basin due to fluctuations in pumping conditions, it's very important that the background groundwater quality conditions be established over time. Constituents in intruded seawater (e.g. sodium chloride) will have the same characteristics as the stored brine making it difficult to distinguish between a saline intrusion event or a leak. In the case of uncertainty, the RWQCB would require the operator to conduct an evaluation monitoring program to establish the source of any constituents that exceed background concentrations; these background concentrations would be written into the Waste Discharge Requirements issued for the operation of the storage ponds.

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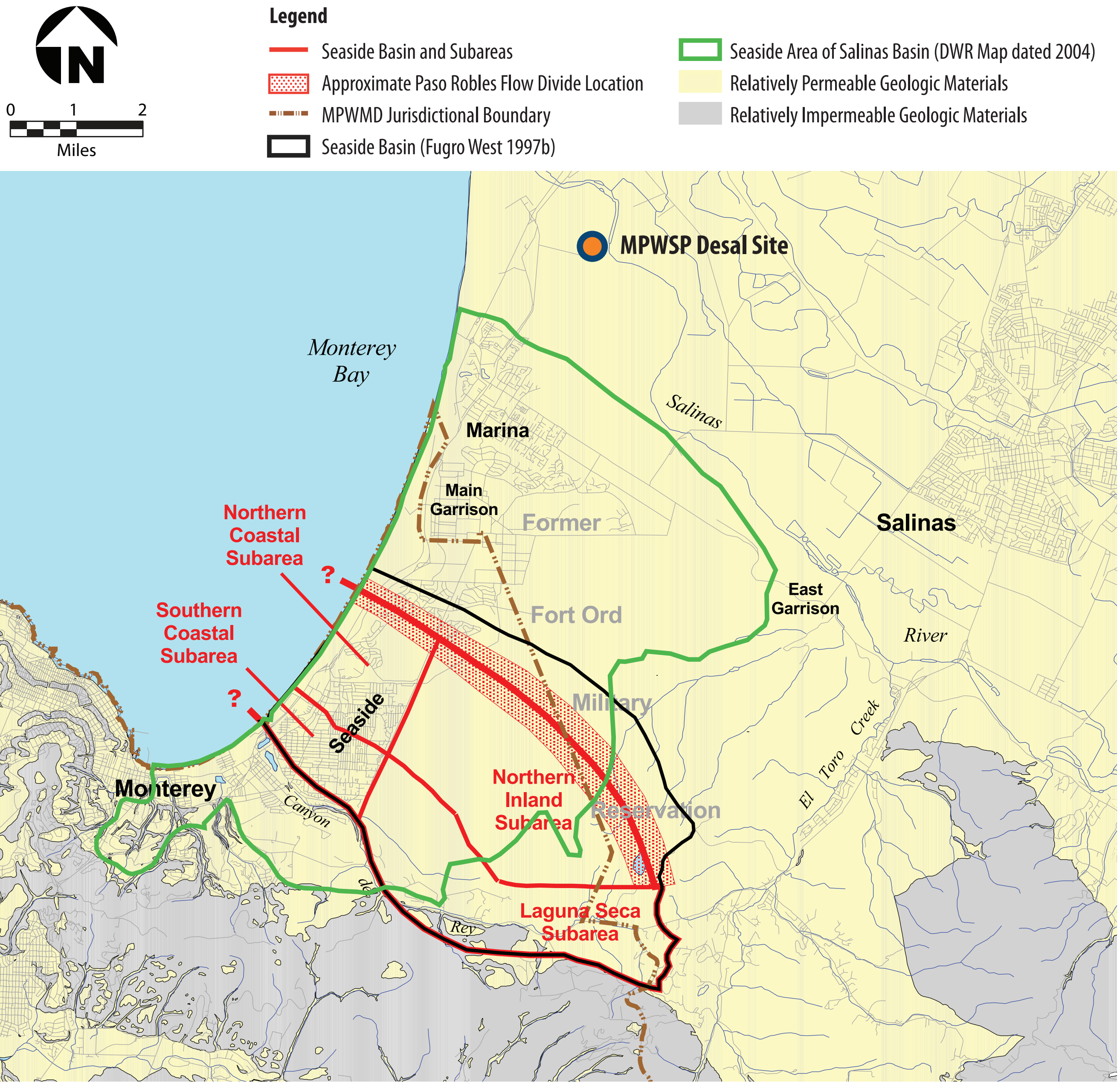

evaluation monitoring program to establish the source of any constituents that exceed background concentrations; these background concentrations would be written into the Waste Discharge Requirements issued for the operation of the storage ponds.

Modified Regulatory Requirement

Of particular note will be the efforts involved in obtaining the CDPH conditional and final approval for the facility, as the approval process for seawater desalination plants is still under development and some significant changes have occurred in State drinking water regulations after approval was granted to the Sand City plant. On such change is the adoption of the Long Term 2 Enhanced Surface Water Treatment Rule (LT2), which now requires two years of Cryptosporidium monitoring be carried out in conjunction with the Watershed Sanitary Survey in order to avoid a Bin 4 classification, which would require 5.5-log reduction of Cryptosporidium. When the Sand City plant was permitted, the LT2 had not yet been adopted, and the maximum Cryptosporidium removal required was 4-log. This removal was achieved using a combination of RO (2-log) and UV (3-log). In addition, free chlorine was used for additional removal of viruses. For the regional plant, it will not be possible to comply with the new Cryptosporidium requirements without additional credits from the UV, RO, or another treatment process.

As we did with the Sand City plant, CDM Smith will work closely with local and state wide CDPH staff, first to develop an approval path for the regional facility and then to achieve the necessary approvals. Our approach to this approval, in the event that a watershed sanitary survey is not carried out, will be to provide UV units validated by the USEPA and rated for up to 4-log reduction of Giardia and Cryptosporidium. While the majority of UV units used in drinking water facilities today have been validated through the German DVGW process, appropriately sized models are available from both Trojan and Calgon that have also been through the USEPA process, allowing them to be granted higher log reduction credits, typically at lower UV doses. By including only USEPA validated units in our design, it will allow the facility to comply with the new requirements of the LT2, while providing additional removal credits that may allow operational flexibility in the upstream RO and downstream chlorination processes.

Table I-12.1 summarizes CDPH's disinfection requirements for the Sand City Water Treatment Plant, the anticipated requirements for the Regional Plant, and the proposed process for meeting these removal credits.

Table I-12.1. Approach to Achieving Pathogen Log Removal Credits

Pathogen	Required			RO	UV	Cl2	Total
	Sand City	w/o Sanitary Survey	with Sanitary Survey				
Cryptosporidium	4	5.5	2	2	4	0	6
Giardia	5	5	3	2	4	1	7
Viruses	6	6	4	2	0	4	6

Permitting Tasks

Our permitting approach will include the following services:

- Permit initiation and agency coordination
- Initial coordination meetings with CAW and permitting agency
- Coordination within our team to obtain the necessary documentation in a timely manner
- Permit applications
- Permit assistance and support to CAW for applicable governmental permits. CAW will lead the identified permits in the permit timeline; however, our assistance for this task will require our team to supply the necessary technical documentation for the permits in a timely manner and have some coordination meetings with the agencies along with CAW. We can assist with the applications as well.
- Assistance in permit acquisition
- All necessary reports for all the permits that our led by our team

13) Design-Build
Quality Management Plan

Section 1
Design-Build Quality Management Plan Overview

The purpose of the Monterey Peninsula Water Supply Project is to identify and implement water supplies to serve as alternatives to the utilization of the Carmel River. One of the proposed alternative supplies is sea water desalination as instituted through the Desalination Infrastructure project (Project) sponsored by California America Water (CAW). The desalination plant will be constructed on a currently vacant site consisting of approximately 46 acres. The facility will include the following components:

- pre-treatment filtration process;
- filter backwash supply system;
- filtered feedwater receiving tanks;
- waste washwater storage, clarification, and recycling facilities;
- desalination process;
- post-treatment stabilization process and chemical systems;
- reverse osmosis concentrate equalization discharge, aeration, equalization and pumping facilities;
- desalinated/finished water storage tanks and pumping station;
- electrical systems; buildings to house process and non-process facilities.

The project scope consists of performing the design, permitting, construction, and commissioning and testing of the desalination infrastructure consistent with the requirements of the RFP. The CDM Smith Design-Build Quality Management Plan (Design-Build QMP) defines the processes and procedures required to achieve a successful project throughout all phases of work. In addition, the Plan establishes mechanisms to verify these processes and procedures are being implemented by the project team. These monitoring activities are critical to assure that all elements of the Plan are being incorporated on a consistent basis throughout the project duration.

Defining Characteristics of Project Quality

Project quality is defined as the totality of features, attributes, and characteristics of a facility, product, process, component, service, or workmanship that bear on its ability to satisfy the owner's requirements.

Quality can be characterized as meeting the requirements of:

- The owner as to functional adequacy; completion on time and on budget, life cycle and operation and maintenance costs.

- The design professional as to provision of well defined scope of work; budget to assemble and use qualified staff; budget to obtain field information prior to design; provisions for timely decisions by the owner and design staff; and contract to perform work with adequate time.

- The constructor as to provision of contract plans, specifications, and other documents in sufficient detail for construction; timely decisions on the part of the owner and design professional on issues effecting project delivery; fair and timely interpretation of contract requirements from field supervisors and inspection staff; and contract performance of work on schedule.

- All concerned agencies as to public safety and health; environmental considerations; protection of public property including utilities; and conformance with applicable laws, regulations and codes in the project location.

Quality in the constructed project is also characterized by: complete and open communication among project parties, selection of qualified organizations and personnel by the owner for all phases of the work, implementation of effective change management protocols, and rapid resolution of conflicts and disagreements in the absence of litigation.

Overview of Quality Management at CDM Smith

The comprehensive CDM Smith Quality Management System (QMS) provides the structure required to integrate and coordinate the QA/QC activities for all phases of the Desalination Infrastructure design-build project. Our QMS, implemented on a corporate-wide basis, has been developed consistent with the International Organization for Standardization (ISO 9001) requirements.

The QMS, which addresses CAW's overall program plan, consists of four tiers:

- Tier 1– CDM Smith Quality Manual; The Manual describes the scope of the QMS and presents the processes used within CDM Smith to develop high-quality work products. It includes a detailed description of the quality responsibilities for key personnel.

- Tier 2 – Supplemental Quality Manuals- Specific to the Monterey Peninsula Water Supply Project, the QMP-4 Design-Build Supplement defines the quality processes applicable to the project characteristics unique to design-build delivery including those associated with construction cost estimating updates, transition from design to construction phase, and design team/construction team interactions.

- Tier 3 – Quality Procedures (QPs)- The QPs describe the methods used to implement the processes and policies identified in the Quality Manual. The

QPs establish the specific requirements for a broad range of quality processes from the conductance of the Project Quality Management Workshop kick-off meeting to identify project critical success factors through the use of Technical Review Committees, Lead Practitioners, and Technical Specialist Reviews to the details of both preparing, and performing the independent checking of calculations and modeling output.

- Tier 4 – Records- Requirements for documenting that the requirements of the QMS have been fulfilled.

Design-Build QMP Purpose

The purpose of the Design-Build QMP is to establish the roles and responsibilities for quality management on the Project throughout all phases of the assignment and to document the quality management activities to be implemented by the project team. This Design-Build QMP has been developed using CDM Smith's Quality Management Plan 4- Design-Build Supplement as the central core for establishing the necessary activities. The applicable sections of QMP-4, as well as the pertinent Tier 3-Quality Procedures, have been excerpted and included in this Design-Build QMP, establishing a thorough framework defining all of the QA/QC activities required for the project.

To the extent possible, this Design-Build QMP has been formulated to be a stand-alone, comprehensive document, which is comprised of the quality management information required by the project team to successfully prepare a quality design of the Desalination Infrastructure project, to construct the facilities consistent with the design intent, and to commission and test the plant components providing the positive verification of the delivery of a high-quality facility to CAW.

The attached figure, Organization Chart, depict the members of the project team associated with all phases of the project. Each team member will contribute to the quality of the overall project through the implementation of the required processes and procedures established in the Design-Build QMP. Additional detail on specific roles and responsibilities will be provided in other sections of the plan.

Organization of the Document

The Design-Build QMP is organized into three sections as described below:

- Section 1 – Design –Build Quality Management Plan Overview; presents the purpose and objectives of the Design-Build QMP.

- Section 2 – Design Phase; establishes the procedures and activities associated with implementing the QA/QC requirements associated with the project design;

- Section 3 – Construction Phase; outlines the requirements for implementing the construction quality control measures for the project

Section 2- Design Phase

Overview

The primary objective of the project design phase is to develop a comprehensive set of high-quality plans and specifications to guide the construction of the facilities. The QA/QC activities associated with the design phase of the project are best characterized by the performance of the independent review of all work performed. As described below in more detail, independent review occurs throughout the design process, starting with the independent checking of all calculations to the assembly of a multi-disciplinary technical review committee to review the design packages at the 10%, 30%, and 60% stages of submittal. Constructability and operability reviews by technical experts throughout the design process provide the integration and coordination necessary to develop a set of plans and specifications which results in a cost-effective construction of facilities which meets the design intent and performance requirements.

Project Team Roles and Responsibilities

The primary individuals responsible for the management and implementation of the design phase QA/QC activities are listed below:

- Design Principal – Paul Meyerhofer
- Design-Build QA/QC Manager – Jack Taylor
- Lead Engineer – Michael Zafer
- Process Design Lead- Curtis Kiefer
- Facilities Design Lead – Doug Brown
- Permitting Support Lead – Greg Wetterau

The Project Organization Chart in the previous section depicts the entire team and support services proposed for the design of the Desalination Infrastructure project.

Design-Build QA/QC Manager

The responsibility of the DB QA/QC Manager, Jack Taylor, to oversee the implementation and monitoring of the design quality procedures established in the CDM Smith Quality Management System. Specific tasks include:

- Identifying participants for the technical review committee (TRC) including technical specialists to address constructability and operability issues.
- Documenting the findings from TRC meetings.
- Monitoring that comments from TRC, CAW, and others have been considered, as appropriate implemented into the design and or addressed.

- Verifying that appropriate sign-offs and approvals have been obtained.
- Reporting monthly to the CDM Smith Design-Build Project Manager and Design Principal, any quality concerns. Mr. Meyerhofer will include these concerns in the monthly report to CAW.
- Ensuring that project close-out activities have been accomplished.
- Coordination with the staff responsible for implementing the construction phase of the project.

Technical Review Committee (TRC)

The responsibility of the TRC (Quality Procedure 2.3 Technical Review Committee) is to provide an independent review of all major project deliverables by experienced and technically qualified staff. The design packages to undergo a TRC include those at the 10%, 30%, and 60% stages. A preliminary listing of technical reviewers participating on the TRC is provided below:

- Chairman - Paul Meyerhofer
- DB QA/QC Manager – Jack Taylor
- Desalination Processes– Ken Klinko
- Process Lead Practitioner– Don Thompson
- Pumping Equipment – Ernie Sturtz
- Desalination Processes– Ian Watson
- Pre-treatment and chemical processes – Temple Ballard

Checking

A description of the checking quality management activities as required under the CDM Smith "Quality Procedure 2.2 Independent Checking", is presented below. Individuals identified by the function group leaders (electrical, structural, instrumentation, building mechanical, etc.) to perform both inter- and intra- function checking will be provided to the CDM Smith Design Principal, Paul Meyerhofer.

CAW Reviews

Work products will be submitted to CAW for review following appropriate implementation of quality reviewers and/or TRC recommendations. The CAW project engineer will send the CDM Smith Design Principal a consolidated list of comments in the format of the review comment spreadsheet (see Attachment 1). The CDM Smith Design Principal will assign each comment to the appropriate CDM Smith technical team member. The technical team member will forward all responses to the Design Principal who will send a consolidated list of responses back to CAW's project engineer on the review comment spreadsheet. If any responses are inadequate or there is disagreement, those responses and associated issues will be discussed at the next progress meeting, or at a time established specifically to address the comments for resolution.

Quality Management Activities

Detailed descriptions of the quality control activities required on this assignment are provided in this section. Activities include the development of computations, the checking of drawings, specifications, and calculations, and the implementation of technical reviews. Report and drawing formats are also provided in this section.

Codes and Standards

CDM Smith developed the Basis of Design Report, as required by the RFP (Appendix 2), which identified a range of codes to be applied to the design of the Desalination Infrastructure project. The design shall adhere to the following codes and standards:

Gog Codes and Standards for S and Standards for StructuresGoverning Codes and standand Standards for Structures
California Building Code (CBC) – 2013 (based upon the International Building Code 2012)
ASCE/SEI 7-10 Minimum Design Loads for Buildings and Other Structures, American Society of Civil Engineers
ACI 318-11 Building Code Requirements for Structural Concrete, American Concrete Institute
ACI 350-06 Code Requirements for Environmental Engineering Concrete Structures, American Concrete Institute
ACI 350.3-06 Seismic Design of Liquid-Containing Concrete Structures, American Concrete Institute
CRSI Design Handbook, 2008, 10th Edition, Concrete Reinforcing Steel Institute
AISC 341-10 Seismic Provisions for Structural Steel Buildings, American Institute of Steel Construction
AISC 360-10, Specification for Structural Steel Buildings, American Institute of Steel Construction
AWS D1.1-08 Structural Welding Code – Steel, American Welding Society
AWWA D100-05 Welded Carbon Steel Tanks for Water Storage, American Water Works Association
AWWA D103-09 Factory-Coated Bolted Carbon Steel Tanks for Water Storage, American Water Works Association

Additional Standards for Tank, Equipment and Nonstructural Component Anchorage
ACI 355.2-07 Qualification of Post-Installed Mechanical Anchors in Concrete & Commentary
ACI 355.4-11 Qualification of Post-Installed Adhesive Anchors in Concrete and Commentary
ICC AC308 Post-installed Adhesive Anchors in Concrete Elements—Approved June 2013
ICC AC193 Mechanical Anchors in Concrete Elements—Approved June 2012, Editorially Revised May 2013

Governing Codes and Standards- HVAC
2013 California Mechanical Code based on the 2012 Uniform Mechanical Code of the International Association of Plumbing and Mechanical Officials (IAPMO)
2013 California Energy Code
CALGreen 2010: CBC Title 24, Part II, Mandatory Measures
American Society of Heating, Refrigeration, and Air Conditioning Engineers (ASHRAE) Standards 90.1-2010 for Energy Conservation
American Society of Heating, Refrigeration, and Air Conditioning Engineers (ASHRAE) Standards 62-2013 for Ventilation of buildings

Governing Codes and Standards- HVAC
NFPA Standard 90A - Installation of Air-Conditioning and Ventilation Systems
UL: Underwriters Laboratories, Inc.
U.S. Green Building Council LEED-NC Reference Guide 2.2
Sheet Metal and Air Conditioning Contractors National Association (SMACNA). Standards
Air Moving and Conditioning Association (AMCA)
National Environmental Balancing Bureau (NEBB)

Governing Codes and Standards- electrical
National Electrical Code (2011 Edition)
International Building Codes (conduit spacing in structural elements – 3 times diameter spacing
California Title 24 Building Codes (2013)
NFPA-1-1 (emergency lighting for occupied spaces)
IES Lighting handbook
California PUC General Orders 95 (overhead work) and 128 (underground work) in public spaces
IEEE 519-1992 (Recommended Practices and Requirements for Harmonid Control in Electrical Power Systems)

Computations

Preparation of Computations

All computations and evaluations must be prepared with sufficient information included to clearly justify resulting decisions as established in "Quality Procedure 3.7 Preparation of Computer Assisted Hand Calculations and Paper Calculations". Calculations and worksheets must also be prepared so that they form a clear record of what was accomplished, how, when, and by whom. The intent is to allow someone not associated with the project to pick up the calculation and be able to ascertain why the calculation was done, what information was used (and its source), what was assumed and why, how the answer was arrived at, and what was concluded.

Computations may be paper or computer assisted. All computations shall conform to the following minimum guidelines for paper-based computations and to the additional guidelines for computer-based calculations provided below. A preliminary list of required calculations should be prepared as one of the initial project steps. Paper calculations must be kept by the CDM Smith Design Principal or design discipline lead, along with all supporting information/backup, in three-ring design notebooks. Subconsultants are responsible for completing and checking their own calculations, and providing copies to CDM Smith when requested.

Minimum Guidelines for Paper-Based Computations

- CDM Smith's standard computation paper should be used for all calculations by CDM Smith staff. Backup data may be on computation paper or standard lined paper, provided that adequate project and individual information data are presented and adequate referencing is made from the calculations. All work shall be printed (not written in script), and at least a 1-inch margin shall be left on the left side of all sheets for binding.

- The entire title block must be filled in, including the name of the preparer and the checker. The page number shall be shown as a fraction (such as 1 of 4), with the latter number designating the total number of pages of calculations.

- The progression of thought behind the work and the rationale used by the preparer shall be delineated. The sheets shall also be neat and legible for ease of use by others.

- Calculations should start by listing the essential factors, such as assumptions, design criteria, available data, etc. Briefly note the source or basis of each factor as appropriate (name of reference, etc.).

- Sketches, details, maps, textbook references, catalog cuts, pump curves, etc., should be included.

- Computations should be as simple as possible and include explanatory notes for clarification. Results shall be underlined or boxed for emphasis.

- A summary sheet as the first page (or pages) of a set of computations shall be provided. Superseded sheets shall be clearly marked as such, referenced to revised sheets, and attached to the back of the revised sheet.

- These calculations shall be submitted to CAW as part of the supporting design documents as specified in the scope of work. Final calculations shall include the proper Professional Engineer's stamp and signature and the signatures of the independent checker.

Computer-Assisted Hand Calculations

Computer-assisted hand calculations (CAHC) include calculations made with the assistance of programmable calculators, spreadsheets, statistical packages, and mathematical computational software.

All common content noted above for paper-based computations must be provided. In addition, the following specific documentation must be made available:

- Copies of all electronic files used in CAHC, either strictly as input data, as output data, or as a combined input/output data set, will be maintained in an electronic medium that cannot be destroyed or edited by ordinary means without detection during the period specified by CDM Smith's document retention policy. Where multiple data sets are needed to fully define a particular calculation (for example, where an output data set exists in a different file from the input data set), all must be identified. A read-only CD or DVD would typically be a good choice for electronic storage purposes.

- Hard copies of electronic files used in CAHC, preserved only to permit ready reference of the original electronic images, will be maintained and identified such that they can be associated with the corresponding electronic sources during the period specified by CDM Smith's document retention policy.

- Specific documentation of the exact version of software environment used, including the name, version number, serial number, manufacturer, and vendor shall be maintained as part of the project files. All electronic and hard copies will include this information, either fully on each copy or by reference to a master reference list, to ensure that the software used to run each specific analysis can be identified.

- Headers and complete reference designation containing the information required on standard calculation paper shall be included on the working versions of electronic files used in CAHC.

- All CAHC output sheets shall be annotated to indicate which data is pertinent. These sheets shall then be sequenced into the overall set of calculations.

- If CAHC involve proprietary or other non-common programs, they shall be validated and validation shall be submitted to CAW.

- As the thought process may not be evident from the electronic file formats, it should be referenced and included on the electronic version or on standard calculation sheets clearly marked to enable association with the electronic and hard copy images noted above.

- Errors arising from CAHC may not be errors of mathematical algorithm or logic, but from structure, references, or logic within the electronic computation environment itself. Checking shall include a review of the electronic image of the computations for logic and consistency with the intended mathematical computation. In the case that spreadsheets are used, this shall include specific checks of all formulas and cell references embedded in the computation areas of the spreadsheet shall be conducted.

- Checking shall also include a review of the formulas and/or design criteria used. These can be shown on a referenced calculation sheet, or printed on the spreadsheet. Particular attention should be paid to "round off" elements, decimals, and "significant digits."

- CAHC shall be submitted to CAW as part of the supporting design documents. Final calculations shall include the proper Professional Engineer's stamp and signature and the signatures of the independent checker.

Construction Drawings

Drawings have been prepared in response to this RFP in general conformance with the CAD drafting quality standards contained below as established in the "Quality Procedure 8.2 Construction Drawing". These quality standards and procedures will apply to the development of the construction drawings as the design advances.

Construction drawings (including text, line work, dimensioning, drawing symbology, sheet layout, and appearance) must conform to CDM Smith graphic standards, as modified to incorporate any CAW requirements. Minimum guidelines to be used when preparing construction drawings are as follows:

- All CDM Smith project construction drawings shall conform to the rules set forth in the *CDM Smith Graphics Production Standards Manual, Volume 1- General*. General and discipline-specific symbologies and line weights are listed in the manual. Any standards required by CAW which differ from those found in Volume 1 shall be documented by the CDM Smith Design Principal and communicated to the design team.

- All CAD drafting shall conform to the requirements set forth in the *CDM Smith Graphics Production Standards Manual, Volume 2- AutoCAD. Any* Standards required by CAW which differ from those found in Volume 2 shall be documented by the CDM Smith Design Principal and communicated to the design team.

- Standard details are set forth in the *CDM Smith Graphic Production Standards Manual, Volumes 4a and 4b* and related projects shall be used. CAW details for civil/utility aspects of the project may be used as requested by CAW and as directed by the CDM Smith Design Principal.

Project-specific construction drawing quality assurance steps include:

- All drawings will be completed in AutoCAD and Bentley Navisworks that can be converted to AutoCad files for submittal to CAW are record drawings at the completion of the project.

- 22 by 34-inch paper size, suitable for reduction to 11 by 17-inches.

- Consistent use of water treatment plant facility terms and abbreviations with those from CAW.

- Plan scales will be identical between design disciplines whenever feasible

- Valves will be numbered per direction from CAW. In general, all valves used in operating procedures will be numbered, including all valves with electric or pneumatic actuators and set points (e.g., pressure relief valves, pressure regulating valves). Valves smaller than 1-inch will not be numbered.

- Process areas for drawing use will be established prior to the start of construction document preparation . These process area numbers will be used for all design discipline drawings of these facilities.

- The plan sheet "background owner", for example the structural or architectural disciplines, will be responsible for updating the backgrounds for X-referencing into other discipline drawings.

- Process and instrumentation diagram format have already been established and have been applied on the P&ID drawings, presented with the CDM Smith Proposal.

Memoranda and Reports

A number of documents will be prepared by the project team as required under various subtasks. These include:

- Special Reports and Studies
- Technical Memoranda
- Permit Related Deliverables

Memoranda, reports, and special studies will be used to communicate information to various team members. It is important to identify the project team member that the documents are being transmitted to and from. Also, a file number should be included in the memorandum header. An electronic file name should be included in the footer of the memorandum so the document can be easily retrieved.

The submittal of these studies, check list, reports and technical memoranda shall include applicable supporting calculations, studies, and background information such that the document that is provided is comprehensive. An outline of each report and TM will be submitted to CDM Smith's Lead Engineer, Michael Zafer, prior to its preparation. A draft of each document will be submitted to the CDM Smith Design Principal who will arrange for the appropriate technical review prior to the CAW submittal. Under no circumstances will a technical memorandum be submitted directly to CAW by a CDM Smith team member.

Technical Review Committee (TRC) Reviews

The function of the TRC is to provide independent reviews by experienced and technically qualified personnel which include the following areas:

- Conformance to deliverable requirements
- Adequacy and appropriateness of technical data
- Pertinent application of existing and new technology
- Whether a sound, practical, and cost-effective approach has been made and that design earthquake criteria, materials of construction, constructability, safety in design, reliability, and operational concerns have been accounted for.

The TRC members identified above will meet and review the following project deliverables prior to submittal to CAW:

- 30% Updated Design package

- 40-50% Design Package
- 80-90% Design Package
- 100% Approved for Construction Plans and Specifications

The CDM Smith Lead Engineer shall provide TRC members with information in addition to the design package being reviewed which will facilitate the review. A briefing memo shall be submitted to the TRC one week prior to the convening of the meeting consisting of the following, as appropriate:

- Brief description of the project
- Design criteria
- Preliminary layouts
- Process and flow schematics, process and instrumentation diagrams, and preliminary equipment listings
- Alternative significant design concepts considered
- Calculations, memoranda, white papers and reports to support submittal
- Project issues

TRC members will review the design packages consisting of construction drawings and specifications prior to, during, and after the TRC meeting. Individual review comments will be identified as mark-ups to the plans and specifications and/or ancillary notes prepared by TRC members.

The TRC meeting will begin with a brief presentation by the project team providing a history of the assignment and identifying key project drivers that significantly impacted the development of the design packages. Relevant permit and operational issues which influenced the design will be discussed during the presentation phase of the TRC meeting. The meeting will consist of a systematic discussion of the review comments compiled by the TRC members with the objective of identifying modifications in the design package required for the submittal to CAW

TRC meeting notes and follow-up memorandum will be prepared by the CDM Smith Design Lead and distributed to all attendees at the TRC meeting within 15 calendar days after the conclusion of the meeting. These notes should include a brief description of the project as well as a tabulation of recommendations and/or specific questions that require answers. The memorandum will provide a description of how the TRC suggestions will be incorporated into the next design package. Explanations will be provided for suggestions not incorporated into the design.

Comprehensive Final Design Review

The CDM Smith Project Manager and Design Lead shall perform a review of the final design. Selected design discipline leads or senior staff may also be included in this review. The Design-Build Quality Manager, Jack Taylor, shall be informed in writing that the final review has been conducted.

The following items constitute this review:

- Satisfaction that all checking procedures outlined in this document has been done.
- Coordination of drawings and specifications, including references. This must be done using an essentially complete set of drawings and specifications.

The above review is intended to be "overall," and is not a substitute for the detailed intra- and inter-discipline checking discussed below.

The CDM Smith Design Lead must personally view all final "red-yellow-green"-type checked drawings, specifications, and calculations.

Checking

Checking is the heart of quality management and must be undertaken diligently and in a timely manner. Checking should only be done by staff thoroughly knowledgeable about the work being checked as established under "Quality Procedure 2.2 Independent Checking". Individuals identified by the function group leaders to perform both the inter- and the intra- function checking will be provided to the CDM Smith Lead Engineer. Checking must be a continuous effort and not left to the end of the project.

The CDM Smith Lead Engineer will write a specific discipline coordination checklist once the final scope of design work is known and negotiated. This checklist will include such subjects as drawing presentation, structure backgrounds, specific areas to be checked based upon past lessons learned, specification- drawing coordination, omissions of necessary work, operation and maintenance needs, and constructability. Specification - drawing coordination will follow the guidelines described in the Construction Specifications Institute's Project Resource Manual, customized for water treatment plant projects.

Intrafunction Checking

Each function group (e.g., structural, electrical, instrumentation and building mechanical) will perform detailed internal checking of all calculations, reports, memoranda, drawings, specifications, and cost estimates, in accordance with an established procedure and schedule. Intrafunction checking shall be performed when the documents are essentially complete (approximately 95 percent), although interim documents shall also be checked as the project progresses. Special care shall be taken to check any last-minute changes.

Interfunction Checking

The primary purpose of this checking is to minimize conflicts and omissions between interfacing functions. Although coordination between disciplines shall be ongoing throughout the project, a thorough interfunction check shall be performed prior to the submittal of the 90 percent design. The CDM Smith Design Lead shall designate group responsibilities for interfunction checking and clearly designate prime responsibility to a single group at each interface.

The table below provides a recommended responsibility matrix and examples of potential problems for the interfunction checking on the MPWSP Desalination Infrastructure Project.

Inter-function Checking Activities

Function	Checking Responsibility	Example of Possible Problem
Structural	Mechanical	Processing piping conflict with structure
Architectural	Mechanical	Equipment blocking access
HVAC	Mechanical	Air handling systems blocking process piping
Mechanical	Plumbing	Floor drains mislocated at pumps
Mechanical	Electrical	Process piping crossing over MCC
Mechanical	Instrumentation	Unit process not tied into controls; all required controls are specified
Architectural	Plumbing	Piping crossing in front of windows; wall chases not provided
Architectural	Electrical	Lighting controls not accessible
Architectural	Instrumentation	Control panel misoriented aesthetically
Structural	Architectural	Structural cross bracing at windows; architectural detailing matches structural framing
Structural	Plumbing	Pipe chase mislocated; pipe penetrations too close together
Structural	HVAC	Roof openings for fans mislocated; dimensions agree
Structural	Electrical	Large bundle of conduit in too small openings; need to detail how conduit duct bank enters structure; concrete equipment pads properly sized and located
Structural	Instrumentation	Control lines inaccessible
HVAC	Electrical	Air handling units not wired; power to thermostats covered
HVAC	Instrumentation	Location conflict; controls coordination
Electrical	Instrumentation	Omission of power to control panel
Civil	Mechanical	Underground process yard piping conflict with pipe drains
Civil	Structural	General grading conflicts
Civil	Architectural	Sloping sidewalk towards building entrance; allowance for ADA access
Civil	Plumbing	Roof scuppers discharge mislocated; location and continuation of pipelines coordinated
Civil	Electrical	Site yard lighting conflict with underground pipe; manholes and handholes at high points of roadways and coordinated with other utilities

The name of the person who performs the interfunction check shall be indicated on the title block, or other documents, as "Cross-Checker."

The checker is responsible for checking for code violations in their own function due to the checked discipline's work. They are not responsible for checking for code violations in any other function than their own.

In addition to the above designations of responsibilities, the following specific considerations are extremely important:

- The mechanical group is responsible for ensuring adequate lifting capacity and accessibility to all pertinent equipment to be serviced. All other groups (e.g., HVAC, electrical, architectural, etc.) are responsible for checking for conflicts with their work.

- All motor control sequences shall be carefully reviewed with electrical by the appropriate functional group. The resulting control sequencing should be written down with appropriate sketches and backup data. This information shall be filed with the pertinent project records for passing along to "downstream" staff (i.e., those involved with such phases as construction and start-up).

<u>Checking Procedures</u>

What is to be Checked and by Whom?

- Calculations, drawings, and sketches (including cross checking with text or specifications) must be checked by a person other than preparer.

- Specifications, equipment data sheets, tables, charts, text should be checked by preparer.

How is the Checking Performed

Calculations

- The complete "thought process," including use of appropriate data, formulas, assumptions, and criteria, shall be reviewed--and not just the mathematics. The review of the thought process should be done by a senior person (such as the Lead Practitioner) prior to the math check being performed by others.

- Original calculations shall be checked. A new set of calculations should not be prepared.

- Corrections shall be clearly noted on the original calculations in a red marker (or in red text for electronic documents); erroneous figures shall be crossed out in red marker (leave legible), but must not be erased.

- All revisions shall be reviewed with the individual who made the original calculations.

- The name of the checker and date of checking shall be included in the appropriate places on all calculation sheets.

Drawings, Figures, and Specifications (Note: for electronic documents, use the same color scheme with the appropriate method of indication.)

- Checking activities for drawings, figures and specifications shall include the initial check by the checker, the backcheck of the checked documents by the individual who created the original document, and the verification of the backchecked document by the checker to determine that all agreed corrections have been incorporated.

- Checking shall be done when the documents are essentially complete (approximately 95 percent), although interim documents shall be checked as the project progresses. Special care shall be taken to check any last-minute changes. A marking system is described below, but an alternate method of checking and backchecking may be used.

- Every correct dimension and note shall be marked out with a yellow marker; revisions and/or additions shall be indicated in red and reviewed with the original designer.

- The person making the corrections shall circle the red marks on the print with a green marker to indicate that the change has been made. Any additional changes not picked up by the check shall be added in blue. The document shall then be returned to the checker for verification. If requested by the checker, a final checking print shall be used in the verification process. The checker will then indicate that the proper corrections have been made by using yellow to cover the previously indicated red and green marks. The intent is that at the completion of the final backchecking, every line and item on the document being checked is completely correct and covered in yellow. These marked up documents shall be stored and maintained for the duration of the project.

- The name of the checker and dates of checking and backchecking shall be written in red near the title box of each sheet checked and backchecked. The name of the checker also shall be indicated on the original drawing.

- For design projects (such as this project) involved with expansions/modifications to existing facilities, a final site visit by the CDM Smith Design Principal (with others as appropriate), with the 95 percent drawings as a "final" check for interferences, is mandatory. Obviously, site visits need to take place at appropriate times during design development as well.

- Every page of specifications and equipment data sheets shall be thoroughly read to ensure correctness, appropriateness, and coordination with the drawings and equipment data sheets. Also, if a specification references another document (e.g., specification, catalog number, etc.), it must be determined to be current. The specification checker must be provided an up-to-date set of drawings and equipment data sheets. Similarly, all references to the specifications on the drawings must also be checked for compatibility.

- Redundant material and excess verbiage shall be eliminated. Specifications should be as concise as possible.

- Procedures shall be the same as noted for drawings (i.e., corrections noted in red, with the person making the corrections marked in green, and at the end, the entire correct checking documents should be covered in yellow). Special care shall be taken to ensure that the graphics agree with the text and tables. These files shall be stored and maintained for the duration of the project.

- The checking set shall identify the checker and dates of checking and backchecking. The final document shall include the proper Professional Engineer's stamp and signature and the signature of the independent checker.

Tables and Charts

- Every table and chart will be thoroughly read to ensure correctness, appropriateness, and coordination with the text.

- All corrections shall be marked in red marker and the revised tables and charts backchecked against the red marked checking set using a green marker.

- The checking set shall identify the checker and dates of checking and backchecking.

Equipment/Processes

Use of Equipment Data Sheets

Procedures for development and maintenance of equipment data sheets will be delineated by the CDM Smith Design Principal, coordinating with design team members, early in the preliminary design phase. Data sheets form the basis for the development of detailed equipment specifications. They will be prepared by the appropriate function groups (usually the process group, as well as HVAC) and circulated to all other team members on a timely basis, as the design progresses, whenever changes are made, and/or at frequencies determined by the CDM Smith Design principal. Data Sheets have already been prepared for most equipment proposed to be included in the project and they are included in the CDM Smith Proposal. Current equipment data sheets will also be kept on the office network project drive for access to all CDM Smith staff.

"Last Minute Changes"

Particular caution will be taken regarding last-minute requested changes to drawing or specifications. Such changes can have ripple effects, all the impacts of which can be overlooked and lead to construction and functionality problems. The Design-Build Quality Manager will be consulted whenever situations such as this occur to determine if such changes is absolutely necessary and the best procedure for implementation.

Geotechnical Work

Supplemental site-specific detailed geotechnical investigations will be conducted as part of the Project, including soil borings, soil analyses, seismic slope stability analysis, fault identification investigation, and recommendations for final foundation and seismic design criteria.

During the design phase of the Project, information from detailed test borings and soils analyses will be evaluated by the CDM Smith team geotechnical engineer (GE) along with anticipated loadings, and other appropriate information. Soil bearing capacity, equivalent lateral pressure, cohesiveness, plasticity, groundwater depths, dewatering capability, and soil corrosivity will be evaluated as required, and recommendations for foundation design and pipe bedding systems provided as appropriate.

The results of all test borings, soils analyses, and recommendations from the CDM Smith geotechnical engineer shall be in written form, GE stamped, and included with the pertinent project records. Furthermore, the geotechnical engineer shall review the design documents, such that a letter is issued from the GE that states the design meets the recommendations in the geotechnical report. Such a letter will be incorporated into the design deliverables and be forwarded to CAW.

In areas of known or suspected high levels of soil corrosivity, a corrosion consultant shall provide a soils analysis, and if required, recommend a corrosion protection system of a coating and/or cathodic protection.

Hazardous materials in soils are not expected at this site and such an investigation or further work is not a part of this contract.

Sealing Plans and Specifications

Design documents prepared for this project for CAW, including the Geotechnical Report, construction drawings, specifications, and addenda, shall be stamped and/or sealed in accordance with applicable California state requirements. Electronic stamping and sealing of documents shall be in accordance with the laws of the state of California.

Information on stamping requirements will be included in the project records. The “Designed” or “Approved By” box on the title sheet should bear the name of the person who stamps the drawing unless otherwise directed by CAW. All documents shall be stamped and sealed by those responsible for the work, including each discipline of the work.

Controlling and Tracking All Documents

All hard copy documents will be filed in accordance with CDM Smith’s standard filing system (Quality Procedure 3.1 Project Filing System and Records Management) . Copies will also be kept electronically, in accordance with the same filing system.

During the design phase CDM Smith will use a common electronic file structure on a secure server with automatic back-up capabilities to facilitate the communication of current drawings and specifications between all design team members. The electronic file structure has a document tracking function to document changes in documents and who accessed the documents.

Section 3- Construction Phase

Overview

The primary objective of the project construction phase is to safely construct the facilities established in the design drawings resulting in desalination infrastructure which meets treatment performance requirements and is flexible and reliable in its operation. The central QA/QC activities associated with the construction phase of the project consist of the three phases of quality control:

1. <u>Preparatory Phase</u>- Meeting conducted before the initiation of construction activities associated with a specific definable feature of work (DFOW) to establish that all prerequisite work and requirements have been completed.

2. <u>Initial Phase</u>- Meeting conducted immediately prior to the beginning of construction activities on a specific DFOW which verifies that the control s for work developed in the preparatory phase has been implemented and the work is to be performed to the level of workmanship mutually agreed upon (i.e. confirm that appropriate inspectors, testing personnel, and equipment is place.).

3. <u>Follow-up Phase</u>- The objective of this phase of quality control, conducted during the performance of the work activity, is to ensure that the construction work implemented is in conformance with the plans, specifications, and standards required.

The procedures and protocols required to implement these phases of construction quality is described in more detail below. Integration and coordination with the design team members is achieved through the active participation of responsible design staff in the review and approval of construction submittals and in specialty inspections. Commissioning and start-up staff will participate in the construction efforts throughout the construction period. The objective is to install process equipment and ancillary components with the ability to readily monitor system performance and to facilitate system start-up.

Duties, Responsibilities and Authority of the Quality Control Team Members

The section describes the duties, responsibilities and authority of the Quality Control Team. it consists of personnel, organization, procedures and documentation necessary to produce the Desalination Infrastructure project in conformance with the contract requirements. The actual practices are not limited to this plan and where a discrepancy exists between this plan and the contract requirements, the contract requirements shall prevail.

Project Construction Team

The individuals responsible for the implementation of the construction phase QA/QC activities are presented in this section. Key team members include the following:

- Design-Build Project Manager – Paul Meyerhofer
- Construction Principal- Chad Brown
- Design-Build QA/QC Manager – Jack Taylor
- Field QA/QC Manager- Kelly Roach
- Quality Control Specialists for civil/architectural work, mechanical work, electrical and instrumentation work and testing coordinator.
- Construction Superintendent – Kenny Vassar
- Project Controls – Cody Belcher
- Procurement and Expediting – Randall Redmann
- Site Safety Officer – Joe Leslie

The Project Organization Chart in Section 1 of this plan depicts the entire team and support services proposed for the design of the Desalination Infrastructure project.

Project Design Support Team During Construction

The design team that prepared the design documents will perform engineering support services during the construction phase. Paul Meyerhofer, Design Principal, will remain the manager of the design team for it role during construction. Services provided by the design team members include:

- Review submittal for conformance with design requirements.
- Develop responses to design issues raised by either CAW or the CDM Smith construction team (RFIs).
- Prepare drawing and specifications for changes to the work.
- Witness selected equipment testing, both field and factory as appropriate.
- Assist in development of plans for, and participate in actual, start-up and commissioning.

Field QA/QC Manager

The responsibility of the Field QA/QC Manager is to oversee the implementation and monitoring of the quality management plan. Specific tasks include:

- Conduct independent review, inspection and testing of the work such that the quality of the work complies with the requirements of the Contract.
- Attend post award conference, design meetings, QC planning meetings, and special coordination meetings.
- Interact directly with CAW's representative regarding the effectiveness and capability of the quality control organization.
- Coordinate communications between field and office engineering efforts.
- Coordinate submittal review process and review and implement final approved submittals.
- Monitor the adherence to procedures for submittal reviews and RFIs including turnaround times.
- Manage and coordinate the three phases (viz Preparatory, Initial and Follow-Up) of control and documentation.
- Review status of record drawing updates on a regular basis to ensure that they are being maintained current.
- Attend weekly progress meetings during design and construction phases. Prepare agenda and meeting minutes for distribution.
- Review daily inspector reports and compile a weekly progress status report to be included in the weekly progress meeting agenda.
- Supervise construction inspection activities.
- Coordinate documentation control efforts.
- Coordinate start-up/testing activities.
- Maintain authority to stop any portion of the work due to less than quality performance.
- Coordinate off-site inspection of fabricator and supplier products.
- Overseeing independent testing and inspection firms, such as soils, concrete, welding and coatings; review and submit test results.
- Attend on-site job progress meetings.

- Review the need for and extent of proposed changes to the work.
- Interact with the site Safety Office to ensure that the site safety plan is being implemented.
- Verify that appropriate sign-offs and approvals have been obtained.
- Report monthly to the CDM Smith Project Manager any quality concerns. The CDM Smith Project Manager will include these concerns in the monthly report to CAW.
- Ensure that project close-out activities have been accomplished.

Quality Control Specialists

The QC specialists (QCS) shall report directly to the Field QA/QC Manager and obtain all authority as directed. The duties and responsibilities of the QCSs include the following:

- Perform daily on-site inspection of construction activities to assure compliance with the intent of the contract documents.
- Review and assure implementation of the approved submittal data.
- Prepare daily inspection reports of construction activities on the project.
- Attend weekly progress meetings as necessary and directed by the Field QA/QC Manager.
- Prepare and maintain a daily log book of all construction activities.
- Report to the Field QA/QC Manager any work that does not comply with the QMP and or the project requirements.
- Photograph construction activities and maintain photo log and album.
- Inspection of construction materials delivered to construction sites.

Construction Superintendent

The contractor's Superintendent office and field personnel shall work pro-actively with the construction quality control team to ensure project compliance with the contract documents. The Superintendent's responsibilities include the following:

- Assure all work is executed in accordance with the Safety Program.
- Daily monitoring of constructor work activities and support the Field QA/QC Manager with control of each phase of the work.

- Coordinate with construction quality control management team prior to work activities such that required inspection, testing, and documentation efforts can be safely completed.

- Submit three-week look ahead schedules to facilitate inspection scheduling and required documentation.

- Track construction project schedule and report deficiencies to the Field QA/QC Manager.

- Provide the Field QA/QC Manager notification of definable features of work to allow sufficient time for implementing the three phases of quality control, including the Preparatory and Initial Phase meetings. (Refer to the section below of this Construction Phase portion of the plan for details on the three phases.)

Submittal Procedures & Initial Submittal Register

This section provides the procedures and protocol for submitting, reviewing, approving, and tracking submittals for the work.

CDM Smith Submittal Responsibilities

- The submittal process will be integrated into the project schedule to allow for review, approval, procurement, delivery, and QC preparatory and initial phase implementation. The schedule will be updated on a monthly basis.

- The Field QA/QC Manager will assure that on-site design-build team management remains attentive to submittal procedures during the course of the project.

- The Field QA/QC Manager will be responsible for ensuring that all submittals are in full compliance with the intent of the contract documents.

- The Field QA/QC Manager will assure that any variations to the contract documents will be identified and justified in the submittal package.

- The Field QA/QC Manager will assure that no work is initiated until associated submittals have been approved.

CAW Submittal Responsibilities

- The design-build team proposed submittal list will be extracted from the project schedule and submitted to CAW for review and tracking.

- CAW will review and approve submittals as necessary

Submittal Requirements

CDM-Smith

Any item that CDM Smith is required to "submit" to CAW as a requirement of the design-build contract is considered a submittal. There are items to be submitted before certain activities are performed, items to be submitted periodically throughout the life of the project, and items to be submitted after–the-fact to verify acceptance or conformity. A submittal register will be maintained to document and monitor the submittal process.

The Lead Engineer will specify equipment and materials required for the project. A submittal list will be generated and submitted to CAW for review and comment, as appropriate.

CAW

CAW will review and append the submittal list generated by the Lead Engineer. Determinations will be made on the submittal register by CAW as to conformance with the contract documents.

Quality Control

All submittals, shop drawings, catalog cuts, samples, etc., unless otherwise specifically noted, will be reviewed by the Design-Build QA/QC Manager for conformance to the drawings and specifications.

The design component of the design-build team will specify equipment and materials required for the project. Review responsibilities will be established for the approval of the equipment and materials. The construction component will prepare and submit the required information (submittals) for review and approval. As determined by CAW, some submittals will be reviewed and approved by CAW while the remaining submittals will be reviewed and approved by the Design-Build QA/QC Manager. In any event, work will not commence in any area until the associated equipment and materials have been reviewed and approved.

Procedures

1) The construction component of the design-build team shall prepare required submittal packages and submit to the Field QA/QC Manager using the transmittal form attached to this *s*ection. The dated transmittal shall initiate the 5-day submittal review period.

2) The Field QA/QC Manager shall distribute the submittal to the design team for review and approval. The Field QA/QC Manager will track the progress of the review, log status, and report to the Project Manager, as appropriate.

3) Disapproved submittals will be returned to the Field QA/QC Manager who will return the unapproved submittal to the constructor component of the Design-Build Team.

4) Submittals, approved by the design team and CAW, will be returned to the Field QA/QC Manager who will in turn forward to the construction team of the design-build team.

5) The following certification statement will be attached to each submittal.

Certifications

Certifying Statement

I hereby certify that the (equipment) (material) (article) shown and marked in this submittal is that proposed to be incorporated with contract number (______) , is in compliance with the contract drawings and specifications, can be installed in the allocated spaces, and is submitted for CAW approval.

Certified by Submittal Reviewer __________________________ Date _______

Certified by Field QA/QC Manager ________________________________ Date _______

Approval Statement

I hereby certify that the (material) (equipment) (article) shown and marked in this submittal and proposed to be incorporated with contract Number (______) is in compliance with the contract drawings and specifications, can be installed in the allocated spaces, and is ______ approved for use.

Certified by the Submittal Reviewer ________

Testing Laboratory Information

This section describes the testing laboratory information that is proposed at the initial stage of the project. It is anticipated that as the project develops, additional testing requirements will be identified and this section will be expanded to provide the appropriate testing laboratory coverage.

The CDM Smith will be utilizing several firms to provide soils engineering and testing services as well as specific materials testing as indicated herein. These laboratories are all accredited by the American Association of State Highway and Transportation Officials (AASHTO) in Aggregate, Soil, and Portland Cement Concrete or other accreditation organizations as applicable.

Specific details on Laboratory Tests Certified by AASHTO and USACE for these services will be provided with submittal of the final Quality Management Plan.

Testing Procedures

The Field QA/QC Manager will coordinate all testing activities including scheduling, scope direction, oversight, and reporting.

Preparatory Phase

The preparatory phase will be performed prior to beginning work on each testing DFOW, as determined by the Design-Build QA/QC Manager. The preparatory phase meeting may be performed concurrently with other project preparatory phase meetings or may be stand-alone meetings to discuss specific testing protocol and scheduling. Items discussed will include:

- Review of applicable specifications and references
- Review of applicable previous testing
- Review of appropriate activity hazard analysis
- Review testing plan to assure that provisions have been made to provide the required testing and identification of required standards
- Discuss testing procedures and required work access
- Review safety plan
- Review reporting requirements
- Review appropriate repetitive deficiencies
- Review procedures to follow should test results indicate failure

Initial Phase

The initial phase will be conducted at the beginning of each DFOW, as determined by the Field QA/QC Manager. The initial phase meeting may be performed concurrently with other project initial phase meetings or may be stand-alone meetings. Items discussed will include:

- Review minutes of the preparatory phase meeting
- Verify that required testing materials and personnel are on-site
- Confirm that quality control specialists are prepared
- Resolve any testing issues that may affect the progress of the work
- Revisit safety concerns and the activity hazard analysis
- Confirm that safe access will be provided

Follow-up Phase

The follow-up phase will be conducted during the course of the work activity. During the follow-up phase, testing will be performed. Activities associated with the follow-up phase include:

- Ensure work is in compliance with contract documents
- Work is being performed in a safe manner
- Proper sampling procedures are being followed
- Ensure sufficient information is obtained to complete Testing Plan and log forms.

Reporting

Field test reports will be generated by the testing laboratory and submitted to the Field QA/QC Manager in a timely manner. Copies of the test reports will be submitted to CAW attached to the last Contractor Quality Control Report of each month.

Quality Control Validation will be maintained during construction. A copy of the current Testing Plan and Log form along with copies of the field test reports, arranged by specification section, will be included in the field office 3-ring binder set for CAW review.

The forms used for reporting test results will be the standard reporting forms of the testing laboratory. Format will be reviewed and approved by CAW to reporting requirements upon initial submission due to the magnitude of possible tests and the variance of reporting formats.

If a test result fails to conform, the Field QA/QC Manager will notify the CAW Representative immediately. The testing laboratory will stamp the cover sheet for each report in large red letters "CONFORMS" or "DOES NOT CONFORM" to the specification requirements, whichever is applicable. Test results will be signed by the testing laboratory representative authorized to sign certified test reports.

Testing Plan and Log

The maintenance of the Testing Plan and log form will be the responsibility of the Field QA/QC Manager. As field test reports are received from the testing laboratory, the Field QA/QC Manager will record on the Testing Plan and log the following:

- By whom the sample was taken by
- By whom the test was taken by
- If the test is taken on-site or off-site
- When the test date was completed
- The date the test was conducted
- The date the test results were forwarded to CAW's representative

- Remarks and acknowledgement that an accredited or CAW's representative approved the testing laboratory

Each month the Field QA/QC Manager will forward an updated copy of the Testing Plan and log along with last daily Contractor Quality Control Report to CAW's representative. A copy of these logs and reports are included in Appendix A.

Procedures to Complete Rework Items

Rework of items found in the field that conflict with the intent of the contract documents can cause serious problems with respect to time, cost, and quality. The quality management team will proactively plan ahead of construction and provide detailed inspection to minimize the potential for these types of problems. However, when discovered, the issue must be addressed as soon as possible to minimize further impacts to the project. It is the intent of this section to establish procedures to resolve issues that require rework.

Conflicts can be identified by any party to the project. The conflict would first be reported to the Field QA/QC Manager where the conflict would be assigned an identification number, logged, and the pertinent information detailed in a project discrepancy report. A copy of this report is included in Appendix A.

The discrepancy report numbering system will include the contractor code. The code will be followed by a sequential numbering system for each contractor.

The Field QA/QC Manager will then submit a copy of the discrepancy report to CAW, Contractor, and the Lead Engineer for review. The review will establish the severity of the issue with respect to the intent of the project goals. A determination will be made, in concert with CAW and Lead Engineer, as to the appropriate course of action. In some cases, the issue may be resolved at the Field QA/QC Manager level and require immediate remedial response from the Contractor. If the discrepancy requires rework, the Contractor will be requested to plan, schedule, and rework the discrepancy. At completion of the rework, the Contractor shall request a final inspection by the Field QA/QC Manager.

Tracking of the status of the discrepancy will include line items in the progress meeting agenda/minutes as a point of discussion. Discrepancy reports will not be closed until final sign-off by the Field QA/QC Manager. At sign-off, a copy of the resolved report will be provided to the Contractor, design engineer, and CAW. A Discrepancy Log and a Non-Compliance Notice and Notice of Suspension will be developed; a copy of these notices are included in Appendix A.

Documentation Management and Procedures

Documentation management control will be one of the primary responsibilities of the Field QA/QC Manager. The goal is to maintain accurate and consistently current records of the work. A construction management information system (CMIS), utilizing Primavera Contract Manager, will be used for collaboration with the project stakeholders for various information/documentation management functions, including, but not limited to, submittals, Requests for Information (RFI), Requests for Deviations (RFD) or substitutions, quality control, punchlists, change initiation and management, correspondence, meeting minutes, and environmental compliance reporting.

The three phases of the construction quality control, including test protocol and result documentation, will be controlled via the proposed documentation procedures outlined below.

This section describes those documentation procedures that are specific to the field construction effort and include:

- Project design drawings, approved for construction
- Submittals
- Requests for information
- Changes to the approved design
- Daily constructor reports
- Daily QC reports
- Off-site inspection reports
- Concrete placement reports
- Notification of Non-compliance
- QC Specialists Reports
- Quality Control Validation
- Meeting Agenda and Minutes

Drawing and Contract Document Control

The Field QA/QC Manager will accept approved contract documents from the Design Team for implementation in the field. Additional work orders, change orders, approved submittal data, and clarifications will be incorporated into the field set of contract documents after information is logged, reviewed, and clarified. The field set of contract documents, maintained at the QC field office, will be considered the Construction Team official contract documents set and used for project quality control activities.

Requests for Information (RFIs)

RFIs will be submitted electronically in pdf format to the Design-Build QA/QC Manager using the standard Expedition RFI form. RFIs can be submitted by the Contractor or the quality control team in the form of questions concerning the design. After being logged by the Field QA/QC Manager, the RFIs will be sent to the Design Team or other appropriate party for resolution. They will review and respond to the RFIs within 7 Calendar Days and return to the Field QA/QC Manager. The Field QA/QC Manager will log the response and return to the Construction Team. Hard and electronic copies will be maintained at the QC field office. A "running" list of RFIs will be maintained by the Field QA/QC Manager and unresolved RFIs will be discussed at the weekly progress meetings until a response is received. A copy of the RFI and Design Team response will be provided to CAW for record purposes.

Daily Construction Reports

A Contractor Production Report will be submitted on a daily basis. The report will be prepared, signed, and dated by the construction superintendent and shall contain the following information:

- Date of report
- Report number
- Name of constructor
- Contract number
- Title and location of contract and superintendent
- Weather conditions and temperature
- Work performed by corresponding schedule activity number
- List of constructor and subcontractor personnel on the work site and their trade, employer, work location, hours worked by trade, and total hours worked
- Listing of job safety actions with complete description and associated schedule activity number identification
- Schedule activity number, submittal number, and list of equipment/material received each work day that is to be incorporated into the work
- Schedule activity number and construction plant equipment utilized including the number of hours used
- Remarks section that lists all actions, directions, and problems encountered

The report will be submitted to the Superintendent/Project Manager by the next working day after each day that work is performed. The Field QA/QC Manager will review and forward the report to CAW. An (electronically) signed hard copy will be sent, or hand delivered, to CAW on the same day following submission of the electronic version.

A copy of this report is included in Appendix A.

Daily QC Reports

The Contractor QC Report will be submitted by the Field QA/QC Manager on a daily basis. The report will be prepared, signed, and dated by the Field QA/QC Manager and shall contain the following information:

- Date of report
- Report number
- Contract number
- Contract title
- Listing of preparatory phase work conducted
- List of initial phase work conducted
- Results of follow-up work conducted
- Remarks including direction received, QC issues/problems, deviations from the Quality Management Plan, construction deficiencies encountered, construction quality management meetings held, acknowledgement that record drawings have been updated, corrective directions given to constructors, and associated corrective action taken by the constructors
- The Contractor QC Report will be certified, signed, and dated and submitted to CAW.

A copy of this report is included in Appendix A.

Off-site Inspection Reports

A narrative report will be submitted to the CAW within 2 working days after all off-site testing and/or inspections. The task inspector will prepare the report. The narrative report will include:

- Date of inspection
- Schedule activity number
- Testing/inspection protocol established during the preparatory phase meeting
- Report number

- Contract title
- Description of initial phase work conducted
- Materials tested/inspected
- Results (or schedule for receiving test results)

The off-site inspection report will be submitted as a memorandum to file narrative and distributed to the Design Team, quality management team, constructor, and CAW by the Field QA/QC Manager.

A copy of this report is included in Appendix A.

Concrete Placement Reports

Concrete Placement Reports will be prepared by the quality control specialists and submitted to the Field QA/QC Manager the same day as the concrete is placed. The report will identify the activities of the constructor during the placement and will include the following information:

- Date of placement
- Schedule activity number
- Discussion of testing/inspection protocol established during the preparatory meeting
- Report number
- Contract title
- Copy of concrete delivery slips
- Description of all site concrete additives
- Time trucks arrive on-site
- Placement times
- Ambient temperatures
- Equipment used by constructors to place concrete
- Locations in the work for each truck
- Number and size of concrete vibration devices used
- Pour duration

- Curing methods
- Tests conducted
- Field testing results (slump, entrained air)

A copy of this report is included in Appendix A.

Notification of Non-Compliance

The Notice of Non-Compliance will be distributed to the constructor and Field QA/QC Manager the day after the issued is identified. Tracking and follow-up activities are also described below in this plan.

QC Specialists Reports

Daily QC Specialists Reports will be prepared each day that work is performed in their areas of responsibility. The QC Specialists Reports will mirror the Contractor QC Report content, submitted by the Field QA/QC Manager, which will summarize the QC Specialists reports, and will provide detailed descriptions of the contractor's work effort. The reports will be prepared, signed, and dated by the QC Specialists and will accompany the Field QA/QC Manager Contractor QC Report submitted by the Field QA/QC Manager to CAW.

Quality Control Validation

Three-ring binders will be maintained at the QC field office that will contain the following:

- All preparatory and initial phase checklists arranged by specification section
- All milestone inspections, arranged by activity/event number
- Current up-to-date copy of the Testing Plan and forms log with supporting field test reports arranged by specification section
- Contract modifications arranged in numerical order
- Current up-to-date copy of the rework items list
- Up-to-date list of punch-list items identified

Progress Meeting Agenda & Minutes

Field agendas and meeting minutes will be managed by the Field QA/QC Manager. Agendas and the minutes from the previous meeting will be distributed via email prior to the progress meeting. Minutes will be distributed to each meeting participant for review and correction during the meeting. The minutes from the previous meeting will be approved at the subsequent progress meeting. A copy of the approved meeting minutes will be distributed to each participant. Distribution will be by electronic (e-mail) means. Progress meeting agendas will include the following:

- Review of previous meeting minutes

- Status of work and review schedule, including update of three phases of control in testing
- Design issues
- Status of deficiencies and outstanding punchlist items (establish completion daily)
- Status of RFIs
- Status of offsite work or testing
- Review of previous testing
- Documentation review
- Three-week look-ahead schedule review
- Invoice issues
- Submittal review
- Safety issues (including upcoming activity hazard analysis and Health & Safety Plan)

In general, all documentation efforts will be managed by the Field QA/QC Manager and copies will be maintained at the QC field office; copies will be provided to CAW and the CDM Smith Walnut Creek office as a backup.

Quality Control List of Definable Features

The Definable Features of Work (DFOW) mark those features that will define topics for the preparatory and initial phase meetings. A design-build project allows for identification of the DFOW as a projection of anticipated features only. Upon completion of design, a more thorough evaluation of features can be made. The listing presented below will be appended at completion of design and DFOW will be assigned activity numbers for inclusion in the project schedule.

These DFOW's are intended to support the "Three Phases of Control" format of the Quality Management Plan. The standard 16 Divisions of the Construction Specification Institute (CSI) format will serve as the general DFOW while noting that special preparatory and initial phase meetings may be required for specific sub-features, as noted in the listing below.

The preparatory phase meetings are performed and documented prior to the commencement of each feature of the work. A check list will be prepared that verifies the items to addressed at these meetings. The meeting agendas will include the following:

- Review applicable contract documents
- Testing requirements

- Safety concerns
- Review of Activity Hazard Analysis
- Inspection and storage of delivered materials and equipment
- Construction standards and contract interpretation
- Inspection protocol
- Submittal review
- Plant coordination, potential shut-down requirements
- Traffic control issues

The Initial Phase meetings are performed and documented at the beginning of each DFOW at specific locations. Most of the items discussed during the preparatory phase meeting will be revisited and updated. Additional discussion items include:

- Specific safety concerns
- Confirmation that needed materials and equipment are ready
- Manufacturer's storage and installation instructions are understood

During the follow-up phase, inspection, documentation, continuation of compliance with the contract documents, quality of workmanship, safety methods, and the remaining issues discussed during the preparatory and initial phase meetings are surveyed. The follow-up phase will be performed on a daily basis.

A preliminary list of DFOWs for the Desalination Infrastructure project is as follows:

- Excavate & backfill
- Install underground Pipe
- Cast-in-Place concrete
- Structural steel
- Masonry
- Painting and coatings
- Equipment installation
- Stainless steel piping
- Fiberglass Reinforced Plastic/Polymer (FRP)

- PVC piping
- Building plumbing
- Building HVAC
- Room Finishes (gypsum board, flooring, etc)
- Conduit and raceways
- Wiring and termination
- Grounding systems
- Switchboard, distribution panels, transformers, MCC's
- Final inspection
- Commissioning

Procedures for Performing the Three Phases of Control

This section will outline the proposed procedures to be used to schedule, control, and document the three phases of work. The three phases of control are:

- Preparatory Phase
- Initial Phase
- Follow-up Phase

The purpose of the "Three Phases of Control" is to require the constructor to plan and schedule the work to ensure that each DFOW is properly planned, implemented, inspected, and tested. Of specific importance is the philosophy of preventing deficiencies as opposed to the need to find deficiencies—preventive measures in lieu of the need for corrective actions.

The preparatory phase activities will be identified in the project schedule such that a detailed schedule of proposed dates can be extracted for meeting schedule planning. Dates and times of scheduled meetings will be distributed by the Field QA/QC Manager.

All preparatory and initial phase meetings will be held at the QC field office.

Three-Phase Control Responsibilities

- Develop, schedule, and implement procedures for tracking control phase meetings for each DFOW

- Notify appropriate personnel of time, date, and agenda for each meeting
- Document actual discussions and provide minutes to attendees
- Monitor work through the follow-up phase
- Identify additional coordination meetings as necessary

Preparatory Phase

This phase is performed prior to beginning each definable feature of work (DFOW). Notify CAW's Representative at least five (5) working days in advance of the Preparatory Phase meeting. The meeting will be attended by CAW, the Field QA/QC Manager, the Superintendent and other appropriate QC personnel relevant to the DFOW. The Field QA/QC Manager will prepare minutes of the meeting. Prior to the meeting, the Superintendent shall confirm the following:

1) Review of contract requirements-plans, specifications codes and other requirements
2) Check to assure that all required submittals have been submitted and approved.
3) Check to assure that all materials and/or equipment are on site and have been tested, as required.
4) Review all relevant RFIs, field memos and changes to the design of the definable feature of work.
5) Review QC requirements for the work including inspection, testing, and acceptance and tolerance requirements.
6) Check to assure access to work has been made to allow for required control testing
7) Confirm work areas to assure that all predecessor and preliminary work has been accomplished
8) Check availability of resources required to perform the work
9) Review hazard analysis to address safety precautions
10) Determine commencement of the Initial Phase.

Initial Phase

This phase is performed at the beginning of a definable feature of work. Notify CAW's representative at least five (5) working days in advance of the Initial Phase meeting which will be attended by CAW, the Field QA/QC Manager, the Superintendent and other QC personnel as appropriate for the particular DFOW.

Minutes of the meeting will be documented by the Field QA/QC Manager. Prior to the meeting, the Superintendent shall verify the following:

1) Check preliminary work
2) Check proposed work for compliance with the contract documents
3) Review of control testing
4) Establish level of workmanship
5) Check for use of defective or damaged materials
6) Check for omissions and resolve any differences of interpretation with the Design-Build QA/QC Manager
7) Check of dimensional requirements
8) Check safety compliance

The initial phase checklist form is included in Appendix A.

Follow-up

Perform daily checks to assure continued compliance with workmanship established at the initial phase. Document the daily checks in the Daily QC Inspection Report. Final follow-up checks shall be conducted and all deficiencies corrected prior to the start of additional features of work that may be affected by the deficient work. Resolution of deficiencies shall include establishing quality and workmanship standards for future DFOW work. Daily reports will be generated by each QC specialist and testing technician and included with the Contractor QC Report.

Activities associated to the follow-up phase include:

- Ensure work is in compliance with the design documents
- Maintain quality of workmanship
- Ensure that required testing established in the preparatory phase and agreed upon in the initial phase is being performed
- Ensure that rework (deficiencies) are being corrected
- Monitor safety activities and verify activity hazard analysis conformance with procedures established during the preparatory and initial phase meetings

The follow-up phase activities will be performed by the assigned QCS, test technician, Safety Manager and the Field QA/QC Manager. CAW representatives will be allowed to inspect any portion of the work. The constructor will make all preparations to allow for safe access to the work areas. CDM Smith's Quality

Management Plan- Management Process Manual No. 2A – Observation Guidelines, Field Manual, will be the basis of field observations.

The Contractor QC Report will document all follow-up phase activities on a daily basis. Discrepancies and or problematic issues will be reported to the Field QA/QC Manager as soon as discovered. The Field QA/QC Manager will resolve all issues during this phase of work.

Note that any safety or quality issues deemed significant by the CQCM will initiate a work stoppage for that issue and all associated work.

Off-site Work

Activities that require work off-site will be controlled with the same procedures defined above except that 10 work days' notice will be provided to CAW with 12 work day's confirmation from the Contractor to the Field QA/QC Manager.

Additional Meetings

Additional preparatory and initial phase meetings may be required on the same DFOW if the quality of the work is deemed unacceptable to the Field QA/QC Manager. Causes for additional meetings include:

- Unacceptable work
- Significant changes to the on-site production supervision or work crew. If work on a specific DFOW is resumed after substantial period of inactivity, as determined by the Field QA/QC Manager
- Determinations made by CAW

Procedures for Identifying and Documenting the Completion Inspection

This section describes the proposed procedures to plan, implement, record, and follow-up the final inspection of the work. The procedures will be managed by the Field QA/QC Manager with support from the Quality Control Specialists. In addition, technical support will be provided by the Commissioning Manager, and the component design engineers.

The completion inspection will occur after the notification has been provided to the Field QA/QC Manager that the work is substantially complete and ready for testing and a preparatory meeting has been conducted. The Field QA/QC Manager will notify CAW's representative.

The final inspection preparatory meeting will identify and discuss the procedures to be implemented during the walk-thru. As with all preparatory meetings, an agenda will be distributed that will include the following items:

- Activity Hazard Analysis review
- Review safety constraints during the walk-thru
- Ensure safe access is available to all parts of the work
- Review of inspection equipment needed
- Identify test requirements and inspection criteria
- Review of unresolved, previously identified, discrepancies
- Review of proposed punch-out list format

The three components of the completion inspection will include:

(i) Punch-list compilation during the construction work

(ii) Pre-final inspection

(iii) Acceptance inspection

Punch-list Compilation During the Construction Work

During the course of construction, punch-list items will be developed in the form of discrepancy reports and memoranda to the Contractor detailing deficiencies observed. A "running" list will be maintained and serve as the precursor to the final punch-out process. These items will be discussed on a regular basis at the progress meetings. The intent is to actively pursue corrections during the work to minimize punch-out responses at the project end. The "running" list will be posted and maintained at the QC field office.

The Contractor, construction quality management team, CAW representatives, and any other observing party are charged with identifying deficiencies during the work and reporting to the Field QA/QC Manager. As identified items are corrected, the corrective procedure will be documented on the "running" list and will not be included in the final inspection process. Should the Contractor protest the identified discrepancy, the issue will be discussed during progress meetings with final determination being made by the Field QA/QC Manager, in consultation with CAW representative.

11.2 Pre-final Inspection

Upon notification from the Contractor that the work is complete and ready for inspection, a pre-final inspection (walk-thru) will be scheduled and notifications made as to date and time of the proposed walk-thru. A 7 day notice will be submitted to the CAW representative prior to the pre-final inspection. The walk-thru process will generate a "final punch-list". The walk-thru will consist of inspection of the work by the final inspection team. This team will consist of:

(iv) CAW Representative

(v) Field QA/QC Manager Quality Control Specialists

(vi) Contractor's personnel

(vii) Design Manager and applicable Lead Design Engineer(s)

(viii) Operation & Maintenance personnel

(ix) Project Manager

(x) Other interested parties

The deficiencies identified during the walk-thru will be itemized and copies of the listing will be distributed to the Contractor and all other participants of the walk-thru. The Contractor will diligently pursue corrective action and report to the Field QA/QC Manager the completion of each discrepancy. The quality management team will provide on-going assistance and documentation of corrective actions.

The inspection activities will include:

(xi) Conformance of the work to the contract documents

(xii) Conformance of the work to code and regulatory requirements

(xiii) Workmanship

(xiv) Safety

(xv) Cleanliness of site and equipment

(xvi) Identification of equipment

(xvii) Protective coatings

(xviii) Removal of unused materials

Final Acceptance Inspection

Upon notification from the Contractor to the Field QA/QC Manager that all corrective action items identified during the pre-final inspection are complete, a final walk-thru will be scheduled. The same participants present during the pre-final inspection will be invited to attend. The purpose of the acceptance inspection will be to verify that corrective action was implemented for each of the discrepancies identified during the pre-final inspection. A 7 day notice will be submitted to the CAW representative prior to final acceptance inspection.

The final acceptance inspection will be repeated until all discrepancies are corrected. Upon completion, the listing will be documented as completed and certified by the Field QA/QC Manager and the previously identified discrepancies will be recommended for acceptance to the CDM Smith Project Manager and CAW.

Formal testing of equipment and processes will commence at completion of the acceptance inspection process or as planned, scheduled and approved by the Field QA/QC Manager. The reasoning for this protocol is to ensure that all systems are prepared, installed correctly, protective coatings applied, electrical installation completed, and required instrumentation is in place.

Training Procedures and Training Log

This section will be prepared during the early phases of construction. Requirements for training CAW personnel are contained in the various locations throughout the contract documents. Equipment manufacturers' will provide training for their specified equipment items, such as pumps, generators, filters, and UV reactors. A detained training plan and schedule will be developed and submitted to CAW for review and approval well in advance of the first training sessions.

Procedures for Project Testing, Start-Up and Commissioning

This section describes the proposed QA/QC procedures to plan, implement, record, and follow-up for testing, start-up, commissioning and certification of the desalination facilities. The procedures will be managed by the Field QA/QC Manager with support from the QCS's, the Commissioning Manager, the systems integrator, the mechanical, electrical and process design engineers, manufacturer's representatives, and CAW representatives, including its operations staff and SCADA programmer.

Testing that will be conducted includes the following:

(xix) Control Systems Functional Acceptance Testing that demonstrates the proper interaction between the facility PLC and the related equipment individual control systems

(xx) Electrical Testing (all Div 16 components)

(xxi) Functional Testing to determine that installed equipment/system will operate as specified

(xxii) Performance Testing to demonstrate that the equipment or system meets all of the contract performance requirements

(xxiii) Pre-Start-up Testing to demonstrate that all systems operating together provide satisfactory performance of the Tesla Treatment Facility as a whole.

(xxiv) Final Commissioning Test demonstrating performance connected to CAW's system and for the specified test period of seven (7) consecutive calendar days without failure.

A detailed testing and start-up will be prepared by CDM Smith and submitted to CAW for review a minimum of 120 days before the first functional test. The Plan will conform with the requirements of the RFP and after approval by CAW will be incorporated into this Quality Management Plan, Section 3- Construction Phase.

Appendix A
Representative Forms

(Example forms from City of Stockton Delta Water Supply Project)

- Revision Log
- Catalog Cut/Shop Drawing, Transmittal, and Approval
- Testing Plan and Log
- Non-Compliance Notice
- Discrepancy Log
- Notice of Suspension or Resumption of Work
- Contractor Quality Control Report
- Contractor Production Report
- Construction Safety Audit
- Concrete Placing Inspection Daily Report
- Daily Construction Report (Pipeline Installation)
- Preparatory Phase Checklist
- Initial Phase Checklist

Form 1. Daily Contractor Quality Control Report

CONTRACTOR QUALITY CONTROL REPORT

(ATTACH ADDITIONAL SHEETS IF NECESSARY)

DATE: Enter (DD/MMM/YY)

REPORT NO: Enter Rpt # Here

PHASE	CONTRACT NO: Enter Cnt# Here	CONTRACT TITLE: Enter Title and Location of Construction Contract Here

PREPARATORY

WAS PREPARATORY PHASE WORK PREFORMED TODAY? YES ☐ NO ☐

IF YES, FILL OUT AND ATTACH SUPPLEMENTAL PREPARATORY PHASE CHECKLIST.

Schedule Activity No.	Definable Feature of Work	Index #

INITIAL

WAS INITIAL PHASE WORK PREFORMED TODAY? YES ☐ NO ☐

IF YES, FILL OUT AND ATTACH SUPPLEMENTAL INITIAL PHASE CHECKLIST.

Schedule Activity No.	Definable Feature of Work	Index #

FOLLOW-UP

WORK COMPLIES WITH CONTRACT AS APPROVED DURING INITIAL PHASE? YES ☐ NO ☐

WORK COMPLIES WITH SAFETY REQUIREMENTS? YES ☐ NO ☐

Schedule Activity No.	Description of Work, Testing Performed & By Whom, Definable Feature of Work, Specification Section, Location and List of Personnel Present

REWORK ITEMS IDENTIFIED TODAY (NOT CORRECTED BY CLOSE OF BUSINESS)		REWORK ITEMS CORRECTED TODAY (FROM REWORK ITEMS LIST)	
Schedule Activity No.	Description	Schedule Activity No.	Description

REMARKS (Also Explain Any Follow-Up Phase Checklist Item From Above That Was Answered "NO"), Manuf. Rep On-Site, etc.

Schedule Activity No.	Description

On behalf of the contractor, I certify that this report is complete and correct and equipment and material used and work performed during this reporting period is in compliance with the contract drawings and specifications to the best of my knowledge except as noted in this report.

AUTHORIZED QC MANAGER AT SITE DATE

CITY OF STOCKTON QUALITY ASSURANCE REPORT

DATE

QUALITY ASSURANCE REPRESENTATIVE'S REMARKS AND/OR EXCEPTIONS TO THE REPORT

Schedule Activity No.	Description

CITY OF STOCKTON QUALITY INSPECTOR DATE

Form 1. Daily Contractor Quality Control Report

CONTRACTOR QUALITY CONTROL REPORT

(CONTINUATION SHEET)
(ATTACH ADDITIONAL SHEETS IF NECESSARY)

DATE: Date (DD/MMM/YY)
REPORT NO. Enter Rpt # Here

PHASE	CONTRACT NO	Enter Cnt# Here	CONTRACT TITLE	Enter Title and Location of Construction Contract Here

FOLLOW-UP

WORK COMPLIES WITH CONTRACT AS APPROVED DURING INITIAL PHASE? YES ☐ NO ☐

WORK COMPLIES WITH SAFETY REQUIREMENTS? YES ☐ NO ☐

Schedule Activity No.	Description of Work, Testing Performed & By Whom, Definable Feature of Work, Specification Section, Location and List of Personnel Present

REMARKS (Also Explain Any Checklist Item From Above That Was Answered "NO"), Manuf. Rep. On-Site, etc.

Schedule Activity No.	Description

Form 2. Sample Construction Inspection Checklist

PROJECT NAME	Pour Number
WTP ☐ Pipeline ☐	TIME
CONTRACTOR OR SUBCONTRACTOR	
LOCATION: Station Number, drawing Grid/Column number.	SPECIFICATION: 03300
REPORT NO: (Inspectors Initials, Date) i.e. JDW0429	

CONCRETE

POUR DESCRIPTION:	
REFERENCES ☐(Plan sheets, etc.):	
APPROVED MIX DESIGN NO. :	
PROPOSED PLACEMENT METHOD:	

PRE - PLACEMENT

IF NOT APPLICABLE, NOTE "N/A"	INSPECTOR		
	ACCEPTED Y/N	DATE☐	REMARKS
Has the Contractor submitted the Working Drawings and Calculations for Falsework? (03100, para 1.3A.2)			
Has the Falsework Designer of Record inspected the falsework prior to the concrete pour? (03100, para 3.4A)			
Are cold joints and construction joints in the locations as allowed in the Project Plans? (03300, para 3.5A)			
Are forms tight, clean, treated with form release agent, and wetted prior to the placement of concrete? (03100, para 2.1A)			
Is the reinforcing steel installed per plan? (see Quality Checklist for Steel Reinforcement) (03200, para 3.1A)			

READY FOR CONCRETE PLACEMENT ☐ YES ☐ NO
if yes, go to next sheet

DATE

CONCRETE PLACEMENT

CONCRETE (CTS) TECHNICIAN ON SITE: NAME / CARD NO.	☐ YES	☐ NO
TESTING FIRM:		
Concrete supplier's Mix Design Number		

Form 2. Sample Construction Inspection Checklist

FIRST LOAD INFORMATION PRIOR TO PLACEMENT TO CONFIRM SPEC MATERIAL					
AMBIENT TEMP:	BATCH TIME	TIME LOAD ARRIVED ON SITE	SLUMP:	DRYING SHRINKAGE (CLASS D) IF REQUIRED	MIX TEMP:

	ACCEPTED Y/N	DATE	REMARKS Y/N
Does the contractor have two or more vibrators available for each 8 c.y. placed per hour (03300, para 3.1B.2)			
Is the air temperature above 40 °F and below 90 °F? (03300, para 2.9d)			
Maximum time to discharge concrete: Above 90° - 60 minutes (03300, para 2.9d)			
Maximum time to discharge concrete: 70° to 90° - 60 minutes(03300, para 2.9d)			
Maximum time to discharge concrete: 40° to 69° - 90 minutes(03300, para 2.9d)			
Maximum time to discharge concrete with a superplasticizer - 90 minutes (0330, para 2.9d)			
Do conditions require the hot or cold weather protection measures? (03300, para 2.2C.9)			
Is the concrete being finished to the required texture as outlined under (03300, para 3.1B.4)			
POST - PLACEMENT			
IF NOT APPLICABLE, NOTE "N/A"	ACCEPTED Y/N	DATE	REMARKS Y/N
Has the Contractor left the forms in place the proper number of days and until the specified strength was achieved? (03300, para 3.1F)			
Is burlap and polyethylene placed as soon as possible after the concrete placement? (03300, para 3.1C.2a.2)			
Is the concrete surface being kept wet throughout the seven day period? (03300, para 3.1C.2a.1)			
Prior to striping, does the contractor have time and cylinder breaks? (03300, para 4.1A.1)			
Is the appropriate finish being applied to the concrete surface? (03300 para 3.1A.6)			
Have the rock pockets, honeycombs, and other blemishes been repaired? (03300, para 4.1B.2)			
NON CONFORMANCE REPORT?	No	N/A	Report No.

COMMENTS ON BACK ☐

____
INSPECTOR'S SIGNATURE

Form 3. Sample CDM Submittal Form

CDM

11373 Lower Sacramento Road
Lodi, CA 95242

Phone: 209-365-4631
Fax: 209-365-4639

SUBMITTAL
NO. PL-02610-001
PACKAGE NO: PL-002

TITLE:	Permalok Steel Casing Pipe	**REQUIRED START:**	
PROJECT:	Stockton DWSP	**REQUIRED FINISH:**	10/30/2009
DRAWING:		**DAYS HELD:**	19
STATUS:	NEW	**DAYS ELAPSED:**	19
BIC:	CCI	**DAYS OVERDUE:**	10

RECEIVED FROM	SENT TO	RETURNED BY	FORWARDED TO
VADNAIS RVO			

Revision No.	Description/Remarks	Received	Sent	Returned	Forwarded	Status	Sepias	Prints	Drawing Date	Held	Elapsed
A	Permalok Steel Casing Pipe	10/21/2009				NEW	0	0		19	19

Form 4. Reworkable Discrepancy/Non Conformance Report

RDR/NCR NUMBER:	**CATEGORY** RDR ☐ NCR ☐	**SUBCONTRACTOR/CONTRACTOR NAME:**
DWG. NO.	**SPEC NO.**	**LOCATION:**

DESCRIPTION OF THE DISCREPANCY OR NONCONFORMANCE:

INITIATOR SIGNATURE: **DATE:**

DISPOSITION/CORRECTION: (Contractor Responsibility)

CATEGORY RDR: Rework: ☐ Scrap ☐ **CATEGORY NCR:** Use-As-Is: ☐ Repair: ☐

Description of measures taken to correct item: (Contractor Responsibility

Design Engineer of Record Signature/Date (if Category NCR):

Responsible Superintendent/ACM Signature/Date (if Category RDR):

CORRECTIVE ACTION REQUIRED: (To be completed by CDM CQCM Only) YES ☐ NO ☐

DESCRIPTION OF CORRECTIVE ACTION REQUIRED TO PREVENT RECURRENCE OF NONCONFORMANCE:

CDM Quality Manager Signature/Date:

ACTION VERIFIED AND RDR OR NCR CLOSED:

Verifying Inspector Signature/Date:

Responsible Superintendent/ACM Signature/Date: **CQC Manager Signature/Date:**

Form 5. Quality Control Surveillance Report

SURVEILLANCE REPORT	TYPE OF OBSERVATION: ☐ OBSERVATION ☐ NONCOMPLIANCE	SURVEILLANCE DATE:	STAGE OF WORK ☐ INPROCESS ☐ COMPLETE
INSPECTION CHECKLIST, SPECIFICATION, OR DRAWING USED AS REFERENCE: (CDM to Provide)			
DESCRIPTION OF ITEM/WORK OBSERVED: (CDM to Provide)			
FINDING: (CDM to provide)			
PERSON NOTIFIED OF OBSERVATIONS NOTED: (CDM to provide) NAME____________________ TITLE____________________ SUBCONTRACTOR ______________________________			
CORRECTIVE ACTION TAKEN: (Subcontractor to Provide)			
VERIFICATION OF CORRECTIVE ACTION TAKEN: (CDM to Provide)			
FINAL ACCEPTANCE SIGNATURES INITIATOR:____________________________ DATE:______________ QUALITY MANAGER:________________________ DATE:______________			

Form 6. Sample CDM Request for Information Form

CDM

REQUEST FOR INFORMATION
No. 00001

11373 Lower Sacramento Road
Lodi, CA 95242

Phone: 209-365-4631
Fax: 209-365-4639

TITLE: Pass Hole Detail

DATE: 10/21/2009

PROJECT: Stockton DWSP

JOB: CDM 61585

TO: Attn: Robert L. Allen
Camp Dresser & McKee Inc.
100 Pringle Avenue, Suite 300
Walnut Creek, CA 94596
Phone: 925-296-8038

STARTED:

COMPLETED:

REQUIRED: 10/23/2009

QUESTION:

As previously discussed and approved.

Please confirm your approval of the use of 4" 3000# 1/2 couplings for the Pass Holes for the Ameron Mainline pipe.

ANSWER:

Mark,

Looks good to me. I have seen a steel threaded cap backwelded for a leak-tight seal work very effectively for hand holes on previous projects.

Requested By: CDM Constructors Inc.

Date: 10/21/2009

Signed: ______________________
Mark. R. Andrews

Form 7. Sample Daily Report

CDM

11373 Lower Sacramento Road
Lodi, CA 95242

Phone: 209-365-4631
Fax: 209-365-4639

DAILY REPORT
No. KV006

COMPANY: CDM Constructors Inc.

DATE: 10/30/2009

REPORT PERIOD: Daily

DAY: Friday

PROJECT: Stockton DWSP

JOB: CDM 61585

TEMPERATURE: 80-90 **PRECIPITATION:** None **SKY:** Clear **WIND:** 40-50

ACTIVITY

Office trailers were delivered to the site by mobile modular. The set up was started on the City's quad complex. Power plus formed and placed the concrete for the Temp.

Certified By: CDM Constructors Inc.

Date: 11/9/2009

Signed: ______________________
Chad E. Brown

Form 8. QC Specialist Inspection Report.

QC SPECIALIST INSPECTION REPORT		DATE
CONTRACT NO	TITLE AND LOCATION	REPORT NO
CONTRACTOR		SPECIALTY INSPECTOR

WORK INSPECTED/OBSERVED TODAY

Schedule Activity No.	WORK LOCATION AND DESCRIPTION	EMPLOYER	TRADE

Schedule Activity No.	LIST SAFETY ACTIONS TAKEN TODAY/SAFETY INSPECTIONS CONDUCTED

EQUIPMENT/MATERIAL RECEIVED TODAY TO BE INCORPORATED IN JOB (INDICATE SCHEDULE ACTIVITY NUMBER)

Schedule Activity No.	Submittal #	Description of Equipment/Material Received

INSPECTION ACTIVITIES OF WORK ACTIVITIES LISTED ABOVE

Schedule Activity No.	INSPECTION ACTIVITIES

Schedule Activity No.	REMARKS

INCLUDE ALL PERSONNEL WORK HOURS IN THE WORK PERFORMED SECTION ON THIS SHEET
INTO THE FRONT CONTRACTOR PRODUCTION REPORT

Signed:

Form 8. QC Specialist Inspection Report.

QC SPECIALIST INSPECTION REPORT (CONTINUATION SHEET) (ATTACH ADDITIONAL SHEETS IF NECESSARY)				DATE Date (DD/MMM/YY) REPORT NO. Enter Rpt # Here
PHASE	CONTRACT NO	Enter Cnt# Here	CONTRACT TITLE	Enter Title and Location of Construction Contract Here

FOLLOW-UP

WORK COMPLIES WITH CONTRACT AS APPROVED DURING INITIAL PHASE? YES ☐ NO ☐

WORK COMPLIES WITH SAFETY REQUIREMENTS? YES ☐ NO ☐

Schedule Activity No.	Description of Work, Testing Performed & By Whom, Definable Feature of Work, Specification Section, Location and List of Personnel Present

REMARKS (Also Explain Any Checklist Item From Above That Was Answered "NO"), Manuf. Rep. On-Site, etc.

Schedule Activity No.	Description

Form 9. Receiving Inspection Report

Purchase Requisition No: ____________	Date Ordered/Received: ____________
Document Catalog No.: ____________	Ordered By: ____________

Description of Material: ____

____

Note: Receiving inspection performed by the purchase requisition requester shall be documented using the checklist criteria to the extent it is applicable to the item or material purchased. Results shall be evidenced by a check mark (✓) in the appropriate ***"NA/Accept/Reject/Yes/No Box"***.

Receipt Inspection Checklist Criteria	N/A	Accept	Reject
1. Verify item/material received is correct per the purchase documents.			
2. Visually inspect received condition for shipping damage.			
3. Verify quantity, dimensions, identification, and markings are correct.			
4. Review quality assurance requirements and verify quality clause conformance for the following:			
• Certifications required by the purchase requisition are correct/complete /authenticated.			
• Inspection and test records conform to manufacturers published data.			
• Item/Component Marking/Serialization is traceable to test data.			
• Limited Shelf Life Material is marked with applicable expiration date.			
• Certified Material Test Reports (CMTRs) were included.			
5. Manufacturers Certificate of Conformance identifies the following, as a minimum:			
• Materials or equipment traceability to the purchase requisition requirements.			
6. Verify all deliverables (documents only) meet the minimum requirements.			

Remarks:

Deficiency Closed ☐ Yes ☐ No Date:__________ Comments: ____________________

____

Placed in Storage ☐ Yes ☐ No ☐N/A	Location:

Verification of Inspection:

I have verified that this receipt inspection was properly conducted and the items and/or material meets requirements as identified in the appropriate purchase requisition (Confirmed by).

Received by: ______________________________ Quality Inspector ______________________________

print name, then sign (Date) print name, then sign (Date)

Form 10. Sample Inspection and Testing Data Control Log

City of Stockton
Delta Water Supply Project
Water Treatment Plant and Pipelines
Inspection and Testing Data Control Log

Contract Number:

Contractor: CDM

Specification Section and Paragraph Number	Schedule Activity ID	Test Required	Accredited/Approved Lab		Sampled By	Tested By	Location of Test		Date Completed	Date Forwarded to CDM Field Office	Remarks
			Yes	No			On-Site	Off-Site			

Form 11. Preparatory Phase Meeting Checklist

PREPARATORY PHASE MEETING CHECKLIST		SPEC SECTION Enter Spec Section # Here	DATE Enter Date (DD/MMM/YY)
CONTRACT NO Enter Cnt# Here	DEFINABLE FEATURE OF WORK Enter DFOW Here	SCHEDULE ACT NO. Enter Sched Act ID Here	

PERSONNEL PRESENT

CITY OF STOCKTON REP NOTIFIED _____ HOURS IN ADVANCE: YES ☐ NO ☐

NAME	POSITION	COMPANY/CM

PROCEDURE COMPLIANCE

IDENTIFIY FULL COMPLIANCE WITH PROCEDURES IDENTIFIED AT PREPARATORY. COORDINATE PLANS, SPECIFICATIONS, AND SUBMITTALS.

COMMENTS: ______________________________

PRELIMINARY WORK

ENSURE PRELIMINARY WORK IS COMPLETE AND CORRECT. IF NOT, WHAT ACTION IS TAKEN?

WORKMANSHIP

ESTABLISH LEVEL OF WORKMANSHIP.

WHERE IS WORK LOCATED? ______________________________

IS SAMPLE PANEL REQUIRED? YES ☐ NO ☐

WILL THE INIITAL WORK BE CONSIDERED AS A SAMPLE? YES ☐ NO ☐

(IF YES, MAINTAIN IN PRESENT CONDITION AS LONG AS POSSIBLE AND DESCRIBE LOCATION OF SAMPLE) ______________________________

RESOLUTION

RESOLVE ANY DIFFERENCES.

COMMENTS: ______________________________

CHECK SAFETY

REVIEW JOB CONDITIONS USING APPLICABLE SAFETY REGULATIONS AND ACTIVITY HAZARD ANALYSIS

COMMENTS: ______________________________

OTHER

OTHER ITEMS OR REMARKS

____

QC MANAGER DATE

Form 12. Initial Phase Checklist

INITIAL PHASE CHECKLIST (CONTINUED ON SECOND PAGE)		SPEC SECTION Enter Spec Section # Here	DATE Enter Date (DD/MMM/YY)
CONTRACT NO Enter Cnt# Here	DEFINABLE FEATURE OF WORK Enter DFOW Here	SCHEDULE ACT NO. Enter Sched Act ID Here	

PERSONNEL PRESENT

CITY OF STOCKTON REP NOTIFIED #HRS HOURS IN ADVANCE: YES ☐ NO ☐

NAME	POSITION	COMPANY/AGENCY

SUBMITTALS

REVIEW SUBMITTALS AND/OR SUBMITTAL REGISTER. HAVE ALL SUBMITTALS BEEN APPROVED? YES ☐ NO ☐

IF NO, WHAT ITEMS HAVE NOT BEEN SUBMITTED? ______

ARE ALL MATERIALS ON HAND? YES ☐ NO ☐

IF NO, WHAT ITEMS ARE MISSING? ______

CHECK APPROVED SUBMITTALS AGAINST DELIVERED MATERIAL. (THIS SHOULD BE DONE AS MATERIAL ARRIVES.)

COMMENTS: ______

MATERIAL STORAGE

ARE MATERIALS STORED PROPERLY? YES ☐ NO ☐

IF NO, WHAT ACTION IS TAKEN? ______

SPECIFICATIONS

REVIEW EACH PARAGRAPH OF SPECIFICATIONS. ______

DISCUSS PROCEDURE FOR ACCOMPLISHING THE WORK. ______

CLARIFY ANY DIFFERENCES. ______

PRELIMINARY WORK & PERMITS

ENSURE PRELIMINARY WORK IS CORRECT AND PERMITS ARE ON FILE.

IF NOT, WHAT ACTION IS TAKEN? ______

Form 12. Initial Phase Checklist

INITIAL PHASE CHECKLIST (CONTINUED FROM FIRST PAGE)		SPEC SECTION Enter Spec Section # Here	DATE Enter Date (DD/MMM/YY)
CONTRACT NO Enter Cnt# Here	DEFINABLE FEATURE OF WORK Enter DFOW Here	SCHEDULE ACT NO. Enter Sched Act ID Here	INDEX # Enter Index# Here

TESTING	IDENTIFY TEST TO BE PERFORMED, FREQUENCY, AND BY WHOM.
	WHEN REQUIRED?
	WHERE REQUIRED?
	REVIEW TESTING PLAN.
	HAS TEST FACILITIES BEEN APPROVED?
SAFETY	ACTIVITY HAZARD ANALYSIS APPROVED? YES ☐ NO ☐
	REVIEW APPLICABLE PORTION OF EM 385-1-1.
MEETING COMMENTS	COMMENTS DURING MEETING.
OTHER ITEMS OR REMARKS	OTHER ITEMS OR REMARKS:

QC MANAGER DATE

Form 13. Sample Design Change Notice Form

Design Change Notice

Project Name: Delta Water Supply Project	DCN Number__________ Date:______
Customer: City of Stockton	Location: Stockton California

Proposed Design Change Details:

Issued By:____ (EOR) Print Name and Title______________________________________	Date:_______________

Change Implementation Details:

New Plans are/will be issued by Engineering☐ Construction Manager to as-built this change ☐

Design Change Notice Approval: Approved By:___________________________ Deputy PM-Design Approved By:___________________________ City Engineer (optional)	Date:____________ Date:____________

Construction Management Actions:

Subcontracts affected:

Cost Impact yes ☐ no ☐	Schedule Impact yes ☐ no ☐
Request an estimate from the Subcontractor? yes ☐ no ☐	
ACM Signature:	Date:

14) Approach to Procurement and Delivery of Materials

Approach to Procurement and Delivery of Materials for the Project

A key step in project planning is identifying elements of the project than can be packaged to expedite design, procurement, and construction activities. Timely procurement and delivery of the major process equipment is a key success factor to completing the project on time. Involving design and construction professionals and vendors, early in the procurement process enables the team to realize shared goals of designing and building a high-quality, cost-effective, and reliable facility.

CDM Smith's established procurement management process begins during proposal development. A select group of vendors have already been engaged during the preliminary design process prior to submitting our final proposal. Final selection of equipment vendors and subcontractors will be heavily weighted toward those willing to commit to meeting budget, schedule, quality, safety, local and WMDVBE participation requirements for the project.

The procurement process breaks down into the following categories:

- Prioritizing Procurement Packages
- Preparing Bid Documents and Soliciting Quotations
- Negotiating Final Scopes and Contract Terms
- Reviewing Equipment Data (Submitals) and Releasing Equipment for Fabrication
- Monitoring the Fabrication Process and Delivery Schedule
- Factory Inspection and Testing
- Equipment Delivery and Storage
- Startup and Checkout of Equipment

Prioritizing Procurement Packages

One of the first steps in developing a procurement approach is prioritizing elements based on delivery times, construction sequencing, and warranty periods. Our project team has already identified critical items, such as the standby generator, media pressure filters, high-pressure feed pumps, reverse osmosis skids, and UV disinfection equipment. Contracts for these items, as well as for other long-lead fabrication items, will be placed immediately after construction notice-to-proceed and will be tracked through the submittal process and start of fabrication through to delivery.

Preparing Bid Documents and Soliciting Quotations

During the design phase of the project the procurement team will be developing bidding documents for all construction components of the project. As design documents are substantially complete bid documents will be finalized and issued to suppliers for quotation. This effort also involves finalizing procurement specifications, contract terms, and identifying potential suppliers for each element of the project. Before solicitations are sent out we will ensure that local and WMDVBE interests are well-represented and provided the opportunity to provide proposals. As previously mentioned, critical long lead items will be focused on first.

Negotiating Final Scopes and Contract Terms

Our procurement team will evaluate all proposals for scope adherence, cost, schedule, quality, local business interests, and WMDVBE participation. The procurement staff will consult with the design team to confirm the supplier's scope meets the requirements of the project and overall intent of the project design. The procurement team will also consult with the project controls team regarding schedule and anticipated delivery dates for each piece of equipment. After evaluating all proposals from a technical and a business perspective, we will engage in final contract negotiations with the supplier who best meets the overall qualifications and requirements of the project.

Reviewing Equipment Data and Releasing Equipment for Fabrication

After the contract is executed the shop drawing/submittal process will commence. CDM Smith's construction staff will work closely with the vendors and design team to coordinate and expedite the submittal process. CDM Smith will conduct pre-submittal meetings with many of the critical vendors. The goal is to always avoid iterative submittal and re-submittal steps; therefore the construction team will review all submittals for conformance prior to submitting them to the QA/QC manager and design team for review. Having already engaged the design team to review scopes prior to finalizing contracts helps facilitate quality submittals the first time. When needed, the construction team will facilitate a conference call or meeting between the submittal reviewer and the supplier to help answer questions and confirm intent or approach. We have found this approach to be very successful on past projects. When appropriate, submittals will be approved as noted with comments to expedite fabrication and delivery.

Monitoring the Fabrication Process and Delivery Schedule

On time delivery is facilitated by monitoring fabrication status on a weekly basis and inspecting equipment during the fabrication process. Supplier contracts will include explicit dates and time frames for submittals, fabrication, delivery, factory-witnessed tests, O&M manuals and start-up support. Our construction staff will work closely with our suppliers to track delivery of all equipment for the project. Suppliers will be required to notify CDM Smith immediately if there is a change in the anticipated delivery schedule. This type of early notification will allow the project team to evaluate options and develop the best contingency plan to ensure the project stays on schedule.

Factory Inspection and Testing

Purchases of large or key equipment, such as large VFD pumps, often require additional inspection and/or factory testing to ensure that equipment meets specifications and will function as designed once it is delivered, installed, and placed into service. In this case, CDM Smith may require witness testing at the factory where the equipment is built before it is delivered to the construction site. CDM Smith has offices globally and frequently utilizes local staff to perform equipment inspections and witnessed testing at the factory locations. This same staff can also be called on to perform site inspections of manufacturing facilities to verify the status of production is as reported.

Equipment Delivery and Storage

The CDM Smith team will consider project schedule, cost escalation and warranty timeframes when determining the required delivery date for each piece of equipment. Once procurement is completed and the equipment is delivered to the site, the proper storage of equipment in the field is critical to the life of the equipment and required to keep the Manufacturer's warranty intact. As an example, large motors delivered to the site will be protected from weather and the space heaters will be energized to ensure condensation does not accumulate inside the motor housing. CDM Smith performs regular checks of stored equipment and audits the stored equipment and equipment to make sure it is protected from damage that may result from exposure to weather. With some very critical pieces of equipment the vendors may be required to visit the site to assure that the equipment is handled and stored properly if it is not to be installed immediately.

Startup and Checkout of Equipment

Coordination with the manufacturer does not end with equipment delivery. The construction team will continue the process to make sure that O&M manuals are delivered and training is scheduled as needed to meet project schedule. Immediately prior to startup, equipment manufacturers will be required to visit the site and startup their equipment to verify that it is installed properly and is in a warrantable condition.

15) Approach to Managing of Schedule-Constraining Resources

Avoiding Schedule Constraints

Project success is a function of meeting design, construction and commissioning schedule milestones throughout the project implementation. The following tables identify potential schedule-constraining issues and resources and list some of our planned actions for the MPWSP Desalination Infrastructure Project that have been used successfully by the CDM Smith team on other projects.

Design

Issue	Potential Schedule Constraint	Preventative Action
Meeting CAW design standards/expectations	▪ Re-design required resulting in delays in design completion ▪ Extensive drawing revisions requested by CAW engineering and operations resulting in multiple iterations for review and subsequent schedule delays	1. CAD drafting standards will be established prior to the initiation of final design activities. A formal submittal of the sheet layouts and standards will be provided to CAW for review and approval. 2. A design kick-off meeting will be held between CAW project team and CDM Smith team design manager and discipline leads to discuss standards, policies, and protocols impacting assembling the construction documents.
Knowledge of Existing and Other Project Components	▪ Inaccurate operational and design assumptions based on lack of system knowledge results in re-design efforts delaying design completion ▪ Extensive design revisions due to lack of understanding of CAW operational preferences for controls and equipment results in multiple design iterations ▪ Proper coordination with other project designs leads to redesign/ start-up issues	1. CDM Smith's internal technical review of design documents to be conducted by senior WTP design engineers in the Walnut Creek office with extensive experience designing facilities in California including the Sand City Desalination Plant. 2. Design workshops held with CAW stakeholders in engineering and operations during the evolution of the design to present/ discuss primary system components. These "User Group" workshops have been utilized successfully by CDM Smith for many public sector clients.
Long Lead Items	▪ Overall delays in the infrastructure schedule	1. Identify critical path equipment items needed at the start of construction. 2. Develop early procurement packages as an initial design activity. Submit the package to the suppliers shortly after NTP. 3. Establish shop drawings and submittal review schedule for vendors with critical milestone dates. 4. Work closely with the suppliers of the critical path items to facilitate submittal review.
EIR Requirements	▪ Construction drawings and specifications not reflecting mitigation requirements result in re-design ▪ Mitigation measures overlooked in the design documentation could result in construction delays	1. All design team members to review the Mitigation, Monitoring, and Reporting Plan (MMRP) developed in the EIR. 2. Internal design review to be performed by Denise Duffy and EOA (environmental subconsultants) to confirm that all mitigation requirements have been appropriately integrated into the plans and specifications. 3. Final drawings not produced until after final EIR issued

Issue	Potential Schedule Constraint	Preventative Action
PG&E and Other Utilities	▪ Delays in power/gas/communication service and other utilties to the site will impact the schedule of start-up and completion of the project	1. Establish early contact with PG&E and other utility companies. Provide load calculations, power distribution single-line diagram and Site Plan. Provide construction schedule information including start date, date of service, and date of completion. Assist CAW to make sure that utilities have all needed information and fees to complete the work on time.
Knowledge of Submittal Requirements	▪ Multiple iterations of submittal review, rejections, and re-submittal results in adverse construction schedule impacts. ▪ Incomplete and/or confusing submittals could result in procurement of off-spec equipment and materials	1. Design team to work closely with construction team establishing submittal needs jointly. 2. Construction team to ensure quality of submittals prior to submitting to design team for review. 3. Develop submittal log, post it in project document control website establish a point person and update regularly. 4. Assign person to work with vendors of major and/or complex equipment to facilitate all requirements are addressed in initial submittal. 5. Allow design engineer/reviewer to approve what is approvable. 6. Clearly identify submittals that are on the critical path. Design team will commit to accelerated turnaround times.
Design Team Experienced in Design-Build	▪ Inexperienced team in design-build projects could result in the "over design" ▪ Lack of synergy within the design-build team reduces both design and construction efficiencies	1. All key CDM Smith team members have extensive design-build experience. 2. Assemble the design-build team with engineers, constructors, programmers and operators not only experienced in the successful completion of design-build projects, but experienced working together on previous projects.
Architecture and Landscaping Approval	▪ Delays in design completion ▪ Unnecessary re-design activities hurting schedule ▪ Delays in construction starting	1. Develop preliminary briefing package for CAW early in the design process. 2. EHDD (architect) and Joni Janecki & Associates (landscape architect) staffs have a successful record within Monterey County. 3. Prepare design drawings and 3D renderings which clearly represent architectural themes.
Competing Projects	▪ Delays in design completion. ▪ Delays in construction submittals	1. Commitment of senior management of the CDM Smith team establishing the CAW MPWSP Desalination Infrastructure Project as the highest priority project in the area. 2. Depth of engineering staff in CDM Smith's Walnut Creek Design Center, routinely producing over 1,500 construction drawings annually provides deep bench strength for the MPWSP project.

Geotechnical

Issue	Potential Schedule Constraint	Preventative Action
Changed Conditions Compared to Current Assumptions	▪ Redesign required, causing delay in design completion	1. Have Pacific Crest Engineering (geotechnical engineering) ready to mobilize immediately upon design NTP. 2. Have Whitson Engineers perform site survey after award of contract.
Changed Conditions During Construction	▪ Delay in foundation preparation, causing a delay in project start-up and completion	1. CDM Smith has developed foundation approach that is less likely to be impacted by variances in site soil conditions. 2. Pacific Crest Engineering's geotechnical staff are within 30 minutes of site and can mobilize rapidly in response to an unforeseen soil condition.

Procurement & Construction

Issue	Potential Schedule Constraint	Preventative Action
Weather	▪ Delays due to rain and wind	1. Build all weather construction access roads. 2. Grade site to shed water. 3. Attempt to schedule weather-sensitive earthwork during dry season.
Accident	▪ Potential for lost time ▪ Responding to injuries ▪ Addressing OSHA assessments	1. Implement jobsite safety orientation program for all personnel on site. 2. Conduct weekly safety meetings. 3. Conduct routine project safety audits with CDM Smith Regional Safety Manager. 4. Develop a culture of safety 5. Activity Hazard Analysis for each detailed feature of work
Fire	▪ Delays due to damaged construction ▪ Lost time associated with responding to fire	1. CDM Smith design utilizes very few combustible materials. Comprehensive fire safety plan and fire-extinguishing equipment on site. 2. Remove combustible packing material from work area and place in solid waste/recycling containers.
Shortage of Working Capital	▪ Project stop or delays due to lack of sufficient financial strength to capitalize project	1. CDM Smith is a $1.5 billion company with a large cash reserve and line of credit. 2. CDM Smith routinely completes projects of this size and larger throughout the U.S. 3. CDM Smith maintains a large untapped line of credit.

Issue	Potential Schedule Constraint	Preventative Action
Insufficient Man Power	▪ Project delays resulting from worker shortages	1. To the extent possible we will hire locally-based subcontractors 2. CDM Smith is signatory with several of the local construction craft unions and we will pull from these resources as needed – early inquiries indicate sufficient staff amiable. 3. CDM Smith is well connected with the construction industry in the area, after recently completing the Sand City Desalination Plant DB and the Pebble Beach Advanced Water Treatment Plant DB. 4. Prevailing wages will help draw people.
Late Delivery/ Shortage of Equipment	▪ "Cascading" impacts where critical equipment not on-site when needed	1. Build on CDM Smith's extensive northern California and Monterey region design-build experience and contacts 2. CDM Smith will conduct presubmittal meetings with critical vendors. 3. Factory inspections/testing as required. 4. Critical vendor progress updates. 5. Procure from vendors with proven performance.
Late Delivery/ Shortage of Materials	▪ Delays from not having enough materials or critical materials not on-site when needed	1. As part of our sustainability efforts, materials will be sourced locally to the maximum extent possible 2. Materials not available locally will be included in our CPM schedule to allow appropriate time for procurement and delivery 3. Material deliveries will be actively monitored and tracked using the CPM schedule
EIR Impacts	▪ Lost time due to implementation of mitigation measures	1. Conduct an environmental mutual understanding meeting with project stakeholders prior to conducting any field work. 2. Consult with environmental professionals to develop project procedures and protocols. 3. Assist CAW with any needed delay recovery plan.

Start-Up & Testing

Issue	Potential Schedule Constraint	Preventative Action
California Department of Public Health (CDPH) Approval	▪ Delays in securing approval from CDPH can delay the testing and start-up schedule of the facility	Using existing relationship, work closely with CDPH staff responsible for granting operating permit to: 1. Conduct permit coordination meeting with CDPH during preliminary design phase of project. 2. Attempt to keep CDPH engaged in project during design development. 3. Define key information required by CDPH. 4. Establish milestone dates for submittal of information to CDPH and review periods. 5. Get concurrence on facility design criteria including monitoring and reporting requirements.

Issue	Potential Schedule Constraint	Preventative Action
Electrical Testing	▪ On-site or off-site electrical testing can delay start-up and pose safety hazards if it is not scheduled and executed properly	1. Critical electrical equipment shall be rigorously tested prior to shipment and again prior to energizing. 2. Power cables should be tested after installation and before termination. 3. Provide inspection, testing and setting circuit breakers and protective devices. 4. Provide short circuit study and protective device setting based on actual purchased equipment.
Harmonics	▪ Excessive harmonics can cause overheating of equipment, premature failure, and nuisance tripping of protective devices, which would delay start-up	1. Provide harmonic calculations during the design. 2. Provide active or passive harmonic filters as required to clean up the power supply.

Start-up/Commissioning

Issue	Potential Schedule Constraint	Preventative Action
Control System Integration	▪ Lack of coordination with the Instrumentation & Control (I&C) team will affect the integration of the different systems and components of the SCADA system ▪ Lack of coordination between vendor-provided systems (RO, UV, Chemical, Post Treatment,etc.) will affect the integration of the SCADA system	1. Coordination with the I&C team will minimize scope creep and programming issues. Clearly define I&C team responsibilities; schedule project key milestones early; and keep track schedule. 2. Conduct witnessed factory Acceptance Tests prior to shipping equipment to jobsite. 3. CDM Smith will self-perform I&C including panel fabrication and programming thus eliminating competing interests from multiple subcontractors/suppliers.
SCADA Coordination with Other CAW Facilities	▪ Undefined control sequences procedures could impact start-up/ commissioning and delay project completion	1. Conduct design coordination/integration meetings with CAW staff regarding other projects (i.e., raw water wells, pipelines, etc…)
Equipment Failure	▪ Delays to testing, start-up, commissioning and final completion. Potential damage to other project equipment	1. Factory testing of equipment prior to shipment. 2. Store and protect equipment from dust, moisture, etc., at the site prior to installation. 3. Schedule equipment deliveries to minimize storage period prior to installation of equipment. 4. Witness factory tests for major equipment. 5. Conduct factory simulated tests for major control panels and systems.
Operation Staff On Board	▪ CAW Operations Staff not identified or assigned to the facility when start-up activities are initiated results in delays ▪ CAW Operations Staff have conflicting duties and responsibilities making them unavailable for start-up	1. CDM Smith team will develop a "Commissioning Plan" a full 6 months prior to initiation of start-up. 2. A "Start-Up Workshop" will be held at least 60 days prior to start-up activities. The workshop will be attended by CAW Operations Staff, managers, and engineers in conjunction with the CDM Smith team. The objective is to establish the schedule of start-up activities and outline resource requirements. 3. Experience working with local CAW staff in starting up new desalination plants.

16) Approach to Attracting, Retaining, and Providing Incentives to Attract and Retain Skilled Laborers

Approach to Attracting, Retaining, and Providing Incentives to Attract and Retain Skilled Laborers

CDM Smith as a union contractor has existing contracts with the local unions. We have already spoken with the business administrators at the local union halls and have found that the Laborers Local 297, Carpenters Local 605, and the IBEW Local 324 journeyman craftsman available and ready to go to work on this project for CDM Smith. As we have built several projects in the Monterey Bay area we are experienced in finding local labor to staff our projects. We even have several past employees living in the area who have expressed interest in returning to work for CDM Smith should we be selected for this project.

One of CDM Smith's strategic goals is to be the employer of choice, this means that we offer a number of benefits and programs for our employees that help make CDM Smith the place to work. In addition to the full benefits packages offered to our employees (through the union contracts), we also provide safety bonuses and periodic jobsite barbeques. Our past experience with hiring laborers in the local area is that there is a consistently large pool of qualified craftsman available to work on a local prevailing wage project. This allows us to hire the best local craftsmen and ensure high-quality construction and an on-time schedule. While not anticipated, our numerous other projects in the San Francisco Bay Area and Central Valley allow us to bring in any specialty craftsman that may be needed that we are not able to source from the local workforce. We also plan on utilizing many local subcontractors who already have a full complement of skilled local workers.

17) Approach to Management of Subcontractors

As an integrated design-build firm and general contractor with a California "A" General Engineering Contractor's license, CDM Smith also holds the required insurance, licenses, and surety bonding capacity which are fully secured and backed by the overall CDM Smith organization.

Self-Performance

Our construction group employs more than 300 construction managers, superintendents, cost estimators, schedulers, carpenters, electricians, pipe fitters, construction labor/trades, and O&M specialists in our construction group. As a result, we are able to balance our self-performance capabilities with subcontractor bid work on construction projects that allows us to provide the most competitive costs and least amount of risk, maintain a high level of project control, and also meet small business and local subcontracting goals. This also enables us to take over work should our subconsultants fail to complete their work.

While CDM Smith has the self-performance capability to execute all major work activities of this project, we have elected to self-perform all electrical, instrumentation and controls, and above-ground mechanical work, and will also provide our own superintendents and foremen for the MPWSP Desalination Infrastructure Project.

Subcontractors

We are reaching out to and engaging local subcontractors to the maximum extent possible. Subcontractors will be selected based on their successful track record in meeting schedule, quality, safety, and cost, as well as their commitment to providing skilled resources. Based on our extensive work in Monterey, California and work in the area on three recent construction projects, we have developed a selective network of qualified subcontractors who are interested in competing for work on this project, detailed in Section 2.0 A General Project Team Information, Division of Work. Because CDM Smith is a Union Signatory, our subcontractors must also be union signatories, and will therefore need to reach out to local unions for local craft laborers. They will be required to maintain the same minimum local hire percentages of the overall contract.

Unions/Craft Laborers

As a signatory Union Contractor, CDM Smith fully understands and will comply with the requirements of the prevailing wage laws to achieve compliance. Because we are signatory with the carpenters, laborers, and electrical unions, we will make calls and conduct hiring from local union halls, providing us with access to local craft labor from the surrounding counties of Santa Cruz, San Benito, and Monterey.

Management of Subcontractors

Coordination of subcontractors and the work they will perform falls into several categories: schedule execution, quality, safety, and financial. From an execution aspect, coordination in the field will primarily be the responsibility of the Superintendent, Ken Vassar. After an initial kick-off meeting, Mr. Vassar will utilize the CPM schedule and three-week look-ahead schedule to notify subcontractors when they will be needed on site. Letting subcontractors know their schedules three weeks ahead sets clear expectations, minimizes conflicts, and provides a smooth workflow. This is further reinforced in weekly superintendent coordination meetings in which all subcontractors discuss the upcoming work and overlap/conflicts are addressed. Similar to other cost control items, onsite construction progress achieved by subcontractors will be compared against the billing received and the baseline schedule to monitor progress. Using weekly and monthly reports prepared on the site, Mr. Vassar will measure and document the work completed by subcontractors during a specific time period. Any deviation outside of the scheduled progress, +/- 10%, will be brought to the subcontractor's attention, both verbally and in writing, and a recovery plan will be implemented.

Subconsultant Performance

CDM Smith employs project schedule software that will automatically flag when any major activities, including those of subcontractor(s) fall behind. Even though there will be minimal subcontractor risk on this project, CDM Smith has tested countermeasures in place if a subcontractor is not performing. Weekly jobsite meetings will address schedule or performance issues with a subcontractor. Our Construction Manager will take the following action to address the schedule or performance issue:

- Review the current progress against the schedule with the subcontractor define the current position of the subcontractor with respect to the subcontractor's manpower and equipment resources allocated to the job
- Define the additional work required for the subcontractor to recover and meet the original
- schedule or to address the performance problem
- Define new schedule milestones for the subcontractor to meet to recover
- Review and verify payments from subcontractor to labor or material suppliers as required
- Assess impact of subcontractor's missed schedule or performance problem on the overall project and adjust other elements to compensate, if necessary
- Assign subcontract, or critical path parts of the subcontract to another contractor or self-perform those parts if necessary

In the event that a subcontractor is unwilling or unable to correct their deficiencies, CDM Smith will either assume the work with self-perform responsibilities or hire another subcontractor to complete the work.

For information regarding subconsultant safety expectations and quality control requirements, please refer to the applicable areas earlier in the 3.0 Technical Proposal, I. Plan for the Performance of the Design-Build Work.

18) Approach to Integrating the DB Entity Project Improvements with CAW's Project Improvements

CDM Smith understands that in addition to the Desalination Infrastructure Project, CAW also has other significant projects that will be happening concurrently as part of its overall MPWSP. In order to complete the Desalination Infrastructure Project by December 31, 2016, several critical data points are needed from each of these projects for the design, construction, commissioning, and operation to proceed on schedule. We are prepared to work with CAW and the other consultants leading these projects as early in the process as is possible. Early coordination and establishing proper lines of communication for each of these projects will help facilitate CAW's overall objectives for the MPWSP.

Design Coordination

During the 60 percent design stage of the Desalination Infrastructure project it's anticipated there will be several small design workshop charrettes with CDM Smith, other project improvements designers, and CAW to communicate design criteria and concepts for each of the CAW improvement projects. Prior to completing the 90 percent design, we will need final information regarding pump sizing, pipeline sizing, surge design, instrumentation and controls, etc.

Construction Coordination

Coordination between CDM Smith and the other project teams will continue throughout the evolution of the project. We envision having the necessary meetings to coordinate construction activities with other concurrent project teams. We will request that all of the conveyance lines be constructed up to the Desalination Infrastructure Project boundary as early as possible to allow for completion of on-site yard piping, pressure testing, and site restoration. We understand, however, the inherent challenges in managing multiple projects and we intend to be flexible and schedule our work around the requirements of the other projects to the maximum extent possible. In the event the other projects are not able to complete their work at the project boundary prior to our yard piping crews demobilizing from the project, we will ask that the final tie-ins be made by the other project team. As previously mentioned, we will proactively work the other project teams to coordinate construction activities and schedules such as tie-ins, pressure testing, loop/integration checks, and necessary road closures.

Schedule

It is our understanding, from our face-to-face discussion with CAW, that the schedule provided in the RFP for the other improvement projects is preliminary and that it is CAW's desire to have these projects completed within a timeframe that allows the Desalination Infrastructure Project to be finished no later than December 31, 2016. In order for CAW to better understand the required timing of the other projects, the table below has been developed and includes critical data points and anticipated required completion dates for each project. In general, the other projects are anticipated to be functional prior to commencement of the run-in testing period for the facility.

Table I-18.1. Critical Data Points for Completing the Desalination Infrastructure Project Improvements

Project	Critical Data Points	Date Needed
PG&E	Final design to coordinate with the Desalination Infrastructure Plant's electrical design	August 2014
	Installation of infrastructure to the meter to energize plant and provide permanent power	December 2015
GWR Project	Plant capacity decision	August 2014
Test Wells	Raw water quality data needed	March 2014
Intake Wells	Coordinate pump size, pipeline size, hydraulic design criteria and I&C infrastructure	June 2014
	Water to startup Desalination Infrastructure Project	June 2016
Raw Water Conveyance	Coordinate pipeline size, material, surge coordination, I&C interface, location for tie-in	May 2016
	Water to startup Desalination Infrastructure Project	June 2016
Desalinated Conveyance	Coordinate pipeline size, material, surge coordination, I&C interface, location for tie-in	June 2014
	Tie-in to pipeline	April 2016
	Water out to conveyance system	May 2016
Brine Conveyance	Coordinate pipeline size, material, surge coordination, I&C interface, location for tie-in	May 2016
	Water to startup Desalination Infrastructure Project	June 2016
Salinas Valley Conveyance	Coordinate pipeline size, material, surge coordination, I&C interface, location for tie-in	June 2014
	Tie-in to pipeline	June 2016
	Water out to conveyance system	July 2016

19) Internal Dispute Resolution Process

Dispute Resolution Process

Our dispute resolution process involves two basic steps. First is the identification of potential problems/risks early during project planning through the development of a risk register. The risk register contains risk/problem definition, probability and impact if it occurs, and immediate and long-term mitigation measures. If problems/risks occur, the second step is to resolve these problems at the lowest level possible, and then work upward in an expeditious manner.

One of the key benefits of an integrated design build approach is the mitigation of nearly all disputes between team members because problems are identified and resolved long before they become issues. In the event of a dispute that cannot be resolved easily at the project management level, we have structured our project and ultimately our team to quickly and efficiently resolve all disputes to maintain schedule and make certain that the quality of the final product is never compromised.

When disagreements arise within the project team, the appropriate project phase leaders (Design, Construction, and Commission) are charged with the responsibility to resolve the disputes. If the dispute cannot be resolved at the project phase leadership level, such as a design requirement that results in constructability issues, the Overall Project Manager will engage with the project phase leadership to resolve the dispute. In the unlikely event that they are not able to resolve the issue the Overall Project Manager shall have final authority to resolve the issue. He is also charged with the responsibility to never compromise safety or quality for cost or schedule.

Table I-12.1. Approach to Achieving Pathogen Log Removal Credits

Problem/Risk	Resolution/Mitigation
Inadequate resources to execute the project or schedule slippage	▪ Extensive up-front project planning using a Risk Register to allocate appropriate resources to the project ▪ Immediate reassignment of additional resources to maintain schedule and quality
Poor design or construction quality	▪ Up-front development and implementation of detailed QC plans ▪ Immediate correction of the deficiency followed up by sharing of lessons learned
Health and safety related incidents	▪ Development and implementation of Accident Prevention Plan and Activity Hazard Analysis (AHA) that focus on hazard identification and mitigation ▪ Immediate correction and reporting of incidents followed by root cause analysis and sharing of results at daily tailgate meetings
Disagreements with CAW regarding any aspect of the project	▪ Early establishment of positive project climate through partnering, kick-off meeting, weekly update calls, and team-building activities ▪ Use of an issue resolution tree to solve the problem at the lowest level and work upward, if needed
Material delivery and logistics issues as a result of project location	▪ Selection of project leaders that are experienced with activities in the Monterey region ▪ Up-front project planning in risk register to identify potential logistics bottlenecks ▪ Immediate reassignment of necessary resources to overcome the bottleneck

CDM Smith's clearly defined problem resolution process allows issues to be resolved at the lowest possible level prior to escalating.

20) Approach to Construction Safety

The CDM Smith construction safety approach is based on CDM Smith's corporate safety program, which has been successfully implemented at numerous design-build project sites throughout the United States. In California, our safety program has been successfully implemented at the City of Sand City Brackish Desalination Facility, City of Stockton 30-mgd Delta Water Supply Facility WTP and pipeline construction, and at the Marine Corps Base Camp Pendleton (MCBCP) for the past 7 years on Design-Build and Operate-Maintain contracts. CDM Smith completed the Southern Region Tertiary Treatment Plant project with nearly 200,000 total man-hours and zero lost-time injuries. The Stockton Delta Water Supply Project received the 2011 Occupational Excellence Achievement Award from the National Safety Council for reaching more than 145,000 person hours worked without a lost-time accident.

Foundation of Health and Safety

Performing projects safely is a basic tenet of CDM Smith's operating philosophy and forms a foundation for all work performed. Translating an integrated safety management system into all project actions promotes maximum personnel and environmental protection. CDM Smith's safety performance record is significantly better than industry averages and is derived from a total commitment to providing a safe work environment and from involving our employees in identifying and mitigating potential hazards. This commitment is evidenced by the numerous safety awards our projects have received.

CDM Smith maintains a comprehensive corporate safety and health program which addresses all facets of construction. Our program was developed to comply with all federal and state OSHA requirements along with the specific requirements of our client agencies. Our program is specifically tailored to meet the requirements of the USACE Safety and Health Requirements Manual (EM 385-1-1), which is more stringent than Cal OSHA requires and we have implemented our program successfully on both USACE and EPA projects.

CDM Smith places a special emphasis on site safety because of our commitment to staff. CDM Smith believes that all injuries can be prevented and that no job is so important that we cannot take the time to perform it safely. CDM Smith's safety philosophy is guided by the belief that our people are our greatest assets and that their health and safety must receive top priority and support every employee and team member. CDM Smith believes the following:

- All injuries are preventable
- All work will be planned and reviewed prior to carrying it out for both for quality assurance and with safety as its number one goal and topic for construction. Protection of personnel while moving around the incomplete work, and fall protection will be highly emphasized
- CDM Smith will be proactive in inspecting and monitoring our sub-suppliers and subcontractors actions in the field. We will take immediate corrective action where necessary in the interest of safety
- CDM Smith believes that trained and educated employees are empowered to work safely
- Working safely is a condition of employment. At CDM Smith we hold those concepts as important goals for ourselves and our subcontractors
- Injury prevention is good business
- Only projects completed without injury and accident are considered successful

CDM Smith maintains a rigorous Health and Safety Program that applies to every project in which we participate. Employees are required to re-train and internally certify annually on our Health and Safety Program requirements. In addition to implementing regular safety policies and procedures, we implement a company-wide safety incentive program for all employees.

We pride ourselves in our focus on safety in all of our operations. The firm maintains an experience modifier rate (EMR) below industry standard – 0.61 in 2013 and .57 in 2012.

For each project, we prepare a site health and safety plan under the oversight of our Corporate Health and Safety Manager, Mr. Ken Meyer. Joe Leslie, our Safety Officer for the CAW project will develop the site specific plan and work with Chad Brown, our Construction Manager to implement it. This plan identifies responsible individuals, communications procedures and safety audit procedures. This plan also identifies the project team, OCWS, and hospital contacts. It provides communication protocols during times of emergency.

On the job site, the health and safety plan is implemented and monitored on a daily basis by the project site superintendent and overseen by the Construction Manager. Important elements of this plan include emergency preparedness, an initial site safety orientation meeting, and site-wide weekly toolbox safety meetings.

Each of our subcontractors is also required to have a job-specific safety program that must include a Hazard Communication Program as well as an OSHA compliance monitoring program. We review our subcontractor safety programs and monitor their adherence to these programs to ensure a truly safe project site.

Selection of Subcontractors

CDM Smith will use a subcontractor selection plan designed to select only subcontractors who have consistently demonstrated a commitment to safety. Beginning with CDM Smith team member selections, we evaluated safety performance of all selected subcontractors. We selected team subcontractors who not only have the necessary technical skills but also share our safety philosophy.

CDM Smith's procurement process after contract award is designed to identify subcontractors that have demonstrated safe construction practices. We will use CDM Smith's pre-qualified subcontractor database and other sources (e.g., personal references) to identify firms with technical skills, proven past performance, financial stability, and superior safety records. We will send questionnaires to prospective subcontractors asking for the following pre-qualification information:

- Corporate safety experience and Safety and Health policies
- Experience Modification Rate (EMR) – target <0.9
- OSHA DART Rate (Days Away from Work, Restricted Duty, or Job Transfer)
- OSHA citations
- Information/resumes for responsible Safety Managers and Site Superintendents
- OSHA 10-hr or OSHA 30-hr Construction Safety training for key personnel

For each construction procurement package, the CDM Smith Safety & Health Manager will prepare specific safety requirements (e.g., only firms with EMR less than 0.90 will be considered). He will prepare qualitative and quantitative criteria to be included in the procurement appropriate for the required activities. CDM Smith procurement staff will release requests for proposals to pre-qualified subcontractors. After bids and additional safety information are received, the Safety Manager will meet with CDM Smith procurement staff and decide whether subcontractors meet job safety requirements. As an additional requirement, subcontractor workers must pass a mandatory drug test before coming onsite.

At the completion of each assignment, CDM Smith staff will enter a safety evaluation into the subcontractor database. Subcontractor performance will be re-evaluated for additional assignments, and selection for future work will depend on safe past performance. Subcontractors who do not continue to meet CDM Smith's safety criteria will not receive follow-on work.

Creating a Culture of Safety

Prior to starting site work, all workers including subcontractor employees will be required to attend a site-specific safety and environmental orientation to learn of required safety protocols and disciplinary actions for infractions. For every definable feature of work, the safest way to execute the work will be preplanned through the use of activity hazard analyses (AHA), which will be approved and reviewed with the crews prior to the commencement of that element of work.

The program will include weekly, mandatory site-wide tailgate safety meetings to ensure that safety is always at the forefront of every employee's and subcontractor's mind. Quarterly meetings will be conducted with CAW's safety management to review open issues, incidents, and any concerns that the CAW, CDM Smith, or the general public has expressed about the project.

Innovative Methods to Ensure and Monitor Safe Work at all Levels

CDM Smith's innovative safety program is based on proactive engagement, monitoring, and communications with CDM Smith employees and subcontractor management and employees. The goal is to promote a safe work environment, provide proper training, ensure that the right tools are available, and supply worker incentives.

We will quickly assess our subcontractors, identify areas where improvement is needed, then work with them to provide additional training or resources needed for them to meet our strict safety expectations. This approach has been successful on many of our previous projects and will help the overall construction program by increasing subcontractor safety.

CDM Smith's safety program was developed for both CDM Smith employees and subcontractors to comply with or exceed all OSHA requirements (29 CFR, Parts 1910 and 1926) and USACE EM385. We will distribute safety documentation to our employees and subcontractors prior to the commencement of work and require signed acknowledgements. We will routinely review AHAs with our subcontractors to ensure their accuracy, modifying them as needed.

The CDM Smith Safety Officer will have direct responsibility for the safety of all CDM Smith and subcontractor employees. He will delegate to Site Safety and Health Officers (SSHOs) responsibility for monitoring CDM Smith and subcontractor performance. The SSHOs will work with subcontractor safety staff and will oversee safety at all work sites by conducting frequent visits, daily inspections, and audits. To improve subcontractor engagement in the safety program, subcontractor employees will be treated as if they were CDM Smith employees, with the same expectations for safe performance, the same discipline plan, and the same motivational programs. All subcontractors must meet the following requirements:

- Designate a Safety Manager to carry out its safety program, which must be at least as stringent as CDM Smith's safety program
- Designate Competent Person(s) for work activities in accordance with OSHA and EM 385. No work will be performed without the appropriate Competent Person(s) onsite
- Identify subcontractor Competent persons in AHAs and provide proof of competency and qualifications to meet specific OSHA requirements
- Report all injuries, illnesses, falls, and near misses to the CDM Smith Site Superintendent and SSHO

Predictive Solutions (formerly DBO2) SafetyNet. CDM Smith will use this software-based tool for all site inspections, audits, and corrective actions for employees and subcontractors. SafetyNet is a tablet-based software service that simplifies collection, analysis, and dissemination of project information. We have developed checklists specific to EM-385, ensuring that oversight inspections address these unique requirements and exceed OSHA compliance. Since 2007, CDM Smith has used this innovative tool to document over 900 inspections and 66,000 individual safety observations at different work sites at MCBCP.

Inspections will be summarized every two weeks and will be presented to CAW, CDM Smith management team, and subcontractor management to emphasize positive safety activities. This tool will enable our safety professionals to observe trends in performance so that proactive measures can be implemented. Inspections will include all subcontractors and provide "leading data" to identify areas of concern before an accident occurs. Our safety team will communicate areas of concern to subcontractors, intervene with training, and provide additional emphasis during subsequent inspections.

Monthly Joint Site Safety Inspection Program. CDM Smith will partner with CAW and our subcontractors to implement joint safety inspections intended to review ongoing work, identify hazards, and review hazard mitigation measures. This program will foster true partnership and improve communications.

Good Catch Program. We will expand CDM Smith's Good Catch Program (used company-wide since 2009) for employees and subcontractors to cover this new project. CDM Smith's program is similar to MCI West's program of the same name. The purpose is to catch workers doing something right and to identify potentially unsafe conditions before an incident occurs. This proactive behavior improvement program emphasizes the importance of consistently observing, reporting, and sharing information on activities or incidents that could lead to accidents, injury to peers, equipment damage, or releases to the environment. CDM Smith will use "good catches" as a learning tool to reward and celebrate improvements through our incentive program (below).

Safety Incentive Program. CDM Smith will roll out a state-of-the-art safety incentive program called the Award of Excellence, which uses positive recognition to direct behavior and reward workers and their foremen. The system has multiple components that incentivize employees and subcontractors for a job well done, including posters with the behavior being pinpointed, Learn cards that allow workers to take tests to prove their abilities, Excel cards that recognize good behavior, and Celebrate cards that recognize milestone achievements. To encourage teamwork, we will distribute branded items (e.g., CDM Smith hats) and will hold events such as safety BBQs.

Bridging Differences. CDM Smith will provide assistance to subcontractors to overcome any corporate or cultural differences that may impact safety (e.g., bilingual AHAs may be required under certain circumstances).

Environmental Awareness. Specific to the CAW desalination facility site, our experienced Environmental Manager will provide mandatory training for all employees and subcontractors to raise awareness of natural and cultural resources, excluded areas, and restricted activities.

Stretch and Flex Program. This program will train subcontractors and employees about work-related ergonomic injuries with simple exercises intended to improve flexibility.

Safety & Health Education Newsletter. CDM Smith will distribute a monthly newsletter to employees and subcontractors with site news and relevant topics such as heat stress, welding, and site hazards (e.g., rattlesnakes).

Disciplinary Plan. CDM Smith's strict code of discipline (zero tolerance) for employees and subcontractors reinforces Safety First – not production. For each subcontractor, during the initial onsite orientation, the SSHO will inform all workers of the Disciplinary Plan. There will be no verbal warnings afterwards. Mandatory AHA retraining, removal from the site and suspension without pay are some of the tools to enforce safe work practices.

J. Plan for Transition and Acceptance Testing

To transition the Monterey Desalination Supply Project from construction to operation of the new drinking water facilities, CDM Smith will:

- Dedicate an experienced team of engineers, builders, operators, programmers, startup and RO equipment specialists for the duration of the project
- Work closely with CAW managers, engineers, water quality and O&M professionals to address specific issues or concerns throughout the project
- Prepare a clear and comprehensive Commissioning Plan that integrates design, training and permitting activities and with the system testing
- Execute the plan and develop contingency plans to adapt to changes

This section describes the roles and responsibilities of key personnel on the Startup and Commissioning Team and outlines the anticipated commissioning program. The section also highlights features of our approach that will expedite the transition and testing activities, reduce the time demands on CAW staff and help to secure timely approvals from CDPH to begin using the new drinking water supply as soon as possible while ensuring protection of public health.

Commissioning Team

CDM Smith's Startup and Commissioning Team consists of experienced engineers, operators, programmers, constructors and equipment specialists that will work closely with CAW beginning with the preliminary design and continuing through the end of the Warranty Period and beyond. Our Commissioning Team has worked together for more than 20 years on complex water treatment projects in California and across the United States. We will apply our collective knowledge and lessons

learned to streamline the regulatory approval process and efficiently initiate the delivery of treated water into the CAW system.

The CDM Smith operations team not only brings a proven track record of commissioning plants throughout California and the United States, but the team also worked specifically with CAW on the startup of the Sand City desalination facility. The roles and responsibilities of key team members during commissioning and startup of the MPWSP Desalination Infrastructure Project include:

Paul Meyerhofer, P.E will continue as Project Manager; lead the DB team's permitting activities with CDPH and other regulatory agencies; and assist with the development and implementation of the testing and training programs.

Michael Zafer, P.E and drinking water treatment operator in California, will transition from Lead Engineer to Commissioning Manager. With 25 years of planning, design, construction, permitting and operations on drinking water projects in California, Mr. Zafer will apply his skills and experience to lead the Startup and Commissioning Team; prepare deliverables; support permitting efforts; coordinate/participate in the training program; direct system testing; and provide plant operations and process optimization support after the acceptance testing is complete.

CAW is the project owner and licensed operator responsible for the day-to-day operations of the plant. CAW is responsible for the control and supervision of any water going to distribution from the plant. Staff will work with the CDM Smith operations team on plant optimization strategies.

Value of CAW and CDM Smith Joint Startup Experience for the MPWSP Desalination Infrastructure Project

- **Recognition of ongoing CAW O&M responsibilities for entire service area**
- **Understanding of the best way to maximize CAW O&M staff's available time for vendor- and CDM Smith-led training**
- **Familiarity with jointly working together to achieve CDPH permit and O&M manual review schedule**
- **Successful history planning for the smooth, rapid transition from testing to delivery of water meeting all water quality objectives.**

CDM Smith will provide training and instruction to CAW operations staff.

California Department of Health (CDPH) will provide regulatory oversight and mandate necessary tests and data before water can be released for public consumption.

Dan Hutton will prepare the detailed testing plans and reporting forms; assist with training and CDPH permitting; coordinate training by equipment suppliers; and lead the field activities for the system testing.

Steve Hoffman will prepare the Training Plan, Operations Plan, O&M Manual and SOPs; coordinate data input to the CMMS; and serve as the lead O&M instructor.

Chris Avina will coordinate the development of the control system; conduct Factory Acceptance Test (FAT), Operational Readiness Testing (ORT), Functional Demonstration Test (FDT) and the Site Acceptance Test (SAT); provide training materials and instruction; and support control system operations throughout the Transition and Acceptance Testing Phase and the Warranty Period.

Kurt Kiefer, P.E. and Paul Laverty will provide technical support and training for the SWRO and BWRO membrane systems.

Technical support and specialized training throughout the Transition and Acceptance Testing will be provided by the following team members:

- **Doug Brown, P.E.-** Chemical systems, pressure filters and membrane systems operation
- **Greg Wetterau, P.E.-** Water quality, regulatory reporting, and membrane systems operation
- **Ken Klinko and Temple Ballard-** Membrane systems performance and troubleshooting
- **Tom Warriner, P.E. and Arvind Akela, P.E.-** Building mechanical systems
- **Darby Howard-** Corrosion control systems
- **Chad Brown-** Construction
- **Kenny Vassar-** Coordination of temporary facilities, system disinfection

Overview of Commissioning Plan

CDM Smith's Plan for Transition and Acceptance Testing includes all the specific activities identified by CAW in the RFP in the General Design-Build Work Requirements (Section 4.3 Testing and Commissioning) and Appendix 7 Acceptance Test Procedures and Requirements. Figure 3-1 presents a summary of the preliminary schedule with the major activities and work products (or deliverables) related to the commissioning activities. A preliminary draft outline and scope of services for the Commissioning Plan is included as part of the overall project schedule provided in Section 3.0 Technical Proposal, H. Proposal Form 12.

Additional Activities to Enhance and Expedite the Commissioning Process

Although not specifically identified in the DB Work Requirements, CDM Smith proposes to include the following planning and quality control activities to expedite the testing and commission process:

- Commissioning Plan Development Workshop with CAW Staff
  - *Provide a forum to brainstorm with CAWs staff to enhance the commissioning plan*
  - *Identify additional design features to implement that will expedite commissioning*
  - *Determine if features should be temporary or permanent*
  - *Discuss staffing needs for commissioning and long-term operation*
- Plant Control System (PCS) Development Workshop with CAW Staff
  - *Define CAWs standards and preferences for the design and operation of the PCS*
  - *Convey the desired "look and feel" of the control screens to the DB integrators*
  - *Coordinate the integration of offsite facilities at the plant and remote monitoring*
  - *Establish security goals and protocol*
  - *Document the standards and guidelines*
- Factory Tests for Major Equipment, including but not limited to:
  - *Filtered Water Pumps*
  - *Backwash Pumps*
  - *RO Feed Pumps*
  - *Brine Disposal Pumps*
  - *Washwater Pumps*
  - *Treated Water Pumps*
  - *Emergency Generator System, Switchgear and Transformer*
  - *Salt rejection for SWRO and BWRO membrane*
  - *Pressure tests of membrane pressure vessels*
  - *Factory testing of energy recovery devices*
- Computer Maintenance Management System (CMMS) Coordination Meeting:
  - *Conduct meeting CAW staff to familiarize the DB team with CAWs CMMS*
  - *Prepare standardized forms to simplify the transfer of data into the CMMS*
  - *Develop an outline for CMMS training*

Proposed Testing Sequence

CDM Smith's developed a preliminary testing sequence for the Desalination Infrastructure project that considers several factors including but not limited to:

- Safety of personnel and the environment
- Permitting and regulatory requirements
- Protection of equipment
- Beneficial use
- Status of off-site facilities/potential impacts
- Operations and staffing requirements
- Maintenance requirements
- Warranty compliance
- Water, chemical and energy usage
- Noise, dust and lighting impacts
- Aesthetics

The following preliminary testing sequence for the equipment and systems at the plant site will serve as the basis of discussion between CAW and CDM Smith as we develop the Draft Commissioning Plan:

1. Factory Acceptance Test (FAT) for PCS
2. Factor Tests for Major Equipment
3. Initial checkout of buildings, infrastructure components and ancillary systems
4. Initial checkout of treatment process components and support systems
5. Operational Readiness Test (ORT) for PCS
6. Commissioning of components and systems:
   a. Functional Demonstration Test (FDT) for PCS and Hydraulic Testing:
      i. Stage 1- Influent line, Iron/Manganese Filters, Filtered Water Tank, Filtered Water Pumps, Backwash System
      ii. Stage 2 Entire system without membranes, chemical systems without chemicals
      iii. Stage 3 Entire system with membranes, with chemicals
   b. Mechanical Performance Demonstration (MPD)
   c. Initial Plant Performance Test (IPPT)
   d. Run-In Plant Performance Test (RIPPT)
   e. Tracer Tests (if required by CDPH)
   f. Acceptance Testing (AT)
   g. Site Acceptance Test (SAT) for PCS

Insight into Securing Timely Approvals from CDPH

CDM Smith has worked with dozens of California water suppliers and CDPH across the state to permit new and modified drinking water plants. Based on our recent work with seawater desalination in Sand City and Santa Cruz, we understand that CDPH tends to be very conservative in the approval of new source waters.

During the commissioning activities there will be periods when treated and/or partially treated water will be recirculated through portions or all of the new plant, and no flow will leave the plant. We also anticipate that CDPH will require a period of full operation or "treat-to-waste" to demonstrate that the new facility will meet permit requirements, before allowing CAW to introduce the treated water into the distribution system. On past projects, CDPH has required 1 to 4 weeks of such demonstration testing. Given the relatively high cost to produce drinking water from seawater as compared to brackish water or freshwater,

CDM Smith will work with CAW to:

- Identify design features (permanent and temporary) to provide flexibility for the required testing
- Negotiate with CDPH to limit the duration of the anticipated "treat-to-waste" period to 1 week or less
- Minimize the amount of water that cannot be distributed to customers

Another option that we would like to discuss with CAW is the potential to use desalinated water during the portions of the commissioning period for irrigation, groundwater recharge or other beneficial uses. For example, the proposed Salinas Valley Pump Station could be used to pump 1.2 MGD of high-quality water to Salinas Valley groundwater basin via the existing Castroville Seawater Improvement Project (CSIP). The existing CISP pond has a capacity of 80 acre-feet (26 million gallons), which may provide additional storage and opportunities to use water that would otherwise be dechlorinated, blended with the concentrate and disposed of to Monterey Bay via the ocean outfall.

Draft Outlines for Commissioning Documents

After the proposed Scope of Services for Commissioning and Training Activities, we provide preliminary draft outlines for the following major deliverables that are referenced in the Commissioning and Training Tasks:

- Plant Control System Design Standards
- Commissioning Plan
- O&M Manual
- SOPs (example)
- Operations Plan
- Desalination Plant 1-Year Operations and Performance Summary Report

CDM Smith

Draft Scope of Services for Commissioning and Training Activities

Task 1 - Commissioning Plan

Approach:
For the Commissioning Plan to be complete, it must include detailed testing protocols and address staffing, training and permitting issues.

Objectives:
- Develop a comprehensive Commissioning Plan
- Incorporate CAW recommendations for sequencing tests for specific systems and components
- Identify additional commissioning activities such as modifications to plant infrastructure design, witnessed/unwitnessed factory tests for major equipment items (e.g., pumps, generators, etc.)

Activities:	Deliverables:
▪ Conduct Commissioning Plan Development Workshop	▪ Presentation; meeting minutes; Final Outline for Commissioning Plan
▪ Prepare Commissioning Plan; Submit draft 180 days before start of testing	▪ Commissioning Plan (draft & final)
▪ Conduct Commissioning Workshop 30 days before initiating testing	▪ Presentation; meeting minutes

Task 2- O&M Training

Approach:
Thoughtful design, quality construction and effective O&M training are essential components for a successful project. Training will prepare the CAW staff to efficiently assume responsibility for the operation of the new facilities. The CDM Smith facility specific training will systematically progress through the system, providing and site specific developed training for the operation and maintenance of the facility equipment and systems. This training provides the CAW staff with the information and tools to develop a thorough understanding and confidence to operate the system.

Objectives:
- Develop insightful and easy-to-navigate O&M documents and training materials.
- Provide focused instruction and hands-on training by industry experts to simplify operations and maintenance.

Activities:	Deliverables:
▪ Develop Training Plan and submit with 90% design submittal	▪ Training Plan (draft & final)
▪ Prepare O&M Manual	
▪ Prepare SOPs	▪ SOPs
▪ Prepare Training Documents (Drawings, Specifications, Submittals, Presentations, etc.)	▪ Documents (Drawings, Specifications, Submittals, etc.) ▪ O&M Manual
▪ Conduct Training by DB Team	▪ Training by DB Team
▪ Conduct Training by Vendors (Managed by DB Team)	▪ Training by Vendors (Managed by DB Team)
▪ Videographing of Training	▪ Videographing of Training
▪ Conduct Training on SOPs	▪ Training on SOPs

Task 3- Instrumentation and Control Testing

Approach:
Development and testing of the plant control system (PCS) hardware and software before it's installed at the site is standard practice on all CDM Smith projects (and all project delivery methods).

Objectives:
- Incorporate input from CAW staff regarding the look and feel of the PCS screens
- Test and troubleshoot the PCS before it's installed at the new plant
- Integrate the plant infrastructure and communications systems with the off-site raw water supply, treated water distribution and brine disposal facilities
- Reduce programming changes made at the site

Activities:	Deliverables:
▪ Conduct PCS Configuration Workshop	▪ Training Plan (draft & final)
▪ Prepare PCS Design Guide	▪ Design memorandum
▪ Conduct Factory Acceptance Test (FAT)	▪ Forms and FAT Test Report
▪ Conduct Operational Readiness Test (ORT)	▪ Forms and ORT Test Report
▪ Conduct Functional Demonstration Test (FDT)	▪ Forms and FDT Test Report
▪ Conduct Site Acceptance Test (SAT)	▪ Forms and SAT Test Report

Task 4 – System Testing

Approach:
Development and testing of the plant control system (PCS) hardware and software before it's installed at the site is standard practice on all CDM Smith projects (and all project delivery methods). In addition to the demonstration of the facility's equipment and systems, the System Testing, provides additional training benefit to the CAW staff through the observation and monitoring of the activities. CDM Smith welcomes the monitoring of these activities to further develop the CAW staff familiarity and confidence with the new facilities.

Objectives:
- Incorporate input from CAW staff regarding the look and feel of the PCS screens
- Test and troubleshoot the PCS before it's installed at the new plant
- Integrate the plant infrastructure and communications systems with the off-site raw water supply, treated water distribution and brine disposal facilities
- Reduce programming changes made at the site

Activities:	Deliverables:
▪ Mechanical Performance Demonstration (MDP)	▪ Forms and MDP Test Reports
▪ Initial Plant Performance Tests (IPPT); 24 hour	▪ Forms and IPPT Report
▪ Run-In Plant Performance Tests (RIPPT); 14 days continuous	▪ Forms and RIPPT Test Report
▪ Acceptance Testing (AT); 16 days continuous	▪ Forms and AT Test Report

Task 5 – CDPH Permitting Support

Approach:
Early and frequent communications with CDPH are critical to securing timely approvals for the Monterey Peninsula. CAW will serve as the lead for all communications with CDPH; and CDM Smith will support CAW by preparing technical documents, coordinating and attending meetings, and preparing responses to questions from CDPH. As part of this support, based on CDM Smith's extensive experience of commissioning and introducing new sources of supply into existing systems, CDM Smith will work closely with CAW and CDPH to efficiently deliver compliant water into the CAW system. Experience has shown that multiple days or weeks may be required to demonstrate to the CDPH staff that all water quality objectives are consistently met.

Objectives:
- Keep CDPH informed on the project beginning with the Basis of Design Report
- Provide appropriate review times for design and permitting documents,
- Meet with CDPH to explain important design features and operational practices
- Respond quickly to verbal requests and written review comments

Activities:	Deliverables:
▪ Coordinate CDPH Review Meeting for Basis of Design Report	▪ Meeting Minutes; Responses to CDPH Comments
▪ Coordinate CDPH Review of Design Drawings and Specifications	▪ Meeting Minutes; Responses to CDPH Comments
▪ Coordinate CDPH Meeting for Development of Startup/Commissioning Program	▪ Meeting Minutes; Responses to CDPH Comments
▪ Coordinate CDPH Review of Startup/Commissioning Documents	▪ Responses to CDPH Comments on Technical Report; Operations Plan, O&M Manual and SOPs
▪ Prepare Operating Permit Application; and Coordinate CDPH Review	▪ Operating Permit Application; Responses to CDPH Comments
▪ Prepare One-Year Operations Summary Report; and Coordinate CDPH Review	▪ One-Year Operations Summary Report; Responses to CDPH Comments

K. Reduction in Rated Capacity

Accommodating a reduction in rated capacity for this type of water treatment plant can be accomplished in an organize manner given the modular nature of the design. Reverse Osmosis and pressure filters are particularly modular, thus reducing the capacity from 9.6 to 6.4 mgd can be accomplished by eliminating approximately 1/3 of the units. The remaining ancillary facilities for the seawater and Brackish water RO processes such as the chemical cleaning system, main control panel, feedwater, brine and permeate manifolds remain the same. CDM Smith did anticipate the reduction in the size of the associated RO Equipment room to maximize the cost savings associated with reducing the capacity to 6.4 mgd. In the future, CAW can expand the building for the next increment of capacity rather than pay for unnecessary space in the initial phase.

CAW requested that the buried underground piping be sized and installed to support the ultimate capacity of 12.8 mgd, and the size of the ancillary facilities such as the RO Concentrate or Brine Equalization Basin remains the same size. As such there are no cost reductions for the construction of the balance of treatment plant components except for the number of pre-treatment pressure filters.

Changes in Scope and Facilities

Identify all changes with the reduction in Rated Capacity from 9.6 to 6.4 mgd

- Reduce the number of 12 ft. diameter pressure filters from ten to seven pressure filters with a capacity of 3.1 mgd each
- Reduce the number of seawater RO units from seven to five SWRO units with a permeate capacity of 1.67 MGD each
- Reduce the number of brackish water RO units from four to three BWRO units with a permeate capacity of 1.33 mgd
- Reduce the capacity of the 5 micron cartridge filters by 33% resulting in four 3.8 mgd units
- Reduce the size of the RO Equipment Process Room from 17,200 sq ft to 11,100 sq ft
- Eliminate two 1000 hp medium voltage VFDS, two low voltage ERD booster pump VFDs and one BWRO booster pump VFD
- Reduce the 480 VAC MDS 2A and 2B capacity from 3000 amps to 2500 amps
- Reduce the capacity of the filtered water pumps by 33%. There are the same numbers of pumps two at 50% and two at 25% design flow, and the discharge pressure remain the same. This reduces motor brake horsepower by approximately 30% from 400 and 250 to 300 hp and 150 hp for the 50% and 25% pumps respectively.,
- Reduce the capacity of the finished water pumps by 33%. There are the same numbers of pumps two at 50% and two at 25% design flow, and the discharge pressure remain the same. This reduces motor brake horsepower by approximately 30% from 400 and 250 to 300 hp and 150 hp for the 50% and 25% pumps respectively.,
- The backwash supply pumps and reclamation basin remains the same since the size of the filters and the resulting backwash volume per backwash remains the same.
- The number of calcite contactors can be reduced from 18 to 12

Correspondence to the Pricing Information

We have indicated the necessary changes to the design in our drawings in the 6.4 MGD drawings. The most significant changes can be seen in drawings M-04 and E-11.

Changes to the Schedule

The schedule substantial completion date will not change because of the reduced capacity.

Changes to the Plan for Performance

The approach for performance to the project for a reduced capacity does not change from the 9.6 MGD approach.

Accommodating a reduction in rated capacity for this type of water treatment plant can be accomplished in an organize manner given the modular nature of the design. Reverse Osmosis and pressure filters are particularly modular, thus reducing the capacity from 9.6 to 6.4 mgd can be accomplished by eliminating approximately 1/3 of the units. The remaining ancillary facilities for the seawater and Brackish water RO processes such as the chemical cleaning system, main control panel, feedwater, brine and permeate manifolds remain the same. CDM Smith did anticipate the reduction in the size of the associated RO Equipment room to maximize the cost savings associated with reducing the capacity to 6.4 mgd. In the future, CAW can expand the building for the next increment of capacity rather than pay for unnecessary space in the initial phase.

CAW requested that the buried underground piping be sized and installed to support the ultimate capacity of 12.8 mgd, and the size of the ancillary facilities such as the RO Concentrate or Brine Equalization Basin remains the same size. As such there are no cost reductions for the construction of the balance of treatment plant components except for the number of pre-treatment pressure filters.

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- The backwash supply pumps and reclamation basin remains the same since the size of the filters and the resulting backwash volume per backwash remains the same.
- The number of calcite contactors can be reduced from 18 to 12

Correspondence to the Pricing Information

We have indicated the necessary changes to the design in our drawings in the 6.4 MGD drawings. The most significant changes can be seen in drawings M-04 and E-11.

Changes to the Schedule

The schedule substantial completion date will not change because of the reduced capacity.

Changes to the Plan for Performance

The approach for performance to the project for a reduced capacity does not change from the 9.6 MGD approach.

L

L. Required Alternative Proposal

L. Required Alternative Proposals

All of the required alternatives are included as part of Section 3.0 Technical Proposal, C. Basis of Design Report Submitted with Proposal.

M. Voluntary Alternative Proposals

01A. Voluntary Alternative Proposal #1: Optimized Reverse Osmosis System

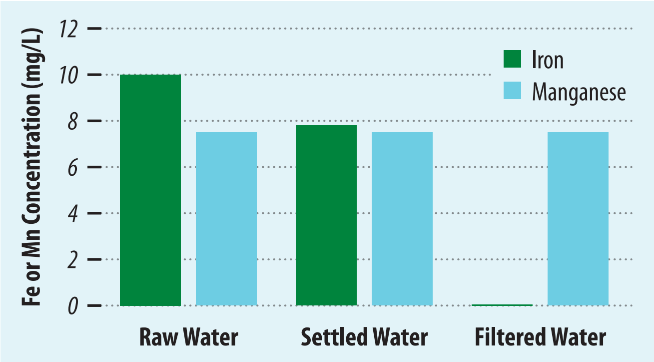
Voluntary Alternative Proposal #1: Optimized Reverse Osmosis System		
Voluntary Proposal Number	1	
Rated Capacity	9.6 mgd and 6.4 mgd	
Summary Description of Voluntary Proposal	Optimized RO System that: ▪ Reduces power consumption ▪ Reduces initial capital cost without compromising system robustness ▪ Provides a membrane process with a 10-year guarantee ▪ Reduces footprint of membrane area	
Summary of Change from Base Proposal	▪ 440 sq. ft. of surface area per membrane element in both first and second pass membrane arrays. ▪ A guaranteed 10-year membrane replacement rate into the design calculations, thereby lowering the average age of membranes as the plant ages. ▪ Redundancy and catch-up provisions are built into the trains with membrane flux increases ▪ Smaller RO train footprint, thereby reducing the facility and piping costs. ▪ Under-slab piping that is common practice for low pressure streams, thereby providing additional reductions in facility and piping costs. ▪ Reduces the size of the second pass to approximately 25% to 34% over the specified temperature range. ▪ Raises the pH of the second pass feed water to 10.5 and eliminates the use of sulfuric acid to reduce the first pass feed water. ▪ Reduces the size of the cleaning system pipes and pumps to an optimum size based on the number of first and second pass vessels that are required to be cleaned in any given time. ▪ Utilizes 1,000 psi-rated pressure vessels in the first pass since the projected pressures do not exceed this pressure rating.	
Deduct to Fixed Design-Build Price	9.6 mgd: $ 3,500,000	6.4 mgd: $ 1,400,000
Expected Annual Operating Cost Savings (assumes no inflation)	9.6 mgd: $ 506,921	6.4 mgd: $ 343,142
Change in Preliminary Project Schedule	None	
Change in Scheduled Construction Date	None	
Change in Scheduled Acceptance Date	None	
Advantages	▪ Reduces power consumption ▪ Reduces construction cost ▪ Guaranteed membrane replacement rate and price for 10 years	
Disadvantages	▪ Requires minor deviations from RFP requirements such as for height of membrane racks, membrane area per element	
Drawings attached	Drawing is attached	
Graphics included	None	
Design Criteria	None	

Aeration for Iron Oxidation		
Voluntary Proposal Number	2	
Rated Capacity	9.6 mgd and 6.4	
Summary Description of Voluntary Proposal	Use of aeration for iron oxidation instead of using sodium hypochlorite to oxidize iron	
Summary of Change from Base Proposal	▪ Add diffused aerators at the raw water wetwell ▪ Eliminate prechlorination and Reduce chlorine usage by nearly 80%, allowing three 1500 lb/day units to be replaced with two 250 lb/day units ▪ Eliminate bisulfite addition	
Deduct to Fixed Design-Build Price	9.6 mgd: $ 650,000	6.4 mgd: $ 650,000
Expected Annual Operating Cost Savings (assumes no inflation)	9.6 mgd: $ 163,392	6.4 mgd: $ 111,147
Change in Preliminary Project Schedule	No change	
Change in Scheduled Construction Date	No change	
Change in Scheduled Acceptance Date	No change	
Advantages	▪ Eliminates risk of oxidant damage to RO ▪ Reduces risk of RO fouling from partially oxidized manganese ▪ Reduces risk of biological fouling from AOC formation ▪ 80% reduction in chlorine usage ▪ Routine use of bisulfite eliminated ▪ Eliminates need for brine aeration ▪ Proven technology with over 100 years of reliable operation	
Disadvantages	▪ Requires aeration facilities at raw water wetwell ▪ Increased oxygen in the water can promote biological activity ▪ Increase dissolved air the raw water can create operational problems in pressure vessel and pipelines if it comes out of solution ▪ Aeration is not effective for rapid manganese oxidation	
Design Criteria Tables attached	▪ Add diffused aerators at the raw water wetwell ▪ Eliminate prechlorination and Reduce chlorine usage by nearly 80%, allowing three 1500 lb/day units to be replaced with two 250 lb/day units ▪ Eliminate bisulfite addition	

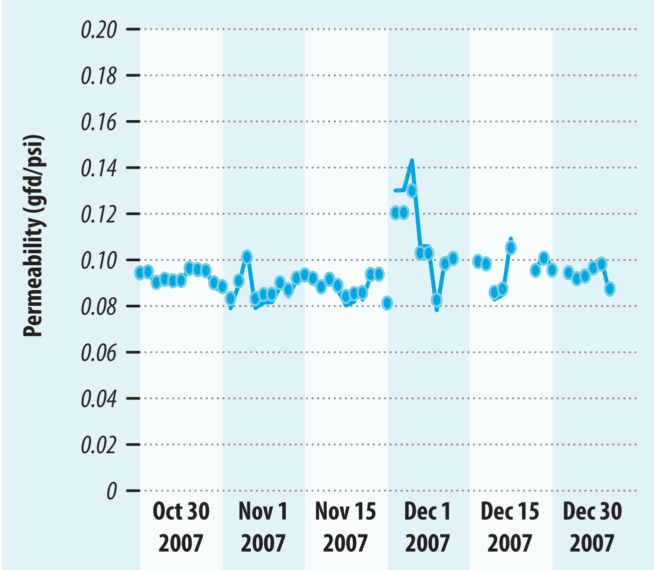
Voluntary Alternative 2 – Aeration for Iron Oxidation

Some seawater desalination facilities using chlorination and granular media filtration have experienced significant challenges with fouling from iron and/or manganese. These have included facilities supplied by beach wells in Morro Bay, California, Aruba, and Salina Cruz, Mexico. These facilities are evaluating alternative pretreatment approaches to decrease the rate of fouling, while the Morro Bay facility has chosen to discontinue using several wells rather than treating the high iron water.

As an alternative to chlorination, aeration can also be used for removal of iron before the RO membranes. Aeration with media filtration is a commonly used method for removing iron from groundwater and has been used for over 100 years at facilities around the country. CDM Smith is currently carrying out design-build of a facility upgrade for the City of Annapolis, MD, where aeration has been successfully used for iron removal since 1929, achieving iron concentrations less than 0.02 mg/L in the filtered product water. CDM Smith has also conducted pilot studies using aeration/filtration as RO pretreatment for the City of Camarill0, California (in conjunction with Trussell Technologies, Inc.), and the South Orange County Coastal Desalination Project (in conjunction with Separation Process Inc.) in Dana Point, finding reliable removal of iron and stable performance of the RO membranes. Test results from these pilots are shown in the figures below, demonstrating consistent removal of iron by the dual media filters and stable permeability in the RO membranes.



Pilot Testing at the Dana Point Slant Well showed reliable removal of iron with aeration, while leaving manganese entirely dissolved



Pilot testing in Camarillo, CA showed stable RO permeability after iron removal with aeration/filtration

While aeration/filtration will remove iron from the source water, manganese oxidation is orders of magnitude slower, requiring over a day of contact time to be impacted by the injected air. This difference in oxidation rate allows iron removal without oxidizing the manganese. The dissolved manganese will then be removed by the RO membranes without causing fouling of the cartridge filters or membranes. One benefit of this approach is that it reduces the risk of partial manganese oxidation, which can cause problems if additional oxidation occurs on the cartridge filters or membranes. Complete oxidation of manganese can be extremely difficult to achieve, even when using more powerful oxidants, such as chlorine dioxide, or catalyzing oxidants, such as potassium permanganate. Incomplete oxidation of manganese can cause operational problems if additional oxidation occurs within the cartridge filters or membranes. By leaving the manganese in the dissolved state, it will reduce the risk of such fouling. The Alameda County Water District has operated the Newark Brackish Water Desalination Facility with dissolved manganese in the water for over 10 years with no manganese related fouling of the RO membranes.

Another significant advantage of using aeration is that it eliminates the risk of oxidant damage to the RO membranes. Although the design in the base alternative will include dechlorination before the membranes, a failure in the dechlorination system could result in unintended damage to the membranes, which would be extremely costly to replace. A number of recent studies on seawater desalination fouling have also shown a significant increase in biological fouling rate after chlorination/dechlorination, due to the increase in assimilable organic carbon (AOC), resulting from the chlorination process (Nappa et al, University of New South Wales, 2013).

While this alternative requires additional aeration equipment at the raw water wetwell and needs to be integrated with the design of those facilities, it results in a large reduction in the quantity of sodium hypochlorite required, elimination of bisulfite use in normal plant operation, and a simplified control system that will not need to monitor ORP to protect the membranes from catastrophic damage.

Design criteria for this voluntary alternative is listed in the table below.

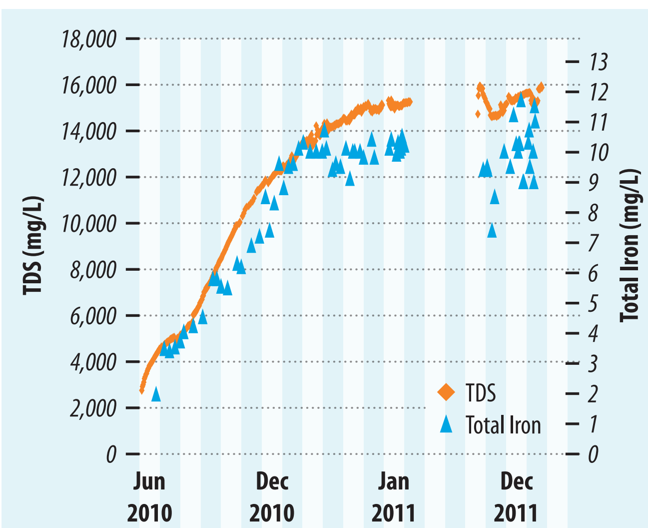
Design Criteria for Voluntary Alternative 2

Item	Description
Blowers	
Number	2
Type	Centrifugal blowers with filters and control package
Capacity	340 scfm
Horsepower	25
Speed	3600
Model	GE/Roots EasyAir X2 with URAI45 or equal
Diffusers	
Type	Fine Bubble Diffusers
Number	140
Capacity	1.5 scfm/diffuser
Air transfer	2% per foot submergence
Item	**Description**
Piping	
Diameter	4-inch
Material	HDPE
Max Velocity	12 m/s
Enclosure	160 sf metal frame building with sound attenuation

Maintain Iron and Manganese in Dissolved Form		
Voluntary Proposal Number	3	
Rated Capacity	9.6 mgd and 6.4 mgd	
Summary Description of Voluntary Proposal	Keep iron in the dissolved state and eliminate pretreatment system for precipitating and removing iron	
Summary of Change from Base Proposal	▪ Add 2,500 gallon compressed nitrogen tank at raw water wetwell ▪ Add nitrogen regulator with control loop to maintain positive pressure in wetwell ▪ Eliminate pre-chlorination and reduce size of on-site hypochlorite system ▪ Eliminate sodium bisulfite ▪ Eliminate granular media filters ▪ Eliminate filtered water tanks ▪ Eliminate filter backwash system ▪ Eliminate filter backwash water recovery basins ▪ Eliminate filtered water pumps	
Deduct to Fixed Design-Build Price	9.6 mgd: $ 9,700,000	6.4 mgd: $ 8,100,000
Expected Annual Operating Cost Savings (assumes no inflation)	9.6 mgd: $ 284,909	6.4 mgd: $ 201,440
Change in Preliminary Project Schedule	No change	
Change in Scheduled Construction Date	No change	
Change in Scheduled Acceptance Date	No change	
Advantages	▪ A frequently used method for managing high iron and/or manganese in brackish well water treated by reverse osmosis ▪ Proven history of reliability at facilities where anoxic conditions are maintained through the RO membranes ▪ Reduces the risk of iron breakthrough or incomplete manganese oxidation if iron and/or manganese levels increase above projected concentrations ▪ Significant operational cost savings ▪ Significant capital cost savings ▪ Eliminates solids handling and disposal	
Disadvantages	▪ Is only feasible if iron and manganese in source water are 100% dissolved and no oxygen is present (anoxic conditions) ▪ Requires careful design of wells to avoid cascading conditions or introduction of air when wells are cycled ▪ If raw water wetwell is used, requires nitrogen blanket to prevent oxidation ▪ Recommendation is contingent on operational data from test well	

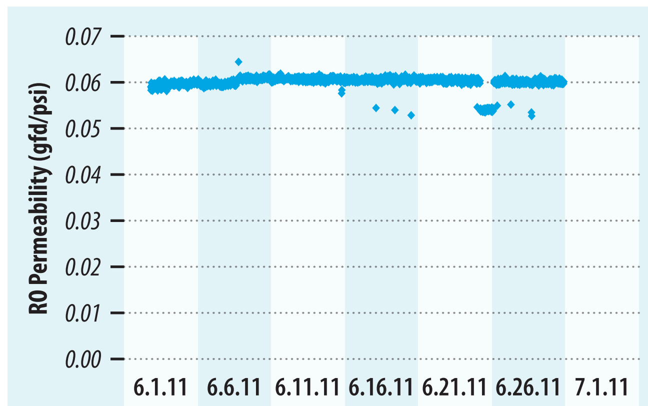
Voluntary Alternative Proposal #3 – Maintain Iron and Manganese in Dissolved Form

The RFP requires an oxidation and filtration system to remove iron and manganese anticipated in the slant well supply. This is a prudent approach at this stage of design, as a representative test well has not yet been installed to provide reliable information on the water quality from the well. For the seawater slant test well installed at Doheny State Beach in 2010, preliminary sampling from a vertical monitoring well indicated a similar iron concentration to what has been assumed in this RFP, however, long term operation of the slant well showed a significant deterioration of water quality as the well was operated, with iron levels climbing from less than 2 mg/L to as high as 12 mg/L after 18 months of operation. Similarly, manganese concentrations increased from less than 0.5 mg/L to as high as 7 mg/L.



Long term operation of the Dana Point slant well saw increasing concentrations of iron as the TDS from the well stabilized.

While these high metals concentrations created a significant challenge for the pretreatment systems used during the pilot study, the water from the slant well remained anoxic for the duration of the testing, with dissolved oxygen concentrations consistently measuring at zero, ORP values consistently below zero, and turbidities consistently less than 0.2 NTU. This low turbidity, anoxic water allowed sending the slant well water directly to the RO membranes (after cartridge filters), without oxidation or filtration to remove iron or manganese. In spite of iron concentrations exceeding 10 mg/L, the fouling potential of the slant well water remained low, resulting in stable RO performance with very little loss in permeability or increase in differential pressure. Permeability results from this testing are shown in the figure below.



RO Permeability remained stable at the Dana Point pilot facility with iron concentrations above 10 mg/L and no oxidation or filtration for pretreatment.

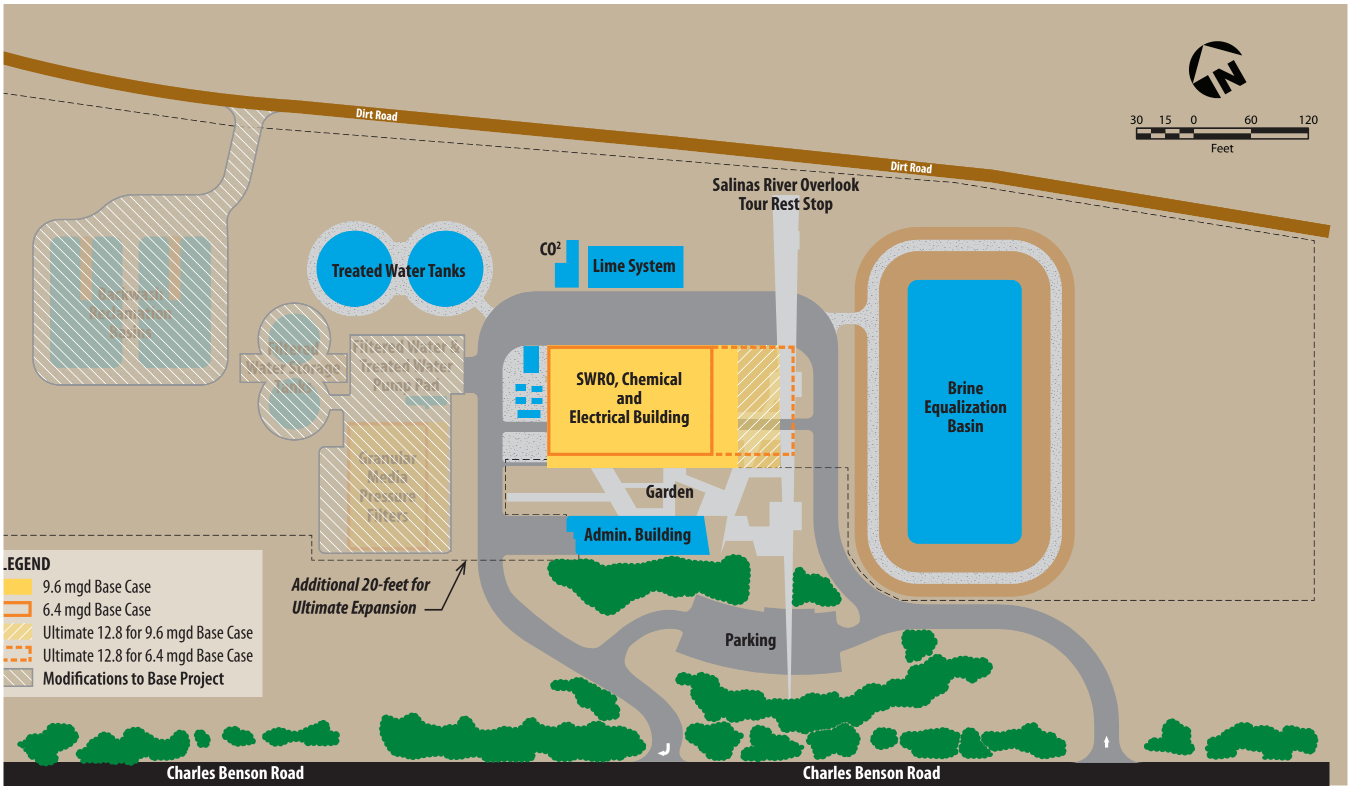
For the Monterey Peninsula Water Supply Project, the opportunity to avoid oxidation and filtration will be contingent on the water quality ultimately produced by the slant wells. If this water is low in turbidity with negative ORP, similar to the Dana Point well, avoiding filters could provide a lower risk treatment alternative at a considerable cost savings. Without any data from a representative test well, however, it is not be advisable to move forward without pretreatment at this time. It is therefore our recommendation that some form of oxidation and filtration be maintained in the design approach until data from a test well can be obtained to confirm the turbidity, DO, ORP, and metals concentrations in the well. If future testing confirms that anoxic, low turbidity conditions are consistent in the slant well water, this voluntary alternative could provide a lower cost option for the project with significantly lower operating costs and a lower risk of RO fouling. Because of the seawater wetwell currently being planned to equalize flows between various slant wells, this alternative also assumes a nitrogen feed system to displace air in the headspace above the wetwell and prevent oxygen transfer to the seawater in the wetwell.

Design criteria for the nitrogen feed system are included in the table below.

Design Criteria for Voluntary Alternative 4

Item	Description
Nitrogen Tank	
Number	1
Type	Horizontal, Painted steel
Capacity	2,500 gallon
Rating	3,000 psi

Item	Description
Nitrogen Regulator	
Type	Forged body, 316 SS
Number	2
Capacity	120 scfm
Rating	4,000 psi
Manufacturer	Matheson or equal



Cal~Flo Emulsified Slaked Lime Slurry System		
Voluntary Proposal Number	4	
Rated Capacity	11.2 mgd or 8.0 mgd (If selected, the system will be designed to accommodate desired finished water production capacity)	
Summary Description of Voluntary Proposal	▪ If selected, the Cal~Flo System would replace Option 1 – Continuous Hydrated Lime System, Alternative to Option 1 – Automated Batching Slurry System (i.e. Tekkem Alternative), or Option 2 – Calcite Contactors. ▪ The Cal~Flo System provides for the direct injection of NSF/ANSI 60 certified Cal~Flo emulsified slaked lime slurry into the reverse osmosis permeate stream. ▪ The Cal~Flo System generally consists of 2 or 3 bulk storage tanks with mixers, 1 lime slurry transfer pump, 2 lime slurry feed pumps, and 1 in-line mechanical mixer. ▪ The Cal~Flo System is generally designed and operated like any other liquid chemical system.	
Summary of Change from Base Proposal	▪ If selected, the Cal~Flo System would replace Option 1 – Continuous Hydrated Lime System, Alternative to Option 1 – Automated Batching Slurry System (i.e. Tekkem Alternative), or Option 2 – Calcite Contactors. ▪ The Cal~Flo System requires a significantly smaller footprint than any of the options presented in the RFP.	
Deduct to Fixed Design-Build Price	9.6 mgd: $1,500,000	6.4 mgd: $1,000,000
Expected Annual Operating Cost Savings (assumes no inflation)	9.6 mgd: ($ 23,048)	6.4 mgd: ($ 5,730)
Change in Preliminary Project Schedule	No change	
Change in Scheduled Construction Date	No change	
Change in Scheduled Acceptance Date	No change	
Advantages	▪ Eliminates dry chemical storage, feed, and preparation systems. ▪ Eliminates dust and inhalation hazards associated with storage and handling of dry product. ▪ Operators store and feed Cal~Flo emulsified slaked lime slurry product as received from tanker (i.e. no wetting or preparation required). ▪ Eliminates potential turbidity excursions associated with calcite contactors. ▪ Eliminates need for grit removal system. ▪ Cal~Flo emulsified slaked lime slurry is NSF/ANSI 60 certified. ▪ Simplified system with fewer mechanical components reduces maintenance costs. ▪ Simplified system with fewer instruments and reduced control requirements. ▪ Improved safety. ▪ Consistent product quality improves process control and consistency. ▪ Proven performance in similar applications. ▪ Simple system facilitates future expansion with additional tank(s) and/or metering pump(s).	
Disadvantages	▪ The Cal~Flo System is a patented and proprietary system only available through Burnett Lime or licensed distributor. ▪ Complete functional guarantee of Cal~Flo System is provided only when Cal~Flo emulsified slaked lime slurry is used (other products can be used if desired, however, the functional guarantee will be voided). ▪ Cal~Flo emulsified slaked lime slurry only available through licensed manufacturer (i.e. General Chemical). ▪ Requires in-line mechanical mixer at high dosages to avoid excursions in turbidity. ▪ The Cal~Flo System is not NSF/ANSI 61 certified, however, Burnett Lime is currently in the process of obtaining certification. (The Cal~Flo emulsified slaked lime slurry is NSF/ANSI 61 certified.)	

Cal~Flo Emulsified Slaked Lime Slurry System	
Drawings attached	Drawings were developed for a 2 tank system. Note, 2 tank system provides sufficient storage based upon max flow-avg dose condition. Additional tank required to meet storage requirement for avg flow-max dose condition. ▪ P&IDs – 5000-28306-I36B – 5000-28306-I46 ▪ Mechanical – 5000-28306-M11

Design Criteria Table for Voluntary Alternative Proposal #4

A list of references and the product brochure are attached for reference. The figure below shows the differences in the process flow diagram between the two post stabilization alternatives. The figure includes photos of the facilities after years of being in operation.

Design Criteria for Voluntary Alternative 4

Parameter	8.0 mgd Finished Water Flow Rate	11.2 mgd Finished Water Flow Rate
Chemical	Lime (Calcium Hydroxide, Ca(OH)2)	
Form	Liquid	
Purity (%)	30	
Specific Gravity	1.17	
Delivery Form	Bulk Delivery	
Delivery Quantity (gal)	5,000	
Application Point - Composite Permeate Pipe		
Flow Basis - Composite Permeate		
Maximum (mgd)	8.0	11.2
Average (mgd)	6.4	9.6
Minimum (mgd)	3.2	3.2
Dosage - Composite Permeate		
Maximum (mg/L as 100% Ca(OH)2)	74	74
Average (mg/L as 100% Ca(OH)2)	28.7	28.7
Minimum (mg/L as 100% Ca(OH)2)	28.7	28.7
Usage - Composite Permeate		
Maximum (lb/day as 100% Ca(OH)2)	4,937	6,912
Average (lb/day as 100% Ca(OH)2)	1,532	2,298
Minimum (lb/day as 100% Ca(OH)2)	766	766
Max Flow-Avg Dose (lb/day as 100% Ca(OH)2)	1,915	2,681
Avg Flow-Max Dose (lb/day as 100% Ca(OH)2)	3,950	5,925
Usage - Composite Permeate		
Maximum (gpd as 30% Delivered Product)	1,687	2,361
Average (gpd as 30% Delivered Product)	523	785
Minimum (gpd as 30% Delivered Product)	262	262

Max Flow-Avg Dose (gpd as 30% Delivered Product)	654	916
Avg Flow-Max Dose (gpd as 30% Delivered Product)	1,349	2,024
Bulk Storage Tanks		
Total Number of Tanks	2	2
Volume of Each Tank (gal)	20,000	20,000
Total Storage Volume (gal)	40,000	40,000
Storage Time at Maximum Usage Rate (days)	23.7	16.9
Storage Time at Average Usage Rate (days)	76.4	51.0
Storage Time at Minimum Usage Rate (days)	152.9	152.9
Storage Time at Max Flow-Avg Dose Usage Rate (days)	61.1	43.7
Storage Time at Avg Flow-Max Dose Usage Rate (days)	29.6	19.8
Tank Mixers		
Type	Vertical, Flange Mounted	Vertical, Flange Mounted
Total Number of Mixers	2	2
Motor Horsepower (HP)	10	10
Motor Speed (rpm)	1,750	1,750
Motor Electrical Requirements (Volt/Phase/Hertz)	480/3/60	480/3/60
Motor Type	TEFC	TEFC
Bulk Storage Tank Transfer Pump		
Type	Centrifugal	Centrifugal
Total Number of Transfer Pumps	2 (One Active/One Shelf Spare)	2 (One Active/One Shelf Spare)
Flow (gph)	150	150
Minimum Total Dynamic Head (ft)	35	35
Motor Horsepower (HP)	7.5	7.5
Motor Speed (rpm)	1,800	1,800
Motor Electrical Requirements (Volt/Phase/Hertz)	480/3/60	480/3/60
Motor Type	TEFC	TEFC
Metering Pumps		
Type	Tubular Diaphragm	Tubular Diaphragm
Number of Pumps	2 (One Active/One Standby)	2 (One Active/One Standby)
Maximum Capacity (gph)	77.3	108.2
Minimum Capacity (gph)	12.0	12.0
Method of Control	Primary Control - Flow Paced Secondary Control - Alkalinity	Primary Control - Flow Paced Secondary Control - Alkalinity

Voluntary Alternative 5. Bulk Sodium Hypochlorite Storage and Feed System

Voluntary Proposal Number	Bulk storage and delivery of Sodium Hypochlorite	
Rated Capacity	9.6 mgd and 6.4 mgd	
Summary Description of Voluntary Proposal	▪ If selected, the Bulk Sodium Hypochlorite Storage and Feed System would replace the On-Site Sodium Hypochlorite Generation System in its entirety. ▪ The Bulk Sodium Hypochlorite Storage and Feed System provides for the direct injection of bulk sodium hypochlorite (12%) into various process streams. ▪ The Bulk Sodium Hypochlorite Storage and Feed System generally consists of 2 bulk storage tanks and 5 metering pumps.	
Summary of Change from Base Proposal	▪ If selected, the Bulk Sodium Hypochlorite Storage and Feed System would replace the On-Site Sodium Hypochlorite Generation System in its entirety (i.e. salt storage/brine tanks, generation units, transformers/rectifiers, dilute hypochlorite storage tanks, large capacity dilute hypochlorite metering pumps, hydrogen gas detectors, etc.). ▪ The Bulk Sodium Hypochlorite Storage and Feed System requires a significantly smaller footprint than the On-Site Sodium Hypochlorite Generation System presented in the RFP	
Deduct to Fixed Design-Build Price	9.6 mgd: $800,000	6.4 mgd: $800,000
Expected Annual Operating Cost Savings (assumes no inflation)	9.6 mgd: ($ 54,994)	6.4 mgd: ($ 31,353)
Change in Preliminary Project Schedule	None	
Change in Scheduled Construction Date	None	
Change in Scheduled Acceptance Date	None	
Advantages	▪ Operators store and feed bulk sodium hypochlorite as received from tanker (i.e. does not require operators to "make" chemical using sophisticated generation equipment). ▪ Eliminates generation of explosive hydrogen gas. ▪ Simplified system with fewer mechanical components reduces maintenance costs. ▪ Simplified system with fewer instruments and reduced control requirements. ▪ Simple system facilitates future expansion with additional tank(s) and/or metering pump(s).	
Disadvantages	▪ Bulk sodium hypochlorite pricing is not as stable as pricing of sodium chlorite, electricity, and water. ▪ Bulk sodium hypochlorite deteriorates at an increased rate when compared to dilute (0.8%) sodium hypochlorite. ▪ Bulk sodium hypochlorite is a hazardous chemical and presents an increased safety concern when compared to dilute (0.8%) sodium hypochlorite.	

Design Criteria for Voluntary Alternative 5

Parameter	8.0 mgd Finished Water Flow Rate	11.2 mgd Finished Water Flow Rate
Chemical	Sodium Hypochlorite Solution (NaOCl)	
Form	Liquid	
Purity (%)	12	
Available Chlorine (lbs Cl2/gal)	0.978	
Specific Gravity	1.168	
Delivery Form	Bulk Delivery	
Delivery Quantity (gal)	4,500	
Application Point - Raw Water Pipe		
Application Point - Spent Filter Backwash Storage Tank		
Application Point - Composite Permeate Pipe		
Flow Basis - Raw Water		
Maximum (mgd)	20.9	29.2
Average (mgd)	16.7	25.1
Minimum (mgd)	8.4	8.4
Flow Basis - Spent Filter Backwash Storage Tank		
Maximum (mgd)	1.4	2.5
Average (mgd)	1.1	2.1
Minimum (mgd)	0.6	0.7
Flow Basis - Composite Permeate		
Maximum (mgd)	8.0	11.2
Average (mgd)	6.4	9.6
Minimum (mgd)	3.2	3.2
Dosage - Raw Water		
Maximum (mg/L as 100% Cl2)	3	3
Average (mg/L as 100% Cl2)	2	2
Minimum (mg/L as 100% Cl2)	0.5	0.5
Dosage - Spent Filter Backwash Storage Tank		
Maximum (mg/L as 100% Cl2)	1.5	1.5
Average (mg/L as 100% Cl2)	1	1
Minimum (mg/L as 100% Cl2)	0.5	0.5
Dosage - Composite Permeate		
Maximum (mg/L as 100% Cl2)	2	2
Average (mg/L as 100% Cl2)	1.5	1.5
Minimum (mg/L as 100% Cl2)	1	1
Usage - Raw Water		
Maximum (lb/day as 100% Cl2)	522	731
Average (lb/day as 100% Cl2)	279	418
Minimum (lb/day as 100% Cl2)	35	35

Parameter	8.0 mgd Finished Water Flow Rate	11.2 mgd Finished Water Flow Rate
Max Flow-Avg Dose (lb/day as 100% Cl2)	348	487
Avg Flow-Max Dose (lb/day as 100% Cl2)	418	627
Usage - Spent Filter Backwash Storage Tank		
Maximum (lb/day as 100% Cl2)	18	32
Average (lb/day as 100% Cl2)	10	18
Minimum (lb/day as 100% Cl2)	2	3
Max Flow-Avg Dose (lb/day as 100% Cl2)	12	21
Avg Flow-Max Dose (lb/day as 100% Cl2)	14	27
Usage - Composite Permeate		
Maximum (lb/day as 100% Cl2)	133	187
Average (lb/day as 100% Cl2)	80	120
Minimum (lb/day as 100% Cl2)	27	27
Max Flow-Avg Dose (lb/day as 100% Cl2)	100	140
Avg Flow-Max Dose (lb/day as 100% Cl2)	107	160
Total Usage		
Maximum (lb/day as 100% Cl2)	673	949
Average (lb/day as 100% Cl2)	368	556
Minimum (lb/day as 100% Cl2)	64	64
Max Flow-Avg Dose (lb/day as 100% Cl2)	460	648
Avg Flow-Max Dose (lb/day as 100% Cl2)	539	814
Usage - Raw Water		
Maximum (gpd as 12% Delivered Product)	534	748
Average (gpd as 12% Delivered Product)	285	427
Minimum (gpd as 12% Delivered Product)	36	36
Max Flow-Avg Dose (gpd as 12% Delivered Product)	356	498
Avg Flow-Max Dose (gpd as 12% Delivered Product)	427	641
Usage - Spent Filter Backwash Storage Tank		
Maximum (gpd as 12% Delivered Product)	18	32
Average (gpd as 12% Delivered Product)	10	18
Minimum (gpd as 12% Delivered Product)	2	3
Max Flow-Avg Dose (gpd as 12% Delivered Product)	12	21
Avg Flow-Max Dose (gpd as 12% Delivered Product)	14	27
Usage - Composite Permeate		
Maximum (gpd as 12% Delivered Product)	136	191
Average (gpd as 12% Delivered Product)	82	123
Minimum (gpd as 12% Delivered Product)	27	27
Max Flow-Avg Dose (gpd as 12% Delivered Product)	102	143
Avg Flow-Max Dose (gpd as 12% Delivered Product)	109	164

Parameter	8.0 mgd Finished Water Flow Rate	11.2 mgd Finished Water Flow Rate
Total Usage		
Maximum (gpd as 12% Delivered Product)	688	971
Average (gpd as 12% Delivered Product)	376	568
Minimum (gpd as 12% Delivered Product)	65	66
Max Flow-Avg Dose (gpd as 12% Delivered Product)	470	663
Avg Flow-Max Dose (gpd as 12% Delivered Product)	551	832
Bulk Storage Tanks		
Total Number of Tanks	2	2
Volume of Each Tank (gal)	6,500	6,500
Total Storage Volume (gal)	13,000	13,000
Storage Time at Maximum Usage Rate (days)	19	13
Storage Time at Average Usage Rate (days)	35	23
Storage Time at Minimum Usage Rate (days)	199	197
Storage Time at Max Flow-Avg Dose Usage Rate (days)	28	20
Storage Time at Avg Flow-Max Dose Usage Rate (days)	23.6	15.6
Metering Pumps - Raw Water		
Type	Peristaltic	Peristaltic
Number of Pumps	2 (One Active/One Standby)	2 (One Active/One Standby)
Maximum Capacity (gph)	24.5	34.3
Minimum Capacity (gph)	1.5	1.5
Method of Control	Primary Control - Flow Paced Secondary Control - Cl2 Residual	Primary Control - Flow Paced Secondary Control - Cl2 Residual
Metering Pumps - Spent Filter Backwash Storage Tank		
Type	Peristaltic	Peristaltic
Number of Pumps	1 (One Active)	1 (One Active)
Maximum Capacity (gph)	0.8	1.5
Minimum Capacity (gph)	0.1	0.1
Method of Control	Manual	Manual
Metering Pumps - Composite Permeate		
Type	Peristaltic	Peristaltic
Number of Pumps	2 (One Active/One Standby)	2 (One Active/One Standby)
Maximum Capacity (gph)	6.3	8.8
Minimum Capacity (gph)	1.1	1.1
Method of Control	Primary Control - Flow Paced Secondary Control - Cl2 Residual	Primary Control - Flow Paced Secondary Control - Cl2 Residual

Delete Sulfuric Acid		
Voluntary Proposal Number	6	
Rated Capacity	9.6 mgd and 6.4 mgd	
Summary Description of Voluntary Proposal	Remove sulfuric acid system	
Summary of Change from Base Proposal	Remove sulfuric acid storage and feed system from design. Water quality projections indicate that sulfuric acid is not needed at the design RO recoveries.	
Deduct to Fixed Design-Build Price	9.6 mgd: $ 60,000	6.4 mgd: $ 60,000
Expected Annual Operating Cost Savings (assumes no inflation)	9.6 mgd: $ 146,528	6.4 mgd: $ 98,348
Change in Preliminary Project Schedule	None	
Change in Scheduled Construction Date	None	
Change in Scheduled Acceptance Date	None	
Advantages	▪ Less number of equipment and instruments to operate and maintain ▪ If necessary, space will remain in the building to install equipment ▪ Less hazardous chemicals for operators to handle ▪ Less complex process control	
Disadvantages	▪ Costs could increase if determined sulfuric acid is necessary and installed at a later date	

Voluntary Alternative 7. Eliminate Walls from Pressure Filter Gallery

Eliminate Pressure Filter Gallery Walls		
Voluntary Proposal Number	7	
Rated Capacity	9.6 mgd and 6.4 mgd	
Summary Description of Voluntary Proposal	Eliminate the walls on each side of the Pressure Filter Gallery and provide just a canopy over the end of the pressure filters, piping and valves.	
Summary of Change from Base Proposal	The 9.6 mgd base proposal provides approximately 2800 sq ft of wall panel to enclose the pressure filter pipes, and the 6.4 mgd base proposal provides approximately 2200 sq ft of wall panel to enclose the pressure filter pipes. Elimination of dry pipe fire sprinkler system	
Deduct to Fixed Design-Build Price	9.6 mgd: $ 88,000	6.4 mgd: $ 70,000
Expected Annual Operating Cost Savings (assumes no inflation)	9.6 mgd: $0	6.4 mgd: $0
Change in Preliminary Project Schedule	None	
Change in Scheduled Construction Date	None	
Change in Scheduled Acceptance Date	None	
Advantages	▪ Reduces costs by eliminating expensive framing to support the metal wall panels around the circular pressure filters ▪ Improve access between the pressure filter piping and the exterior components along the length of the pressure ▪ Improved natural ventilation and lighting in the pipe gallery	
Disadvantages	▪ Wind can blow rain and debris into the pipe gallery ▪ The space cannot be heated ▪ Reduced Security for components	

Eliminate Walls from Chemical Storage		
Voluntary Proposal Number	8	
Rated Capacity	State 9.6 mgd and/or 6.4 mgd	
Summary Description of Voluntary Proposal	Eliminate exterior walls around chemical storage rooms. Roof and internal walls for separation of non-compatible chemicals would still be provided.	
Summary of Change from Base Proposal	▪ External walls around chemical areas would be eliminated ▪ Due to open nature of these storage areas HVAC ventilation systems could be reduced	
Deduct to Fixed Design-Build Price	9.6 mgd: $ 50,000	6.4 mgd: $ 40,000
Expected Annual Operating Cost Savings (assumes no inflation)	9.6 mgd: $ 0	6.4 mgd: $ 0
Change in Preliminary Project Schedule	None	
Change in Scheduled Construction Date	None	
Change in Scheduled Acceptance Date	None	
Advantages	▪ Reduction in capital cost ▪ Reduction in O&M cost as fewer ventilation fans would be required, thus reducing power consumption and maintenance requirements. ▪ While removable panels have been proved in the base project, open walls would allow for easier access should tank replacement or major maintenance be required	
Disadvantages	▪ While sheltered open walls would allow partial weather exposure. While all equipment would be designed for this exposure, operators working on equipment in this area would be partially exposed to elements.	

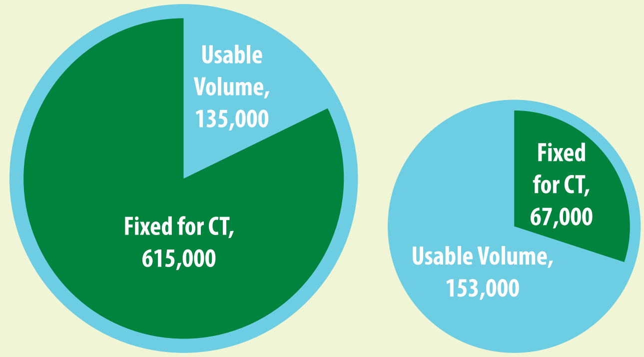
Smaller Finished Water Tanks and Install UV

Voluntary Proposal Number	10. Reduce Chlorine Contact Volume	
Rated Capacity	9.6 mgd and 6.4 mgd	
Summary Description of Voluntary Proposal	Reduce Chlorine Contact tank size by obtaining disinfection credits for UV	
Summary of Change from Base Proposal	▪ Reduce size of finished water tanks from 750,000 gallons each to 220,000 gallons each ▪ Permit the UV units to achieve 4-log removal credits for Giardia and Cryptosporidium ▪ Provide chlorine contact to achieve 4-log virus reduction (6 mg/L-min required at 10°C)	
Deduct to Fixed Design-Build Price	9.6 mgd: $ 400,000	6.4 mgd: $ 400,000
Expected Annual Operating Cost Savings (assumes no inflation)	9.6 mgd: $ 0	6.4 mgd: $ 0
Change in Preliminary Project Schedule	No Change	
Change in Scheduled Construction Date	No Change	
Change in Scheduled Acceptance Date	No Change	
Advantages	▪ Complies with new Cryptosporidium requirements of LT2 ESWTR not in place when Sand City was permitted ▪ Complies with multiple barrier requirements for Giardia and viruses ▪ Can be done with same UV dose specified in RFP, provided EPA validated units are used ▪ Reduces chlorine usage ▪ Increases usable volume for flow equalization	
Disadvantages	▪ Limits the UV manufacturers and UV products that can be used (DVGW validation not sufficient)	

Voluntary Alternative 9 – Smaller Finished Water Tanks and Install UV

The RFP specifies that pathogen removal credits be achieved through a combination of RO, UV, and free chlorine contact, specifying that free chlorine be used to achieve a minimum 1-log Giardia inactivation. This requirement would dictate a 615,000 gallon minimum water volume in the finished water tanks to meet the CT requirements. As an alternative, UV could be used to meet the Giardia and Cryptosporidium inactivation requirements, allowing the minimum chlorine contact volume to be reduced to 67,000 gallons to achieve only the 4-log virus inactivation. As some flow equalization is needed on top of the chlorine contact, this alternative includes a total of 440,000 gallons of storage, split between two independent 220,000 gallon tanks. The majority of this volume would be used for flow equalization, while a minimum of 67,000 gallons would be maintained for chlorine contact.

Voluntary Alternative 10 – Reduce Chlorine Contact Tanks



By using the installed UV units to provide redundant Giardia removal, the finished water tank volumes can be decreased substantially, while increasing the usable volume for flow equalization.

The primary benefit of this alternative is the reduction in size of the finished water tanks, however, the usable volume for flow equalization, above the minimum chlorine contact volume, would be larger than the volume specified in the RFP, providing improved operational flexibility to meet diurnal flow and demand variations. Maintaining the use of UV units would also allow the facility to meet the increased Cryptosporidium removal requirements specified by the Long Term 2 Enhanced Surface Water Treatment Rule (LT2), which was not in place at the time that the Sand City plant was permitted. Recent discussions with CDPH have confirmed that a total of 5.5-log Cryptosporidium inactivation will now be required if a watershed sanitary survey is avoided. Cryptosporidium cannot be inactivated with free chlorine, requiring that UV be used in conjunction with RO. The table below presents the base line approach and the alternative approach for meeting the pathogen removal requirements.

Pathogen Log Reduction Requirements and Approach

Parameter	Maximum Requirement	Base Alternative				Voluntary Alternative 10			
		RO	UV	Cl2	Total	RO	UV	Cl2	Total
Cryptosporidium	5.5	2	4	0	6	2	4	0	6
Giardia	5	2	4	1	7	2	4	0	6
Virus	6	2	0	4	6	2	0	4	6

Design Criteria for the reduced capacity finished water tanks are included in the table below.

Design Criteria for Voluntary Alternative 9

Item	Description
Finished Water Tanks	
Number	2
Type	Painted steel
Capacity	220,000 gallons

CDM Smith

Substitution of Industry Standard Materials		
Voluntary Proposal Number	10	
Rated Capacity	9.6 mgd and 6.4 mgd	
Summary Description of Voluntary Proposal	Modifications of some of the RFP design criteria to align with similar industry standard design criteria for seawater plants without impacting water quality criteria, performance or long term maintenance.	
Summary of Change from Base Proposal	▪ Change 4160V – 480V transformers from Cast Coil dry type style to liquid filled pad mount style. Cast Coil transformers of this size are substation style and conflict with PG&E standards ▪ Change the Generator Enclosure from Pritchard Brown to Cummins. Pritchard Brown is a quality manufacturer but is located on the east coast. This requires fabricating the generator on the west coast shipping it to the east coast and back to the west coast for delivery and installation. Cummins makes comparable quality enclosures at the same factory as the generator on the west coast, avoiding costly additional shipping. ▪ Change the rating of the 21kv breakers/gear from 35kv to 27kv. 27KV is the standard rating for PG&E and will likely be required by PG&E. ▪ Delete curb and gutter on plant roads. To better blend with the coastal and rural environment and promote natural infiltration of storm water we propose to provide roadways without curb and gutter ▪ Provide standard check valves on the discharge of the finished water pump station in lieu of hydraulic ball valves. ▪ Modify the spacing of chemical containment sumps from 100' to 300'. All containment pipe will still be sloped to drain to the sumps. ▪ Change the piping material for low pressure, seawater above ground piping from FRP to HDPE. The below ground piping is currently allowed to be HDPE. HDPE is commonly used for above ground piping provided proper pipe supports are included. This alternative includes installation of the necessary pipe supports for the above ground HDPE pipes. ▪ Delete the uninterruptible power supplies on the UV system. On power failure the pumps will also fail so water will not flow. Once the backup generator is started to run the flushing pumps the UV system would be powered by the backup generator. Thus no flow would occur when the UV system didn't have power.	
Deduct to Fixed Design-Build Price	9.6 mgd: $ 790,000	6.4 mgd: $ 790,000
Expected Annual Operating Cost Savings (assumes no inflation)	9.6 mgd: $ 0	6.4 mgd: $ 0
Change in Preliminary Project Schedule	None	
Change in Scheduled Construction Date	None	
Change in Scheduled Acceptance Date	None	
Advantages	Construction cost savings	
Disadvantages	Requires deviations from CAW stated preferences	

Vibration Monitoring		
Voluntary Proposal Number	11. Vibration Monitoring	
Rated Capacity	State 9.6 mgd and 6.4 mgd	
Summary Description of Voluntary Proposal	Provide Vibration Monitors only on Pumps greater than 500 HP	
Summary of Change from Base Proposal	RFP requires vibration monitors on pumps greater than 200HP While it is prudent to provide these on the 1st pass RO feed pumps which are 800 HP in size the smaller 200-500HP pumps are rarely provided with vibration monitoring in the industry. In this Voluntary alternative vibration monitors would only be provided on pump larger than 500HP(1st pass RO Feed)	
Deduct to Fixed Design-Build Price	9.6 mgd: $ 50,000	6.4 mgd: $ 50,000
Expected Annual Operating Cost Savings (assumes no inflation)	9.6 mgd: $ 0	6.4 mgd: $ 0
Change in Preliminary Project Schedule	None	
Change in Scheduled Construction Date	None	
Change in Scheduled Acceptance Date	None	
Advantages	▪ Vibration monitoring systems can be maintenance intensive ▪ Vibration monitoring systems can be a source of nuisance alarms ▪ Cost savings	
Disadvantages	▪ Should an imbalance develop vibration monitors may provide opperators an alarm before they notice the malfunction during their regular rounds.	
Drawings attached	None	
Graphics included	None	
Design Criteria Tables attached	None	

FRP Cartridge Filters		
Voluntary Proposal Number	12	
Rated Capacity	9.6 mgd and 6.4 mgd	
Summary Description of Voluntary Proposal	Change the material of construction of the RO Cartridge filters from AL6X to FRP	
Summary of Change from Base Proposal	▪ Change cartridge filters from AL6X to FRP	
Deduct to Fixed Design-Build Price	9.6 mgd: $ 90,000	6.4 mgd: $ 64,000
Expected Annual Operating Cost Savings (assumes no inflation)	9.6 mgd: $ 0	6.4 mgd: $ 0
Change in Preliminary Project Schedule	None	
Change in Scheduled Construction Date	None	
Change in Scheduled Acceptance Date	None	
Advantages	▪ Despite the built in lifting devises FRP is lighter and thus changing cartridge filters will be slightly less strenuous on the operators ▪ While AL6X is extremely corrosion resistant it is prone to some amount of surface rusting, that while not a functional issue, can be aesthetically undesirable	
Disadvantages	▪ Many believe AL6X has a longer design life; however, FRP is being used for pipe material and RO pressure vessels, and is proving to be comparable in design life to AL6X	

N

N. Proposal Form 23: Governmental Approvals Schedule

PROPOSAL FORM 23

GOVERNMENTAL APPROVALS

The required Governmental Approvals are:

Governmental Approval	Issuing Agency	Governmental Approval Application Submission Date (Number of days from Contract Date)	Assumed Approval Issuance Date (Number of days from Date of Application Submittal)
*General Construction Stormwater Permit	Regional Water Quality Control Board	March 30, 2014 (100 days)	April 28, 2014 (30 days)
*Title 27 Permit	Regional Water Quality Control Board	June 14, 2014 (176 days)	December 14. 2014 (180 days)
*Waste Discharge Permit	Regional Water Quality Control Board	June 16, 2014 (178 days)	July 15, 2014 (30 days)
*NPDES – storm water discharge	Regional Water Quality Control Board	June 15, 2014 (177 days)	July 15, 2014 (30 days)
*Permit to operate a public water system	California Department of Public Health	September 6, 2015 (625 days)	September 18, 2016 (210 days)
*Combined Development Permit	Monterey County	April 29, 2014 (235 days)	July 27, 2014 (90 days)
*Grading Permit	Monterey County	April 29, 2014 (235 days)	June 27, 2014 (60 days)
*Erosion Permit	Monterey County	April 29, 2014 (235 days)	July 27, 2014 (90 days)
*Use Permit	Monterey County	May 10, 2014 (141 days)	August 7, 2014 (90 days)
*Permit to Construct	Monterey County	June 27, 2014 (189 days)	August 25, 2014 (60 days)
*Tree Removal	Monterey County	June 27, 2014 (189 days)	August 25, 2014 (60 days)
*Authority to Construct	Monterey Bay Unified Air Pollution Control District	June 7, 2014 (169 days)	August 5, 2014 (60 days)
*Permit to Operate	Monterey Bay Unified Air Pollution Control District	December 1, 2015 (711 days)	December 2, 2015 (1 days)

Governmental Approval	Issuing Agency	Governmental Approval Application Submission Date (Number of days from Contract Date)	Assumed Approval Issuance Date (Number of days from Date of Application Submittal)
**NPDES – clean water act	Regional Water Quality Control Board	December 21, 2013 (1 day)	September 11, 2014 (265 days)
**Certificate of Convenience & Necessity	California Public Utilities Commission	December 21, 2013 (1 day)	August 13, 2014 (236 days)
**Biological Opinion	US Fish & Wildlife	December 23, 2013 (3 days)	September 4, 2014 (177 days)
**Coastal Development Permit	California Coastal Commission	December 20, 2013 (0 days)	September 11, 2014 (265 days)
**National Historic Preservation Act	***California State Historic Preservation Office	March 20, 2014 (90 days)	September 11, 2014 (265 days)
**Incidental Take Permit	California Department of Fish & Wildlife	February 28, 2014 (70 days)	August 27, 2014 (180 days)
**Water System Expansion Permit	Monterey Peninsula Water Management District	December 20, 2013 (0 days)	September 16, 2014 (270 days)
**Brine Line Connection Permit	Monterey Regional Wastewater PCA	December 20, 2013 (0 days)	September 16, 2014 (270 days)

* Contractor led permits
**CAW led permits
***Not likely to need this permit

CDM Constructors Inc.
Name of Proposer

Paul Meyerhofer
Name of Designated Signatory

[signature]
Signature

Senior Vice President
Title