

TASK ORDER NO. 1

Project No. J-120, Process Control Systems Upgrades

This TASK ORDER NO. 1 Project No. J-120, Process Control Systems Upgrades (Task Order No. 1) dated as of July 28, 2021, is made and entered into by and between the ORANGE COUNTY SANITATION DISTRICT, hereinafter referred to as "OC SAN", and ABB, INC., hereinafter referred to as "CONTRACTOR". This Task Order No. 1 is entered into pursuant to the Agreement for the Design, Installation, Implementation, and Maintenance of a Process Control System, dated July 28, 2021, by and between OC SAN and CONTRACTOR for Project No. SP-196 ("Master Services Agreement").

CONTRACTOR agrees to furnish the necessary services to accomplish the project elements outlined in the Scope of Work attached hereto as Attachment "A", and by this reference made a part of this Task Order No. 1.

The total compensation shall be in an amount not to exceed \$11,818,480 and consistent with Unit Price Schedule Project J-120 Buildup attached hereto as Attachment "B", and by this reference made a part of this Task Order No. 1.

Concurrent with the executed Task Order No. 1, CONTRACTOR shall furnish a Performance Bond and a Payment Bonds (Bonds) consistent with the requirements specified in the Master Services Agreement. The Bonds shall be attached to this Task Order No. 1 as Attachment "C".

Costs for the Work included in this Task Order No. 1 shall be invoiced separately from costs for work included in any other task orders issued to CONTRACTOR.

All terms and conditions of the Master Services Agreement shall remain in full force and effect.

ORANGE COUNTY SANITATION DISTRICT

ABB, INC.

John B. Withers
Board Chairman

Date

Signature

Date

Printed Name & Title

Kelly A. Lore
Clerk of the Board

Date

Signature

Date

Ruth Zintzun
Purchasing & Contracts Manager

Date

Printed Name & Title

Attachment "A"
Project J120 Scope of Work

TASK ORDER #1 J-120 SCOPE OF WORK

TABLE OF CONTENTS

PART 1 – SUMMARY..... 2

PART 2 – GENERAL PROJECT DESCRIPTION, REQUIREMENTS 3

 2.1 GENERAL PROJECT DESCRIPTION..... 3

 2.2 REQUIREMENTS 3

 2.3 COORDINATION WITH OTHER PROJECTS..... 4

PART 3 – PROJECT SCHEDULE 6

PART 4 – PROJECT EXECUTION 6

 4.1 PROJECT ENGINEERING SERVICES..... 6

 4.2 CONFIGURATION, PROGRAMMING AND COMMISSIONING PRODUCTS AND SERVICES 15

 4.3 LICENSING 38

 4.4 TRAINING 38

PART 5 – GENERAL REQUIREMENTS 39

 5.1 SOFTWARE 39

EXHIBITS..... 41

PART 1 – SUMMARY

TASK ORDER #1 J-120 shall replace the existing CRISP based HMI solution with CONTRACTOR's new SCADA Platform. CONTRACTOR shall provide products and services to design, develop, test, and deliver all Work for the project described herein. A summary of key Work activities and deliverables is as follows:

- New SCADA System
 - Workstations (Engineering and Operator)
 - Facility Historian
 - System Architecture
 - Replace existing Access Database and interface with SAT tool
 - New M580 or DCS controller programming standards
 - New HMI Standards
 - Application Architecture
 - Modification of Engineering Specifications
 - Hardware Standards Development (for DCS Proposers)
 - Training and Development System
 - Mobile and Commissioning system
 - Maximo Integration
 - Automatically Generated Reports
 - Read-Only SCADA System
 - Enterprise-Level Dashboard Reports
- New graphics
 - All new graphics programmed, installed, tested and commissioned per the new HMI graphics standards.
- All licensing as described in 17440
- All training as described in 01820

In addition to this, provide line item pricing for the following optional item:

- Replacement of the Enterprise Historians.

Unless otherwise stated, all of the Work described herein applies to the following systems and locations at the SANITATION DISTRICT:

- Plant 1 Process SCADA System
- Plant 1 Electrical SCADA System

- Plant 1 Central Generation System
- Plant 2 Process SCADA System
- Plant 2 Electrical SCADA System
- Plant 2 Central Generation System
- Collections System
- Plant 1 Load Shedding System
- Plant 2 Load Shedding System

PART 2 – GENERAL PROJECT DESCRIPTION, REQUIREMENTS

2.1 GENERAL PROJECT DESCRIPTION

TASK ORDER #1 J-120 is an enterprise-wide SCADA upgrade where SANITATION DISTRICT endeavors to install a single SCADA platform to replace the existing obsolete CRISP SCADA platform currently used for Plant 1 and Plant 2 process, pump stations, and P1 electrical and the existing Wonderware SCADA platforms currently in use for Plant 1 and Plant 2 Cen Gen. It is SANITATION DISTRICT’s goal to have a uniform SCADA platform provided by a single CONTRACTOR. CONTRACTOR shall complete the TASK ORDER #1 J-120 Work indicated herein and all associated attachments. In addition, TASK ORDER #1 J-120 will provide PLC/controller hardware and the associated remote I/O for development and testing.

The Work provided by the CONTRACTOR shall include the completed field verification, design, engineering, development and testing of HMI and PLC/Controller standards, fabrication, systems integration, bench testing, procurement, construction, installation, commissioning, documentation, management, ancillary services, training, warranty, maintenance and upgrades (during TASK ORDER #1 J-120 and prior to final acceptance), and any other services and equipment necessary to create and install a fully functional, feature-rich, SCADA Platform that meets the requirements of the CONTRACTOR’s proposal. The specific use of devices, equipment, software and services necessary for successful completion of the Work shall be determined by the CONTRACTOR as part of the Work and reviewed and approved by the SANITATION DISTRICT.

Unless specifically excluded by the Work statements, the inclusion of or failure to include any particular device, equipment, service, or software in the Work statement shall not relieve the CONTRACTOR of the obligation to design and provide a sound, operable, functional, and complete SCADA Platform.

2.2 REQUIREMENTS

The CONTRACTOR shall furnish all labor, materials, equipment, transportation, tools, and consumables, as well as provide all needed engineering services to accomplish the functional, performance and technical requirements of these Task Order Documents including, but not limited to, project management, engineering/design, procurement services, project scheduling and project controls, coordination with and assistance to the SANITATION DISTRICT regarding work performed by others (PLC programming by PCI or control room upgrades by a different CONTRACTOR), construction services, startup and testing services, equipment delivery, documentation services, and

ongoing management and support services.

Unit Prices shall be the basis of all pricing for the Work. However, for TASK ORDER #1 J-120 (type 2 task order per the Agreement) the price total from this buildup shall revert to a Lump Sum price for ALL Work required in the Task Order Documents. The CONTRACTOR hereby agrees to complete the Work within the required time frame, and to accept in full payment for all services, equipment, materials, licenses and Work therefore, per said Lump Sum price.

TASK ORDER #1 J-120 pricing shall include the following *optional* items:

- Replacement of the existing Wonderware enterprise historian

2.3 COORDINATION WITH OTHER PROJECTS

The following projects may impact or require coordination with this project:

- J-117B – Outfall Low Flow Pump Station & Plant 2 SCADA system network and Upgrades
 - Project Description: This project will rehabilitate the mechanical, electrical, and civil systems at the Ocean Outfall Booster Station at Plant 2 which is the primary pumping station for the discharge of secondary effluent to the ocean outfall system. This project also includes replacement of portions of the Ocean Outfall Booster Station pumping systems with a low flow pump station to more efficiently pump dry weather flow and provide several major electrical upgrades at Plant No. 2. In addition, this project will replace the plant water pump station to accommodate the GWRS Final Expansion.
Project P2-107 is the part of the same construction contract. It will replace the existing fiber optic network with a series of looped fiber networks and network switches, creating an industrial control system that increases the reliability of this critical system. This project will also provide two new server rooms in existing buildings that will contain core switches and other equipment for the process and IT networks.
- J-124 Digester Gas Facilities Rehabilitation
 - This project will rehabilitate the low and high pressure digester gas facilities at Plant Nos. 1 and 2 to meet current and future OCSD needs such as Air Quality Management District and National Fire Protection Association regulations, and future projected gas production. The Project includes rehabilitation of the existing gas compressor building at Plant 1 and replacement of all compressors and flares. The Plant 2 work includes construction of the new gas compressor building, new flares and replacement of existing gas compressors.
- P1-105 Headworks Rehabilitation at Plant 1
 - This project will rehabilitate and upgrade facilities at the Plant 1 Headworks. Facilities to be rehabilitated include the Metering and Diversion Structure, the Bar Screen Building, the Bin Loading Building, the Main Sewage Pump Station, the Grit Basins, the Primary Influent channels, the Headworks Odor Control Scrubbers, and

electrical power distribution and control systems. The project will also include demolition of the original Headworks No. 1 facilities and the unused Chlorine Building pumps.

- P2-122 Headworks Modification at Plant 2 for GWRS Expansion
 - This project will modify the Headworks, related piping, and sidestream flow routing to separate reclaimable and non-reclaimable flows to accommodate the Orange County Water District's Groundwater Replenishment System Final Expansion. Work elements include splitting of an existing PLC into two PLC's, modification of graphics and addition of two new RIO panels.
- P2-128 TPAD Digester Facility at Plant 2
 - This project is the largest of a set of related projects to replace the mesophilic anaerobic digesters at Plant 2 with new digesters in a temperature-phased anaerobic digester (TPAD) configuration. This project will include six new thermophilic digesters, batch tanks, cooling facilities, and associated sludge pumping, digester mixing, power distribution, and controls. Replacement and demolition of existing digesters will be included in a separate project.
- FE-XXX Plant 1 and Plant 2 Control Room Upgrades
 - This project will upgrade the control room facilities at Plant 1 and Plant 2 with new flooring, lighting and operator workstation consoles. Additional consoles for workstations may also be provided in other key areas.

The CONTRACTOR shall furnish and install a complete and fully functional SCADA system that is integrated with existing facilities and coordinated with other construction projects that have a SCADA system component. In many cases, coordination will only affect the sequencing of graphics development and commissioning sequence. The CONTRACTOR shall review reports, plans and specifications to identify potential conflicts with the following adjacent projects and participate in the number of meetings indicated in the following table:

Project	Number of Meetings
FE-XXX	2 meetings @ 2 hrs.
J-117B	2 meetings @ 2 hrs.
J-124	2 meetings @ 2 hrs.
P1-105	2 meetings @ 2 hrs.
P2-128	4 meetings @2 hrs.

The Project Manager is the only required attendee for all of the project coordination meetings.

PART 3 – PROJECT SCHEDULE

The table below lists the time frames associated with each major project deliverable and SANITATION DISTRICT’s review and approval of those deliverables. CONTRACTOR shall comply with the deadlines indicated in the table.

The ENGINEER will issue a Notice to Proceed (NTP) that will authorize CONTRACTOR to begin preparation of the Project Management Plan (PMP) specified in Section 4.1.2, Project Management.

CONTRACTOR shall include scheduled milestones and activities required to be performed by the SANITATION DISTRICT in their CPM schedule. SANITATION DISTRICT concurrent engineering activities shall be limited to no more than two unless approved by the SDMT. See Specification Section 01300 for the requirement.

Proposed Work Sequence and schedule:

Milestone ID	Description	Processor Milestone & Duration	Note/Comments
A	Task Order Notice to Proceed	NTP	
B	Mobilization and PMP	NTP +60 days	
C	Engineering Complete (all enterprise submittals)	NTP + 360 days	
D	Plant 1 (Programming, Testing, Commissioning, and Installation)	C + 400 days	
E	Plant 2 (Programming, Testing, Commissioning, and Installation)	D + 400 Days	
F	Collection System (Programming, Testing, Commissioning, and Installation)	E + 200 Days	
G	Final Completion and Commencement of Warranty	D, E & F + 90 days	
H	End of Warranty	E, F, & G + 1 year	

PART 4 – PROJECT EXECUTION

4.1 PROJECT ENGINEERING SERVICES

4.1.1 Mobilization

The SANITATION DISTRICT shall provide a Staging Area (location shall be provided by the

SANITATION DISTRICT) for the CONTRACTOR's staff. See Mobilization Specification Section 01505 for more information and for the requirement.

4.1.2 Project Management

CONTRACTOR shall prepare a Project Management Plan (PMP) prior to beginning technical work on the project. The purpose of the PMP is to ensure that the work is properly planned so that:

- The resources are efficiently used to complete the project scope and accomplish the project objectives.
- The Work is planned to meet the specified schedule while providing appropriate opportunities for SANITATION DISTRICT input and sufficient time to phase the startup and commissioning.
- Quality control and quality assurance measures are planned and implemented to meet SANITATION DISTRICT's expectations.

The PMP shall focus on project-specific information and be as concise as possible to document the required information. Where CONTRACTOR has a standard procedure for some activity, that procedure shall be referenced, and not repeated in detail. See Exhibit 1 for a sample Project Management Plan.

A. Project Management Progress Meetings

CONTRACTOR shall prepare an agenda and conduct monthly project management meetings with SANITATION DISTRICT's Project Manager and the CONTRACTOR's Project Manager throughout the duration of the Engineering Services work. The purpose of the meetings will be to review CONTRACTOR's Progress Report. Meetings should be arranged so that the most recent Progress Report is available for the meeting. Other meetings shall be scheduled on an as-needed basis.

B. Project Schedule

See Section 01300 Contractors Construction Schedule and Reports

C. Project Logs

CONTRACTOR shall produce and maintain on at least a monthly basis the following logs through the course of the project:

Project Decision Log. The project decision log shall track decisions made during workshops and meetings, and as a result of SANITATION DISTRICT's review of deliverables. The log shall include the date of the decision, the title of the meeting where it was made (if applicable), a description of the decision, and a brief summary of the impacts. A separate decision log is required for development of the standards and is described in more detail in that section.

Action Item Log. The action item log is used to track action items generated during meetings. Action items may only be assigned to members of the SANITATION DISTRICT or CONTRACTOR teams. If action is required by a different party, the action item shall be assigned to the person on the team to track who will track the action item with that person. The action item log is not intended to include normal CONTRACTOR tasks, nor to include

comments on deliverables. The Action Item log shall include a tracking number (typically coded to the date), a date it was created, a description of the action required, the lead person, and the date it was resolved. If action is required by more than one person, the person who will be asked to coordinate that action shall be listed.

Issues Log. The Issues log shall list general comments and concerns raised by CONTRACTOR or SANITATION DISTRICT staff during the project. This log is not intended to track SANITATION DISTRICT comments on submittals. The log shall include a very short description of how the issue will be addressed. The Issues log shall be reviewed monthly to confirm that the issue has been appropriately addressed.

Meeting Log. See Section 4.1.5 Workshops and Meetings.

Risk Management Log. See 4.1.3 Risk Management, Risk Mitigation Measure Log
CONTRACTOR shall be responsible for managing CONTRACTOR's project execution, schedule, budget, subcontractors, and coordination with other projects. The following project management requirements apply to the entirety of Part 4 – Project Execution.

4.1.3 Risk Management

CONTRACTOR staff shall develop a project-specific Risk Management Plan (RMP) in coordination with SANITATION DISTRICT staff and update the plan at key points in the project. CONTRACTOR shall assist the SANITATION DISTRICT in managing risks per the tasks described below. The RMP is intended to cover the risks during the entire project execution phase.

CONTRACTOR staff shall prepare and manage the RMP documents. CONTRACTOR's responsibilities for preparing the RMP consist of leading the risk workshops, maintaining a log of risk mitigation measures, and providing risk updates in monthly progress reports. See Exhibit 2, Risk Management Plan for a sample Risk Mitigation Plan.

A. Initial Risk Workshop

An Initial Risk Management Workshop will be held shortly after the beginning of the Enterprise Submittal effort. Attendees will include SANITATION DISTRICT's project team. CONTRACTOR's Project Manager and Project Engineer shall prepare for and leading the workshop. The purpose of the workshop will be to initially identify the key project-specific risks and discuss which risks warrant additional attention as the project progresses. CONTRACTOR shall prepare the minutes for this Workshop.

B. SCADA Graphics Risk Management Workshop

A SCADA Graphics Risk Management Workshop shall be held at least 4 weeks prior to submittal of the first Draft Area Graphics Submittal. The Workshop will be utilized to:

- Identify key project-specific risks
- Characterize the nature of the impact of each risk should it occur
- Characterize how likely the risk is to occur
- Timeline of adjacent projects that are in graphics development and potential schedule

impacts and conflicts.

- Identify potential mitigation strategies that should be implemented or be ready to be implemented to address each risk.

The Workshop shall be planned and scheduled for a duration of 3 hours and will be held at SANITATION DISTRICT's offices. CONTRACTOR shall prepare the agenda, all appropriate presentation materials, and minutes for the Workshop. The minutes shall include sufficient information for SANITATION DISTRICT to populate the project risk register to be included in the RMP.

C. Risk Mitigation Measure Log

Following CONTRACTOR's completion of the RMP, CONTRACTOR shall prepare a log of all the mitigation measures recommended in the plan to be implemented. The log is likely to include measures to be taken during the Engineering and Commissioning phases. The log is not intended to track mitigation measures that would be implemented only if and when a particular risk occurs. The risk mitigation measure log may be kept in the same worksheet (with dedicated columns) as the risk management log.

The log shall include the following information for each recommended mitigation measure:

- A brief description of the mitigation measure and the risk it is intended to address.
- A description of who has the lead to implement the measure.
- What components of the project design or execution would need to incorporate or address the measure.
- The time frame for completing the measure.
- A brief summary of the status of the measure, to be used in on-going updates.

The Risk Mitigation Measure Log will be used for on-going risk management and as a basis of reviewing CONTRACTOR submittals.

D. Risk Monitoring Updates

Prior to monthly Project Management Meetings, CONTRACTOR shall review the RMP and update the Risk Mitigation Measure Log. The monthly Progress Report shall include a discussion of the following risk issues:

- Identification of all risks included in the RMP that have occurred since the last monthly report
- Identification of all risks included in the RMP that have been resolved or are no longer a risk
- Identification of new risks that have occurred or been identified since the last progress report.

- An update of the Risk Mitigation Measure Log reflecting the status of each recommended mitigation measure.

The risk discussion in the monthly progress report shall be included in the agenda of the monthly project management progress meeting.

4.1.4 Quality Control

The following Quality Control requirements apply to the entire Project Execution phase. The CONTRACTOR shall budget the below Quality control activities during Project Execution as a part of the overall TASK ORDER #1 J-120 budget.

Submittals that contain gross deficiencies or errors requiring a significant amount of SANITATION DISTRICT staff time for checking will be rejected and will require a resubmittal. Such submittals may not be reviewed in their entirety. CONTRACTOR shall resubmit until their review, checking and correction for coherence, consistency, spelling, etc. has been performed.

A. Quality Control Requirements

The CONTRACTOR shall develop a Quality Assurance/Quality Control (QA/QC) Plan for implementation of the Scope of Work. The CONTRACTOR's QA/QC Plan shall be reviewed and approved by the ENGINEER and shall include or reference all the controls necessary for implementation. As a minimum, the QA/QC Plan shall include the following:

- Purpose and objective
- QA/QC Team – Roles and Responsibilities
- Independent Quality Control (IQC) Team – Roles and Responsibilities
- The In-house Quality Process
- QC coordination with SANITATION DISTRICT
- QC process for each type of submittal (drawings, standards, manual, graphics, programming, etc.)

QA/QC documentation shall include, but not be limited to, the following:

- IQC Comment Log
- Drawing IQC Checklists
- QC Validation Forms

On a periodic basis, SANITATION DISTRICT will conduct an audit of CONTRACTOR's work to ensure conformance with the QA/QC Plan. SANITATION DISTRICT shall notify CONTRACTOR when these audits will occur. For this project, an audit will be done before the first Area Graphics Submittal and after the ORT Test. In addition, the SANITATION DISTRICT reserves the right to conduct additional QA/QC Plan audits if necessary. CONTRACTOR shall respond to any SANITATION DISTRICT comments made during the audit within two weeks. If comments are extensive, SANITATION DISTRICT will schedule a follow-up audit approximately 60 days after the comments are received.

SANITATION DISTRICT may also make periodic visits to the CONTRACTOR's offices to review the progress of the technical work. These visits may include talking to CONTRACTOR's personnel, reviewing drawings, and documents (both hardcopy and electronic), reviewing software (graphic screens, controller logic, etc.).

A sample QA/QC Plan is included in Exhibit 1 which is a part of the project management plan. Major elements of the QA/QC Plan shall include the following:

- CONTRACTOR shall be responsible for the technical adequacy and quality control of his work.
- CONTRACTOR controls shall assure that planning and design inputs (such as decision logs) are correctly translated into planning and design documents such as static graphic screens, PLC/Controller programming templates and other work products.
- CONTRACTOR shall be responsible for the physical control, security, and distribution of controlled documents required for performance of the Scope of Work.
- CONTRACTOR's planning and design activities shall be controlled through the review workshop process, including discipline checks, coordination with other CIP Project work, and review workshops by an Independent Project Review Team.

Prior to the submittal to SANITATION DISTRICT, each Submittal identified in the Scope of Work shall be thoroughly reviewed and corrected by a member of the QC Team. The reviewer shall attest to their review in the form of a written affidavit outlining the submittal subject and identifying the corrected deficiencies.

Documentation that all reviews were performed and all comments resolved, incorporated and back checked will be recorded on a QA Validation Form and submitted to SANITATION DISTRICT for acceptance when the Design Submittal is delivered.

All submittals shall be accompanied by a transmittal letter signed by CONTRACTOR's principal-in-charge or Project Manager, if appropriate, indicating that the submitted documents have been checked, and identifying the reviewer's name. Signatures of the respective checkers shall be included where appropriate. All submittals shall be checked with a goal of insuring accuracy and consistency.

4.1.5 Workshops and Meetings

TASK ORDER #1 J-120 will have three different classes of meetings, each described in detail below. This section includes a partial list of the meetings that will be required to execute the work of this Task Order. Other required meetings are listed in other sections of this document and in the Specification Sections. It is expected that the CONTRACTOR engages with the ENGINEER and with SANITATION DISTRICT staff in a sufficient number of workshops and meetings to obtain consensus on major decisions and to produce the work required by this task order regardless of whether those workshops and meetings are listed here. CONTRACTOR to assume the length of each specified Workshop to be two hours and each specified meeting to be one hour. **WORKSHOPS ARE SOLELY INTENDED TO REPRESENT THE MINIMUM AMOUNT OF**

TIME THAT THE CONTRACTOR IS REQUIRED TO SPEND IN COLLABORATION WITH THE SANITATION DISTRICT. IT DOES NOT INCLUDE TIME SPENT BY THE CONTRACTOR ON THE DESIGN, DEVELOPMENT, EXECUTION, TESTING OR COMMISSIONING OF ANY DELIVERABLE.

A. Workshops

Workshops involve the entire SANITATION DISTRICT team and are used to make key decisions or review a deliverable. Workshops are also used to present, review, and provide comments on deliverable. The following table below is a partial listing of workshops that are required to execute the scope of work of this Project:

Submittal	Number of Workshops	Notes
Project Kick-Off Meeting	1	
Plants 1&2 Control Rooms	2	
Plants 1&2 Control Room Design (4.2.1.A.1A)	7	To include a one hour kickoff meeting, 6 workshop (one hour each) and four hours of site visits (2 hours per plant)
Enterprise Historian	6	See Note 1
System Architecture	10	See Note 1
Cybersecurity	4	
Training on existing standards	5	See Note 1, Note 2
PLC or Controller Programming Standards	50	See Note 1
HMI Standards Development	40	See Note 1
Application Architecture	2	See Note 1
Specification Section Modifications	4	See Note 1
Hardware Standards Development	4	See Note 1
Training and Development System	1	
Mobile and Commissioning System	1	
Maximo Integration	2	See Note 1
Automatically Generated Reports (including MSO's and dashboard reports)	10	See Note 1
MES Report	4	
Read-Only SCADA System	1	See Note 1
Truck Loading System	2	
Pilot PLC/Controller	8	See Note 1
Area Graphics Submittals	50	See Note 1

Note 1: CONTRACTOR's Integration Specialist required to attend

Note 2: 5 day-long training sessions led by SANITATION DISTRICT staff (minimum of 40 hours). Must include all technical personnel working on the project

B. Technical Progress Meetings

Technical progress meetings typically occur on a more-or-less regular basis and include a variety of topics on the agenda. The agenda for these meetings is determined based on whatever

issues require SANITATION DISTRICT input at the time. CONTRACTOR to assume that there will be a minimum of two Technical Progress Meetings per month for the duration of the project.

C. Focused Meetings

Focused meetings are intended to address a particular topic or discipline, and usually do not include the full project team. Focused Meeting may also be used to review interim or informal submittals. CONTRACTOR to assume that there will be a minimum of one Focused meeting (involving either the integration specialist, the project engineer or both) per week for the duration of the project. The SANITATION DISTRICT requires that the following work be performed at the SANITATION DISTRICT facilities:

- Programming Standards
- Workshops and meetings for the Enterprise and Area Graphics Submittals.
- CONTRACTOR presence is required as specified in EXHIBIT 9 for the following items:
 - Control Room Conceptual Design
 - Enterprise Historian
 - Active Directory (AD) Study
 - Cybersecurity
 - MSO/Automatic Report Generation
 - MES upgrades
- Testing and commissioning

D. Workshop and Meeting Planning

Due to limited SANITATION DISTRICT staff availability, some meetings may need to be scheduled up to two weeks in advance to find a time when all the required SANITATION DISTRICT team members are available. The CONTRACTOR's Project Manager shall create and maintain a log of all anticipated meetings. The log shall also be used to track submission, review and finalization of agendas and minutes.

The log shall include, as a minimum, the following information for each meeting:

- Subject of meeting. If the meeting is specifically included in the scope, use that title. Provide enough of a description that no two meetings have the same exact subject description.
- Scheduling Reference. Examples might include "4 weeks after Kickoff Meeting" or "Upon submittal of Area Graphic 11".
- Date. If the meeting is too far in the future to schedule, indicate that this date is tentative.
- Date Minutes Drafted. This should be the date that the draft minutes were transmitted to SANITATION DISTRICT.
- Date Minutes Reviewed. This should be the date that SANITATION DISTRICT transmitted its comments on the minutes or indicated that there were no comments on the minutes.

E. Workshop and Meeting Agendas

CONTRACTOR shall submit an agenda to SANITATION DISTRICT for review at least one week prior to each meeting and workshop. The agenda shall include the following:

- Topics: A listing of each topic to be covered with sufficient detail so that SANITATION DISTRICT attendees can reasonably determine if their participation is needed or not. A one-line description is not typically sufficient for the purpose. The topic description shall include what information will be presented, and what decisions will be needed.
- Timing: The proposed timing of each topic on the agenda including the projected start and stop time for the subject. The purpose of this item is to allow SANITATION DISTRICT staff who cannot attend the entire meeting to attend the portions where they are needed.
- Attendees. The agenda shall include both SANITATION DISTRICT and CONTRACTOR team members. The SANITATION DISTRICT Project Manager will add the SANITATION DISTRICT staff attendees to the agenda prepared by the CONTRACTOR, based on the CONTRACTOR's Agenda and the CONTRACTOR's recommendation of which SANITATION DISTRICT staff members should attend.
- Meeting time and place. The CONTRACTOR shall work with the SANITATION DISTRICT PM to set the meeting date and time. Fifty percent of the meetings will be held at SANITATION DISTRICT offices while the other fifty percent may happen via a conference call. The SANITATION DISTRICT PM will reserve the conference room.
- A preliminary list of material to be provided at the meeting.

Materials to be used or referenced by the meeting attendees to prepare for the meeting shall be sent with the meeting agenda.

The CONTRACTOR shall provide the following at the meeting:

- Hard copies of the agenda, one for each attendee
- One sign-in sheet with the names of attendees pre-listed.
- Native electronic files used for the presentation. With the exceptions noted below, hard copies of presentation materials will generally not be required. The SANITATION DISTRICT Project Manager will make the electronic files available to the SANITATION DISTRICT project team internally.
- Hardcopies of all materials that cannot be easily viewed when projected on a screen. Examples might include design drawings and spreadsheets.

F. Meeting Minutes

CONTRACTOR shall transmit the minutes to the SANITATION DISTRICT Project Manager within 3 business days of the meeting in MS Word format using SANITATION DISTRICT 's template, or an approved substitution. CONTRACTOR shall also update and transmit the Action Item Log, Decision Log, and Design Issues Log with the minutes.

The SANITATION DISTRICT Project Manager will distribute the minutes for internal review. If

there are no SANITATION DISTRICT comments on the minutes within 5 business days, they will be considered final. If there are comments, the SANITATION DISTRICT Project Manager will incorporate all appropriate SANITATION DISTRICT comments in the MS Word file with changes tracked. The updated MS Word file will be transmitted back to CONTRACTOR. If CONTRACTOR has no comments on the SANITATION DISTRICT edits, the minutes will be considered final. If CONTRACTOR has further comments on the SANITATION DISTRICT edits, those comments should be discussed with the SANITATION DISTRICT Project Manager.

G. Informal Meeting Requirements

Informal meetings such as office meetings shall be recorded as follows:

- CONTRACTOR shall notify the SANITATION DISTRICT Project Manager/ Project Engineer prior to the meeting.
- CONTRACTOR shall prepare minutes for the meeting.
- The minutes shall be submitted to the SANITATION DISTRICT Project Manager/Project Engineer.
- After review and modification, the minutes will be filed as a formal record of the meeting.
- Meetings that do not follow this procedure will not be recognized as having occurred.

CONTRACTOR shall prepare for all telephone and teleconferencing meetings in the same manner as outlined above.

A copy of all comments on project issues obtained by CONTRACTOR from SANITATION DISTRICT staff without direct SANITATION DISTRICT Engineering Project Manager's involvement shall be submitted for the Project Manager's approval within three business days of receipt.

4.2 CONFIGURATION, PROGRAMMING AND COMMISSIONING PRODUCTS AND SERVICES

4.2.1 Engineering Services

CONTRACTOR shall provide products and services which fulfill the requirements of the Work explicitly required by the Contract Documents (inclusive of this Task Order) and all work compelled or implied by the engineering submittals described herein; including but not limited to the Enterprise Submittals, the Area Graphics Submittals and submittals associated with the Contract Specifications. The list below is not a comprehensive list of submittals required for TASK ORDER #1 J-120. Additional submittals are required as detailed in the attached Contract Specification Sections.

ALL WORK INCLUDED AS PART OF AN APPROVED SUBMITTAL SHALL BE SUBSEQUENTLY IMPLEMENTED, TESTED AND COMMISSIONED IN ACCORDANCE WITH THE SUBMITTAL AND ALL REFERENCE DOCUMENTATION THAT IS INCLUDED IN THE AGREEMENT.

The activities covered by these submittals shall include all phases of the work from planning and design to installation testing and commissioning. All items listed as a part of the enterprise

submittals shall be provided by the CONTRACTOR to the SANITATION DISTRICT.

The CONTRACTOR shall perform all work implied by the submittals listed herein. The SANITATION DISTRICT will provide the following for installation:

- Network cabling from workstations and servers.
- Available power and grounding for all equipment.
- Adequate ports in network resources.

In addition to the workshops specified in 4.1.6, the CONTRACTOR shall facilitate all additional workshops necessary to gather information, reach consensus and deliver submittals in accordance with the milestones contained herein.

The engineering submittals shall be logically grouped together in the following hierarchy (submittals in bold below):

A. Enterprise Submittals

1. Plants 1&2 Control Room & Workstation Submittals

The CONTRACTOR shall include the following elements in this submittal:

- a. Workstation specification for each individual workstation type (Operator workstation, Servers, Historian, Engineering workstation)
- b. List of required equipment
- c. Power and grounding requirements
- d. Network requirements
- e. Commercial off-the-shelf software and CONTRACTOR software configuration
- f. Workstation configuration to support large screen monitors (workstation cut sheet and specification)
- g. Field and mobile workstation types and quantities
- h. Field-situated operator workstation cut sheets or specifications
- i. CONTRACTOR shall provide a total of 60 thick client Operator Workstations for the following areas:
 - Plant 1:
 - Control Center (2)
 - Central Generation (1)
 - Blower Building 2 (1)
 - Gas Compressors (1)
 - Power Building 8 (1)
 - Power Building 6 (1)
 - Power Building 3A (1)

- Plant 2:

- Control Center (2)
- Central Generation (1)
- DCH (1)
- Tricking Filters Lab (1)
- Gas Compressors (1)
- OOBs (1)
- EPSA (1)
- West RAS/PEPS (1)
- Pump Stations:
 - One thick client Operator Workstation at each facility (total of 15)
- Electrical buildings Plant 1 (15)
- Electrical buildings Plant 2 (13)
- j. CONTRACTOR shall provide a total of 50 thin client Operator Workstations between Plant 1 & Plant 2.
- k. CONTRACTOR shall provide a total of 13 thick client Engineering Workstations.
- l. CONTRACTOR shall provide a total of 10 thin client Engineering Workstations.
- m. CONTRACTOR shall work with the SANITATION district to update the 17425 Specification as required to suit the platform.
- n. For details on base workstation requirements, refer to Section 17425, SCADA Workstations

1A. Control Room Conceptual Design

The CONTRACTOR shall provide design services to replace the HMI consoles and displays located within the Control Center at Plant Nos. 1 and 2. Assume the following level of effort:

- a. Plant No. 1 Control Center
 - 1) Two alternative locations will be evaluated: 1) replacement of equipment in the existing control room, and 2) building out a new control room in a nearby conference room within the Control Center.
 - 2) There are other systems separate from the HMI that will need to be relocated:
 - a) Remote access to entry gates
 - b) IP phones
 - c) Industrial cordless phone system
 - d) Gate controls
 - e) Fire alarm system annunciator
 - f) Plant/OC Regional emergency radio system
 - g) Building door controls
 - h) Tsunami/Weather station alarm system
 - i) Emergency PA siren controls

- j) Admin/HR panic button audible alarm and strobe
- b. Plant No. 2 Control Center
 - 1) Two alternative locations will be evaluated: 1) replacement of equipment in the existing control room, and 2) building out a new control room in a nearby conference room within the Control Center.
 - 2) There are other systems separate from the HMI that will need to be relocated:
 - a) IP phones
 - b) Industrial cordless phone system
 - c) Gate controls
 - d) Fire alarm system annunciator
 - e) Plant/OC Regional emergency radio system
 - f) Building door controls
 - g) MIDLAND Public Alert All Hazards Alert Radio
 - h) Plant 2 MRT Radio Alert switch
 - i) Tsunami/Weather station alarm system
 - j) Emergency PA siren controls
- c. Refer to to Exhibit 9 – (Standard Control Room Design Study) for additional required scope for this item
- d. Both control room configuration will need to consider the following:
 - 1) The control room will need to be secured with lockable doors with card key access.
 - 2) Plant control will be monitored 24 hours/day, 365 days/year.
- e. The CONTRACTOR shall be responsible for producing both a draft conceptual design memo and a final conceptual design memo.
 - a) The conceptual design memo shall include the following items:
 - Proposed configuration of consoles, desks, displays, etc.
 - Proposed room improvements, which may include but is not limited to, elevated flooring, window treatment, partition walls, HVAC modifications, etc.
 - Proposed quantity and type of hardware and furnishings
 - Proposed connection points which include the following:
 - New electrical service connection
 - New ICS and IT connections
 - Summarize key constructability and construction sequencing constraints and plans.
 - Develop system architecture configuration of the components
 - Preliminary construction schedule
 - Draft drawings to include:
 - Control Room Renderings:
 - Isometric drawing of final control room space
 - Scalable plan view of control room space, showing critical dimensions

- Proposed points of connection with electrical, ICS, and IT networks
- AACE International Class 3 cost estimate per OC San's Engineering Design Guidelines, Chapter 01. Data used to prepare the cost estimate shall be furniture, fixtures & equipment (FF&E) only.

2. Enterprise Historian

The CONTRACTOR shall include the following elements in this submittal:

- a. Review of the existing Wonderware facility and Enterprise historian system and architecture
- b. Detailed review of replacing the enterprise Historian and how it will impact the following:
 - 1) The SCADA database
 - 2) The SAT application
 - 3) MSO's and other automatically generated reports
 - 4) Other enterprise users
- c. Complete design of the new ABB Enterprise Historian system including the following:
 - 1) Specification of server requirements
 - 2) System architecture design
 - 3) Integration with MOM application for MSO reports and augmented field procedures
 - 4) Integration with LIMS system
- d. The Contractor shall provide the following:
 - 1) Licenses for up to 50 users on the Enterprise historian
 - 2) Licenses for 150,000 tags
 - 3) Method for obtaining Enterprise historian data via SQL query or directly via an API
 - 4) Trend client and query client applications on enterprise machines including an Excel plug-in and SQL.
 - 5) Full redundancy with automatic failover
 - 6) Interface with the existing LIMS system for historization of LIMS data (The SANITATION DISTRICT LIMS system is not currently being historized by the SCADA historian)
 - 7) Fully licensed for any mix of up to 150,000 analog and discrete points at all of the SANITATION DISTRICT sites. See section 17440 for more details.
 - 8) Import of all of the existing Enterprise historian data into the new Historian
 - 9) Interface with a software/hardware package for electronic operator round sheets for historization of operator round sheet data.

- 10) For more information about the existing Enterprise Historian refer to the Historian spec and the accompanying architecture diagrams. For a listing of the existing Enterprise Historian tags, see Appendix 1-L Existing Historian Tags.
- 11) Tools for data analysis
- 12) Refer to Exhibit 9 – (Option 1: Enterprise Historian) for additional required scope for this item

3. System Architecture

In addition to design, furnish, install and commissioning, this work includes complete, construction ready drawings for all components:

- a. All servers required to deliver a complete SCADA system including application, historian and engineering servers required for the programming and integration of pilot and all future controller hardware.
 - 1) DCS CONTRACTORS shall develop any typical network diagrams specific to the proposed controller including the RIO network.
 - 2) All servers shall be provided and designed as redundant/hot standby pairs.
 - 3) System shall be architected such that there is a means to update and import changes to graphics or areas without impacting other areas or systems while maintaining full redundancy.
- b. All components shall be sized for the expansion required in Section 17440, Performance, Growth and Licensing. Facility Historians and Enterprise Historians shall be configured to capture all of the data that the Wonderware and CRISP Historians presently capture at a one second interval. Additionally, the CONTRACTOR Facility Historian shall import all of the existing Wonderware and CRISP Historian Data, which is over 20 years of data. For a list of the existing points historized on the system, see Appendix 1-L.
 - 1) All Facility Historian servers shall be provided and designed as redundant/hot standby pairs.
- c. All software components shall be licensed per section 17440, Performance Growth and Licensing.
- d. All other peripherals required to create a fully functioning SCADA Platform using CONTRACTOR’s solution..
- e. CONTRACTOR’s systems are required to utilize the SANITATION DISTRICT’s ICS network. SANITATION DISTRICT shall provide all hardware, copper and fiber optic cabling required to connect CONTRACTOR’s complete SCADA Platform.
 - 1) Include all specific CONTRACTOR network requirements such as network equipment, additional fiber optic cabling and VLAN configuration.
- f. SCADA Platform shall be designed such that SANITATION DISTRICT staff are provided with the ability to see and control ‘islanded’ local PLC’s or controllers for all pump station operator workstations and the thick client operator workstations as specified in Section 17425, SCADA Workstations.
- g. All hardware required to provide for communications between the plants and pump

stations such that thick client operator workstations meet the requirements of Section 17425, SCADA workstations.

- h. Provide an enterprise network block diagram showing interconnection between the Plant 1, Plant 2, and Collections systems. This includes the Electrical systems, CenGen and load shedding facilities.
- i. Provide individual network block diagrams for Plant 1, Plant 2 and the Collections System.
- j. Define user profiles and privileges on the platform. From user login function to user privileges, right mouse click displays and access rights. CONTRACTOR shall review, modify, and build upon the existing security infrastructure, rights and privileges.
- k. Provide an interface and integration with the SEL load shedding system
- l. Provide interface and standard for displaying Maximo data and creating and editing work orders in the SCADA system
- m. Import existing Wonderware historical data in stages and to coordinate it with commissioning of individual process areas.
- n. Configure existing thin clients connected in the field to the ICS network with the ability to access virtual operator workstations.
- o. Integrate all components with the existing SANITATION DISTRICT ICS network
- p. Design, configure, test and commission all required Proxy servers for communications between the Industrial DMZ and servers on the ICS network. This will include Proxies for the following:
 - 1) Maximo Integration
 - 2) Historian (Enterprise and Facility)
 - 3) Read-Only SCADA System
 - 4) Alarm and Event List Reporting
 - 5) Support for HTML applications to replace the 'Process' website as described herein.
 - 6) Other Proxies required by SANITATION DISTRICT policy prohibiting direct communication between the ICS and the Industrial DMZ but not listed here.
 - 7) Provide a tool that is fully licensed for alarm statistics, alarm reports and root cause analysis.
 - 8) Capability to text alarm notifications based upon priority
 - 9) Scalable graphics which can be viewed from tablets or other handheld devices
 - 10) Fully licensed process simulation capabilities such that PLCs or controllers can be fully tested in a bench top setting

3A Active Directory (AD) Study

- a. Establish a team comprised of OC San PCI, IT Personnel along with ABB System and Domain Personnel
- b. Review OC San's current approach to the ICS Domain Architecture including existing and new requirements/interactions with the corporate domain, user management philosophy
- c. Review ABB's Standard Domain Architecture
- d. Develop a common approach for the structuring of the ICS and ABB Domains to be utilized going forward for the implementation of ABB and Third-Party Systems going forward
- e. Create a final domain architecture design document outlining the structure and management of the ICS and ABB Domains

3B. Cybersecurity Suite

- a. Design and configure ABB Foundational Cybersecurity Controls server(s) (quantity to be determined based on 800xA system design)
- b. Provide two weeks of comprehensive, on-site customer training of the Allow listing software and other cybersecurity components
- c. Provide a fully-licensed version of Intelligent Allowlisting software for all server and client machines for all 800xA systems provided under this project.
 - 1) Design and build a centralized management server for administrating the allowlisting software on the existing Foundational Cybersecurity Controls server.
 - b) Deploy agents to manage allowlisting policies and engine on each machine
 - c) Build allow lists on each machine
 - d) Monitor continuously for two weeks after deployment and make adjustments per OC San requirements
 - 2) Provide five of each of the following software packages:
 - a) McAfee Application Control license extension
 - b) McAfee Device Control license extension
- d. Network Monitoring
 - 1) Provide network monitoring software solutions for the OC San HMI system (800xA)
 - 2) Design, configure and install sensors as required to collect live network information
 - 3) Design, configure and install the management console for aggregation of collected data
- e. Cyber Asset Inventory
 - 1) Perform the following work:
 - a) Configure and install the Cyber Asset Inventory server virtual machine
 - b) Connect to up to eight (8) mirror/SPAN ports (i.e. network segments)
 - c) Connect to one (1) network for web-based UI
 - d) Install one (1) device data collector
 - e) Configure ten (10) users

- 2) Test and verify the following functions operate properly:
 - a) Automatic network data collection
 - b) Evergreen asset inventory
 - c) Semi-automatic device data collection of windows devices
 - d) Automatic and manual synthesis of devices
 - e) Asset inventory event list
 - f) Export of asset list
 - g) E-mail of event list
- f. Refer to Exhibit 9 – (Option 4: Cyber Security) for additional required scope for this item

4. Import and Modification of Existing Access Databases

- a. In close coordination with the SANITATION DISTRICT and PCI programming support staff, the CONTRACTOR shall develop a method, plan and execute the work of importing all of the current SANITATION DISTRICT Access databases into the CONTRACTOR’s native SCADA platform database in their entirety. The requirements include:
 - 1) Review of the existing Access Database Schema, all of the tables in the database and how they support and interact with the functions of the custom SAT application.
 - 2) Incorporation of table data into the CONTRACTOR’s SCADA platform.
 - 3) Detailed listing of the fields in the ‘Main’ table and how they will be incorporated into the CONTRACTOR’s SCADA platform (or discarded if not necessary).
 - 4) Plan for adding custom or user-defined fields to the CONTRACTOR’s SCADA platform database and plan for the future.
 - 5) Plan for the database such that it can be used with the existing SANITATION DISTRICT’s SAT application (programmed in C#) OR a new application to produce the following file types:
 - a) Unity Pro (1 XML file)
 - b) ProWorx (1 .FIL file)
 - c) Virtual Annunciation File (1 CSV file)
 - d) Vijeo Designer Files (1 XML file)
 - e) CMMS, P&ID & Loop Verification applications
 - f) ORT/FAT Procedure Generator
 - 6) In close coordination with the ENGINEER, review of the SAT application (programmed in C#) CONTRACTOR shall develop a replacement application, which is capable of replacing the SAT functions which will not be provided by the new system.
 - 7) Import all of the master Access databases and all of the associated data into the CONTRACTOR’S SCADA database.
 - 8) See Appendix 1-A for more detail on the SAT application and the structure of the Access database.

5. PLC or Controller Programming Standards Development

- a. In close coordination with the SANITATION DISTRICT, the CONTRACTOR shall

develop programming templates/standards (custom function blocks) corresponding to existing SANITATION DISTRICT PLC programming templates. The required steps to accomplish the work are as follows:

- 1) The CONTRACTOR shall review the Decision Log for the current Unity standards. The CONTRACTOR shall review and understand the current and previous documentation and code for all standards written in Unity and Legacy Ladder Logic.
- 2) The CONTRACTOR shall prepare a Decision Log for the new standards based upon the design principles outlined in the 'UNITY Design Goals' document in Exhibit 3 and based upon the CONTRACTOR's system. The Decision Log shall have line items for each decision made and the CONTRACTOR's suggested solution. For examples of decisions made in the process of developing interim Unity Programming standards, see Exhibit 3.
- 3) In addition to the features listed above, the CONTRACTOR shall provide new template/standards with the following features:
 - a) I/O simulation: CONTRACTOR shall provide the ability to simulate all I/O signals based upon user defined values, calculations, or process/equipment simulations. This may be either internal or external to the programming templates. The simulation logic shall be designed such that minimal or no changes are made to the program to avoid introducing errors due to modifications to support bench testing.
 - b) All data between the HMI and PLC/Controller shall be communicated via data structures and/or custom data types with all template related data packed into a single tag. Individual pieces of data (such as a Hi alarm threshold) shall be tag attributes.
 - c) Provide a method of communicating all of the interlocks and/or permissives to the HMI via a structured data type.
 - Link all of the interlocks and/or permissives in existing PLCs to structured data types created in the HMI
 - d) If a common alarm is used to animate graphical objects at the HMI, provide a data structure for the common alarm such that all of the individual alarms that make up the common alarm are visible from the HMI.
 - e) Custom function blocks shall be provided to allow for the expansion of custom data types such that all attributes associated with a given custom data type is visible to someone trying to troubleshoot PLC/Controller logic in the online mode.
 - f) ALL attributes associated with custom data types and function blocks are made easily viewable while in the online mode. No additional modification of logic shall be required to enable this functionality.
- 4) The CONTRACTOR and SANITATION DISTRICT shall engage in a two (2) week, full time, exchange of information regarding the CONTRACTOR's platform and the existing SANITATION DISTRICT PLC system. The CONTRACTOR's integration specialist and Project Engineer are required to attend. The CONTRACTOR shall submit the Decision Log to the SANITATION DISTRICT one week prior to these

meetings.

- 5) Wherever possible, standard programming templates and logic may be used so long as it does not compromise or reduce the functionality of the existing SANITATION DISTRICT standard programming template. In addition, CONTRACTORS may propose to consolidate or redevelop existing templates so long as the functionality is not compromised or reduced in any way. Proposals must be reviewed and approved by the ENGINEER before development to begins.
- a. For all CONTRACTORS, develop new PLC/Controller programming standards for the provided platform which are specifically designed and implemented to optimize the transfer of data between the PLC/Controller and the CONTRACTOR's HMI platform. SANITATION DISTRICT is in the process of developing standards for the M580 PLC which are compatible with the existing CRISP HMI system. These standards are available for reference in Exhibit 3 – Existing PLC standards. These standards may be used as a basis but CONTRACTOR shall make modifications and develop new code under the direction of the SANITATION DISTRICT to optimize performance with the CONTRACTOR's HMI platform.
- b. For all CONTRACTORS, new programming standards shall be provided for the following SANITATION DISTRICT standard programming blocks (see Appendix for individual template summaries and descriptions). CONTRACTOR is responsible for developing the following templates:
 - 1) C01 – Pump Control Constant Speed
 - 2) C02 – Pump Control Variable Speed
 - 3) C04 – Valve Control Opened/Closed
 - 4) C06 – Valve Control Modulating with Limit Switches
 - 5) C07 – Chemical Addition Flow Pacing
 - 6) C08 – PLC Diagnostic Template Logic
 - 7) C09 – PID Control Closed Loop
 - 8) C10 – Lead/Lag/Standby Constant Speed
 - 9) C11 – Lead/Lag/Standby Variable Speed
 - 10) C12A – Transmitter Scaling with Alarms
 - 11) C12C – Transmitter Scaling No Alarms
 - 12) C12G – Discrete Alarm with Reset
 - 13) C13 – Motor Runtime
 - 14) C15A – Auto/Manual Station
 - 15) C15B - Cascade/Manual Station
 - 16) C15C - Manual Loading Station
 - 17) C17 – Timer sequencer
 - 18) C19 - Totalizer Template
 - 19) C20 – Gate Control Modulating

- 20) C21 – Read Modicon Quantum PLC
- 21) C41 – Circuit Breaker Control Open/Close
- 22) C42 - ATS Control
- 23) C43 – Power Monitor Communications
- 24) C44 – Power Monitor Transmitter Signals with Alarms
- 25) Unity Helper Blocks

- c. Develop framework for organizing and naming function block diagrams within a PLC/Controller
- d. Develop framework for version control of PLC/Controller software.
- e. Develop a means to bulk generate programming templates from .csv files (or another file format such as xml) either through the SAT application, through the CONTRACTOR database or both.
- f. Develop database entry format (new required columns, column descriptions) which corresponds to the SANITATION DISTRICT master database and function with Modicon Quantum and Modicon M580 PLCs
- g. Provide documentation for each template matching the documentation style and content from Exhibit 5 - Sample PLC/Controller Standards Documentation
- h. The CONTRACTOR shall assist OCS&D in the development of a new programming flow chart which best fits the CONTRACTOR SCADA platform hardware and software. For an example of an existing programming flow chart, see Exhibit 3.
- i. Bench testing of the new programming standards including the following:
 - 1) Bench testing of logic with AC800M Controllers
 - 2) Review and verification of function with alarm and graphical elements
 - 3) Testing plan will be submitted to the ENGINEER for approval
 - 4) Testing will include Unwitnessed and Witnessed testing for each step of testing
 - 5) Testing level of effort will be similar to the level of effort described in EXHIBIT – 8.

6. HMI Standards Development

In close coordination with the SANITATION DISTRICT, the CONTRACTOR shall develop the following graphics standards:

- a. Develop page navigation paradigm including menus and linking between pages
- b. Develop method and standard for reproducing the functionality of configuration screens
- c. Develop method and standard for reproducing information available on runtime and flow summary screens
- d. Develop method for handling current alarms in SANITATION DISTRICT PLC's including shelving, acknowledgement, and bad actor reporting.
- e. Develop alarm screen, alarm summary, event summary, alarm groups, alarm parameters. Including replacement of existing functionality provided by CRISP and the alarm/event/audit logs viewer on the Enterprise network (see Appendix 1-K Enterprise Reports for more details).

- f. Develop database entry format (new required columns, column descriptions) which corresponds to the SANITATION DISTRICT master database
- g. Develop new graphics standards for L1 (overview), L2 (process graphics) and equipment detail pages in a color style.
- h. Develop a new graphics standard for L1 (overview) graphics in ASM style.
- i. Develop new graphical objects to replace existing CRISP symbols, such as pumps, valves, display text, etc. These graphical objects shall correspond to all versions of the SANITATION DISTRICT PLC programming templates.
- j. Develop methods for bulk generation of graphical objects from .csv files (or another file format such as xml) either through the SAT application, through the CONTRACTOR database or both
- k. Develop standard for trend screens
- l. CONTRACTOR shall develop two (2) sets of HMI standards for the following PLCs/controllers. The standards shall be designed such that they have a similar look and feel between existing PLC template logic and new PLC/Controller template logic:
 - 1) Existing Modicon Quantum PLCs and Modicon M580 PLCs (current CRISP Standard)
 - 2) New Modicon M580 PLCs or CONTRACTOR controllers (new graphics standard)
 - 3) For both sets of standards, the CONTRACTOR shall provide the following elements for HMI graphics associated with each template:
 - a) Graphical elements for use in process overview graphics
 - b) Graphical elements for use in process graphics
 - c) Graphical elements for use in equipment detail pages
 - d) Develop graphic faceplate templates for devices which correspond to the PLC programming templates. Develop method for display of device interlocks/permissives on faceplates.
 - a. For new PLC/Controller template logic, this linking shall be done with a data type. For existing PLC/template logic, the CONTRACTOR is required to manually link all device interlocks/permissives from the PLC logic. CONTRACTOR is required to determine all device interlocks/permissives by reviewing the existing logic.
 - b. Existing scans and addressing of SANITATION DISTRICT's PLCs are optimized. Since some permissive coils are outside of the 'optimized range' of scanned PLC addresses, the CONTRACTOR shall pilot this solution for existing PLC's with the SANITATION DISTRICT and shall work with the ENGINEER to determine the best solution to implement this and to maintain update rates at one second or better.
 - e) Incorporate elements of configuration screens (such as in service/out of service buttons, lead/lag/standby lineups, etc.) into faceplate templates where possible. Where not possible, provide method for display of configuration screen elements.
 - f) Custom group faceplates for equipment that is grouped together

functionally (i.e. lead/lag/standby pumps)

- m. For all HMI standards developed, CONTRACTOR shall provide corresponding documentation that matches the content and format provided in Exhibit – 6 , HMI Standards Documentation.
- n. Bench testing of the new HMI standards including the following:
 - 1) Bench testing of graphics with logic in AC800M Controllers and Modicon Controllers
 - 2) Review and verification of function with alarm and graphical elements
 - 3) Testing plan will be submitted to the ENGINEER for approval
 - 4) Testing will include Unwitnessed and Witnessed testing for each step of testing
 - 5) Testing level of effort will be similar to the level of effort described in EXHIBIT – 8.

7. Application Architecture

- a. Develop, plan, design and implement a plan for the segmentation of facilities and corresponding PLC's within the framework of the CONTRACTOR application software.
- b. Develop, plan, design and implement the allocation or splitting of servers between clients and individual PLC's
- c. Develop, plan, design and implement a logical hierarchy for system objects including multiple levels of directories for existing and future PLC's and/or controllers.
- d. CONTRACTOR shall provide a complete and independent system and server set for each of the following areas at a minimum:
 - 1) Plant 1 Process
 - 2) Pump Stations
 - 3) Plant 1 Electrical (inclusive of the Cen Gen and Load Shedding Systems)
 - 4) Plant 2 Process
 - 5) Plant 2 Electrical (inclusive of the Cen Gen and Load Shedding Systems)

8. Specification Section Modifications

- a. For DCS CONTRACTORs, modify the following Master specification sections to suit CONTRACTOR hardware:
 - 1) Section 17405: Control Panels
 - a) Produce Representative drawing for each panel type described in the Unit Prices.
 - b) Produce all other representative drawings referred to in section 17405
 - 2) Section 17406: PLC Hardware
 - 3) Section 16120: Conductors and Cables

9. Hardware Standards Development (applicable to DCS CONTRACTORs only)

- a. Develop control panel designs, standard drawings and a corresponding bill of materials (BOM) for single controller and hot-standby controller configurations, for process, electrical and pump station panels.
- b. Develop RIO panel designs, standard drawings and a corresponding bill of materials (BOM) for single rack (36-inch wide RIO panel) and 2-rack (72 inch wide RIO panel)

configurations.

- c. Develop panel designs for wire marshalling using pre-fabricated cabling and termination assembly's integral to the RIO panels.
- d. Develop changes to existing loop drawing standards corresponding to the changes to the RIO designs befitting the proposed platform. Modify existing tools for automated checking of loop drawings against I/O lists.
- e. Develop standard format for hardwired IO listing (columns, column descriptions) which corresponds to the fields in the SANITATION DISTRICT IO database structure which will remain in place.

10. SANITATION DISTRICT Training and Development System

- a. CONTRACTOR shall furnish and install the following items at the PCI lab. Every component of the development system shall be fully licensed on the scale of the SANITATION DISTRICT SCADA system to provide complete functionality with the understanding that this is for a test system only and will not be used in a production environment.
- b. As a minimum, provide the following items from the Unit Price Schedule:
 - Two complete single Controller assemblies (includes highest feature set controller with maximum memory expansion and fastest communications capabilities, redundant power supply backplane with maximum slot and expansion capacity, two ICS Ethernet communication modules providing vendor's system native communications support and with support for Modbus TCP and Ethernet IP communications (if communications adapters cannot provide support for all protocols, provide additional Ethernet modules as necessary for redundant Modbus TCP and Ethernet IP support), single channel and dual-channel fiber optic RIO communication modules, single channel and dual-channel copper RIO communication modules, two (redundant) highest capacity power supplies). Provide any additional cards (in-rack fiber to copper converter, in-rack network switch, etc.), fiber optic cables, network cables, communications or other adapters, terminations, etc. as needed to enable the testing of the full features set of the single controller assembly. (1-001 from the Unit Price Schedule)
 - Two single power supply (non-redundant power) backplanes for single controller systems with maximum slot and expansion capacity.
 - Two (2) complete Redundant Controller assemblies (includes redundant controllers, backplanes, redundant ICS Ethernet communication modules, fiber optic RIO communication modules, redundant power supplies) (1-002 from the Unit Price Schedule)
 - Two IEC 61850 Ethernet communications modules.
 - Complete Remote (RIO) rack (minimum 12 slot, includes backplanes, single and redundant fiber optic Ethernet RIO communication modules, single and

redundant copper Ethernet RIO communication modules, two (redundant power supplies) (1-007 from the Unit Price Schedule).

- Two single power supply (non-redundant power) minimum 12 slot, Remote (RIO) backplanes.
- c. Two of each of the following modules from the Unit Price Schedule. All modules shall be provided complete with each channel wired to pre-fabricated secondary terminals or terminations units with fused disconnects via pre-fabricated cables on both ends:
- 120 VAC 16 point individually isolated neutral per point Discrete Input
 - 24 VDC 16 point Discrete Input
 - 120 VAC 16 point heavy duty rated Form C relay Discrete Output (8 point card may be provided if 16 point card is not available in product line)
 - 120 VAC 16 point heavy duty rated Form A relay Discrete Output
 - Multirange (must include 4-20mA and 0-20mA) 8 channel, individually per point isolated differential, Analog Input
 - Multirange (must include 4-20mA and 0-20mA) 8 channel individually, per point isolated differential, Analog Input with HART support
 - 4-20mA 8 channel individually, per point isolated differential, Analog Output (4 point card may be provided if 8 point card is not available in product line)
- d. In addition, CONTRACTOR shall provide the following:
- Two physical I/O simulation stations such as those typically used in CONTRACTOR classroom training
 - Two fully-licensed engineering workstations capable of ‘standing’ up a complete SCADA system including the following:
 - Graphics configuration server
 - A separate historian server/workstation machine
 - PLC/controller logic configuration/repository server
 - A SCADA server and all Modbus, Modbus TCP, Ethernet IP, and other applicable drivers
 - Dual monitors for each station including two 30-inch monitors
 - Two Industrial grade network switches for RIO networks
 - All appurtenances including cabling, kvm switch and power supplies for Controllers, RIO racks and switches mentioned above

11. Mobile and Commissioning System

The PCI group at the SANITATION DISTRICT routinely commissions new PLCs and HMI graphics associated with CIP projects and as such requires a compact and lightweight mobile commissioning workstation configured with CONTRACTOR software in order to test the interaction between graphics, the controller/PLC in the field and end devices in the field. CONTRACTOR shall provide two complete and FULLY LICENSED mobile commissioning workstations with the following features:

- Fully licensed servers capable of ‘standing’ up a complete and independent SCADA

Platform including configuration of graphics, historian and PLC/controller logic and all communication and device drivers. Licenses for two (2) operator workstations and two (2) engineering workstations.

- Configurable wireless networking capability
- PLC or Controller rack for 'headless' operation of RIO panels
- All cabling and power supplies required for operation of the PLC/Controller rack and for connection to a RIO rack from the PLC/Controller rack

CONTRACTOR shall produce a submittal with detailed drawings for a mobile and commissioning system capable of meeting the requirements above. The submittal shall include the following elements:

- Bill of Materials including required licenses for full functionality
- Engineering Drawings
- Narrative Description
- Relevant procedures and/or instructions for set-up, first time use, operation of 'headless RIO panels' and incorporation into a larger system.

12. Maximo Integration

CONTRACTOR shall provide a method for right clicking on individual objects wherever that object is located in the entire hierarchy of the SCADA system to accomplish the following tasks. In addition, CONTRACTOR shall perform the work of linking all existing Maximo tags to tags and objects in the newly created SCADA database:

- Create, edit, and cancel a work order request for the asset associated with the SCADA object and its parent object(s) with the ability to embed screenshots, trends or other relevant HMI based information to the work order request.
- View the outstanding work order requests or work orders associated with the SCADA object and its parent object(s)
- View the work order history associated with the SCADA object and its parent object(s)
- Backfill data into the work request such as date, time, location and asset tag, etc.

All data shall be displayed and integrated into the CONTRACTOR's native system and shall be represented as such. It is not the intention of the SANITATION DISTRICT to provide a link to MAXIMO but rather to have seamless integration between the CMMS system and the SCADA system.

The submittal shall contain the following:

- All required servers, network connections, and equipment
- Network diagrams
- Graphical representation of the workflows described above

- Strategy for correlating Asset ID's with native SCADA tags
- Operations level User manual containing the following:
 - How to create or cancel work requests
 - How to view outstanding work requests/orders
 - How to view work order history
- PCI level User manual containing detailed configuration and troubleshooting information

13. Automatically Generated Reports

CONTRACTOR shall review the MSO reports found in Appendix 1-J and shall replicate these reports using the MOM software package and the Enterprise Historian. This shall include interfaces to the following data:

- a. PLC/SCADA point data
- b. LIMS Database
- c. Operator Round Sheets (Augmented Field Procedures (AFP) to be built by CONTRACTOR)

CONTRACTOR shall be responsible for the following:

- a. Produce the existing 51 MSO reports from the MOM application.
- b. Operator Round Sheets (AFP's using the MOM application):
 - 1) Plant 1:
 - a) Headworks Round Template – (Large sheet)
 - b) Primary treatment Round Template (2 medium sheets)
 - c) Scrubber Round Template (2 medium sheets)
 - d) Secondary treatment Round Template (2 medium sheets)
 - e) Daily Digester CTS Feed Round Template
 - f) Digester Round Template (1 large, 1 medium sheet)
 - g) T&D Round Template (1 medium)
 - h) Cogen Master Aux Round Template (19 subsheets)
 - i) Chemical Inventory Round Template (1 medium)
 - 2) Plant 2:
 - a) Scrubber Acid Wash Log Template
 - b) East Side Round Template
 - c) Headworks D Round Template
 - d) Head works D Scrubber Bios Master Template
 - e) Headworks D Scrubber Master Template
 - f) Master Scrubber Rounds with Data Transfer Template
 - g) Solids Odor Rounds Template
 - h) AS Round Template – (3 sheets, 1 large sheet)
 - i) DAFT Rounds Template -A/B/C/D – (Very Large Sheet)
 - j) Trickling Filter Round Template (Very large sheet)
 - k) Digester Dome H2S Readings Template
 - l) Digester Rounds Master (3 sub sheets)

- m) Cengen Master Aux Template (17 sub sheets)
- c. Operator Round Reports
 - 1) Operator Round data is combined with LIMS data and history data to create Operator Round Reports. The Operator Round Sheets listed above shall also be configured as reports
- d. TPOD Report
 - 1) TPOD report is a monthly view of the data for the fiscal year while MSO is daily report of the data. One TPOD report shall be created
- e. The following meetings shall be required:

Meeting	Location	Duration	Frequency	ABB Attendees
Kick-Off Meeting	Conference Call	½ Day	1	Project Manager & Lead Engineer
Status Meetings	Conference Call	2 hours	Every other week	PM & Lead Engineer
Technical Interviews/Meetings by SME	Conference Call	2-3 hours	60	SME
Technical Interviews/Meetings by SME & Lead Engineer	At Site	3 days	3	SME & Lead Engineer
Workshops	At Site	1 week	2	SME

- f. Refer to Exhibit 9 – (Option 2: MSO Reports (MOM Reports)) for additional required scope for this item

14. Truck Loading System Replacement Study

The SANITATION DISTRICT currently uses Mettler-Toledo software to track truck loading of bio-solids at both Plant 1 and Plant 2. The software is deployed on the SANITATION DISTRICT enterprise network. The software is used to produce tickets for individual truck loads and for tracking. The system receives data from the truck loading scales over a serial link and also provides a graphical interface so that SANITATION DISTRICT can enter data pertaining to truck operators. The CMRS system interacts with other applications such as the MSO system as well. Refer to Appendix 1 – O: Truck Loading System Description for more information.

CONTRACTOR shall perform a complete field verification and study of the CMRS system and provide a recommendation for replacement software. The study shall include the following:

- Document all data links (and their associated communication protocols) coming into the software
- Document all I/O that is used by the system, produce a complete I/O list for each Plant.

- Documentation of all user functions and user input data
- Documentation of the software's interaction with other systems such as MSO's and the Bio-Solids Tracking System (BTS).
- Recommendation for replacement software.

15. Read-Only SCADA System

CONTRACTOR shall provide the design for a read only version of the complete SCADA system in the Industrial DMZ. CONTRACTOR shall size the system and licensing such that the system is available for use to up to 100 concurrent users on the SANITATION DISTRICT business network. This system shall make use of the existing SCADA graphics and shall not require configuration of new graphics. When new graphics are created on the SCADA system, they shall be propagated to the read-only SCADA system automatically.

16. Enterprise-Level Dashboard Reports

The following Enterprise level dashboard reports shall also be provided (see Appendix 1-K for more details):

- a. MES – Major Equipment Status
 - 1) Provide a complete replacement of the existing MES system using the MOM application and all of the existing features. The following enhancements shall also be provided:
 - a) Provide new, custom equipment groupings at the HMI level through use of the Asset Structure
 - b) Out of Service (OOS) buttons to send OOS signals to child equipment in the equipment hierarchy and the parent equipment as OOS. Interface shall be provided between the HMI and MES system. Assume 8-10 sub-equipment in the hierarchy for each equipment
 - c) User must fill in a service entry form when putting an equipment OOS
 - d) Some sub-equipment are critical and have special rules – if any of the equipment in that category is OOS then entire parent equipment is OOS
 - e) Operator notes made in the HMI shall be available in the MES system
 - f) Tie into Maximo to see if there is a pending workorder for the equipment
 - g) Refer to Exhibit 9 – (Option 3: MES Enhancement Reports) for additional required scope for this item
- b. Plant 1 CRISP Data
- c. Plant 1 Scrubber Runtime Hours
- d. Plant 1 Sludge Totals
- e. Plant 1 Solids Handling
- f. Plant 1 Chemical Rate of Change
- g. Plant 2 Plant Data
- h. Plant 2 Scrubber Runtime Hours

- i. Plant 2 TFPS Runtime Hours
- j. Plant 1 and Plant 2 Chemical Tanks
- k. Alarm/Event/Audit Log Viewer*

*A complete, searchable and sortable version of the Alarm and Event list shall be provided for Enterprise users. CONTRACTOR shall provide all of the same functionality of the existing alarms and events list.

B. Area Graphics Submittals

For each area, the CONTRACTOR is required to provide two (2) different submittals:

1. Field Verification (FV) Submittal. For the FV submittal, the CONTRACTOR is required to identify the active and abandoned graphics. The CONTRACTOR shall submit the following in the FV submittal:
 - o A list of the active graphics to be replaced in the area
 - o Screenshots of the active graphics to be replaced in the area
 - o A list of the tags in the area and the graphics that they appear on (this can be a modified version of the Access database with additional fields for graphic names)

The CONTRACTOR shall not proceed to the Design Submittal for an area graphics package until the FV submittal is approved.

2. Design Submittal (Described Below)

CONTRACTOR shall logically group together SANITATION DISTRICT's process areas and PLC's to perform the graphics conversion work in the most efficient manner. No more than two areas shall be grouped into a single submittal. No more than four (4) PLC's shall be grouped into a single submittal. Existing graphics are located in Appendix 1-B. Once a submittal package is complete but prior to submittal, the CONTRACTOR shall meet with the ENGINEER for detailed review. Further meetings between the ENGINEER and the CONTRACTOR may be required to ensure that each graphics package meets the new graphics standards and that all functionality and information found in the CRISP graphic is provided with the new graphics (at a minimum).

In all cases, the CONTRACTOR is required to review the SANITATION DISTRICT PLC code and corresponding Access Database and group the Access Database entries which are derived from PLC templates into objects that correspond to the custom objects created in the Enterprise Submittal. Except in the case of custom PLC logic, all on screen graphical elements and pop up windows shall be derived from the templates created in the Enterprise Submittal.

The following areas are required (note that due to the ongoing CIP program, the PLC quantities are subject to change):

1. Plant 1:
 - a. Area 10 – Preliminary Treatment (10 PLC's)

- b. Area 11 – Primary Treatment (10 PLC's)
 - c. Area 12 – Secondary Treatment (11 PLC's)
 - d. Area 15 – Solids Handling (19 PLC's)
 - e. Area 16 – Co-Generation Facilities (4 PLC's)
 - f. Area 17 – Utility Units (3 PLC's)
 - g. Area 19 – Miscellaneous Buildings (1 PLC)
2. Plant 2:
- a. Area 20 – Preliminary Treatment (6 PLC's)
 - b. Area 21 – Primary Treatment (5 PLC's)
 - c. Area 22 – Secondary Treatment (9 PLC's)
 - d. Area 24 – Effluent Disposal (8 PLC's)
 - e. Area 25 – Solids Handling (22 PLC's)
 - f. Area 26 – Central Generation Facility (7 PLC's)
 - g. Area 27 – Utility Units (3 PLC's)
 - h. Area 29 Miscellaneous Buildings (1 PLC)
3. Other:
- a. Pump Stations (15 PLC's)
 - b. Area 18 - Plant 1 Electrical (16 PLC's)
 - c. Area 28 - Plant 2 Electrical
 - d. Plant 1 Load Shedding
 - e. Plant 2 Load Shedding
 - f. Create new graphics for each area according to the new graphics standards to replace all of the aforementioned areas inclusive of all the following existing CRISP and Wonderware screen types. For a complete list of the existing screens see Appendix 1-B HMI Graphics. For the purposes of pricing, the CONTRACTOR shall assume 20% additional screens to those in the appendix.
 - 1) Menus
 - 2) Process Overviews
 - 3) Process Graphics
 - 4) Detail Screens
 - 5) Configurations
 - 6) Trend Screens
 - 7) Flow Summaries
 - 8) Sequences
 - 9) Runtimes
 - 10) A/M Stations
 - 11) Faceplate Tuning
 - 12) PLC System Screens
 - 13) All SEL load shedding HMI screens

- 14) All screens displaying power monitoring data from the Electrical and Process SCADA systems
- 15) All screens displaying VFD data
- 16) HMI System Screens
- 17) All Wonderware screen types
- g. Develop 40 additional new abnormal situation management (ASM) style L1 graphics for Process Areas in addition to the existing color process overview graphics.
- 4. Each Area Graphics Submittal shall contain the following:
 - a. Screenshot of every graphics screen and a list of the CRISP screens that it is intended to replace. Graphics screens are inclusive of all summary screens, trends and pop-up windows such as faceplates.
 - b. Listing of the tags displayed on each screen.
 - c. Screenshot of the CRISP graphics the screen is intended to replace. The corresponding CRISP graphic(s) shall be on the following page.
 - d. A complete database for the PLC's associated with the area in the CONTRACTOR's native database format. This includes ALL of the records from the current SANITATION DISTRICT Access database for the PLC. All database fields shall be complete. CONTRACTOR shall also provide the database in Excel format.
- 5. SANITATION DISTRICT is open to innovative ideas from CONTRACTOR to expedite the process of reviewing area graphic screen submittals. Pilot PLC/Controller.
- C. PLC Replacement/Interface

CONTRACTOR shall provide a redundant/hot standby PLC/Controller pair complete with all appurtenances required to communicate with an existing Modicon PLC in the field and to test the functionality of the new HMI and PLC/controller programming standards. The preference would be to communicate directly with Quantum I/O but it is not required. The PLC/Controller shall be located in the PCI laboratory. CONTRACTOR shall program and test the PLC/Controller and the corresponding HMI screens in accordance with all of the standards developed above. The SANITATION DISTRICT will support the effort by modifying existing the existing PLC as necessary. The following submittals are required:

 - 1. PLC/Controller hardware scope of supply and network connectivity to the existing PLC.
 - 2. PLC/Controller program
 - 3. See Section 01810 for required commissioning submittals
 - 4. See Appendix 1-N for the control logic and I/O list for the PLC replacement

4.2.2 System Configuration and Programming Services

CONTRACTOR shall provide any and all configuration and programming required to create a fully functional SCADA System for the entirety of Plant 1 and Plant 2 (process, electrical, cogen/central generation, and load shedding) and the Pumping Plants as described elsewhere in this document. All of the activities described herein apply to all of the plant areas. CONTRACTOR shall provide all programming required by the submittals and required to create a fully functional SCADA system ; in addition, CONTRACTOR shall provide any and all configuration and programming required to create a fully functional SCADA System. The activities required in this

section include the following:

- CONTRACTOR shall convert and import all of the current SANITATION DISTRICT Access databases into their native SCADA platform in its entirety. See Exhibits for the complete SCADA tag database. CONTRACTOR shall create a submittal containing the proposed I/O database in the native format of the CONTRACTOR's platform for SANITATION DISTRICT approval. A .csv or Excel export will be acceptable.
- CONTRACTOR shall program all graphics approved through the area graphics submittals to operate with the new SCADA System.
- CONTRACTOR shall program 80 new ASM style L1 Overview graphics.
- CONTRACTOR shall review all existing PLC source code to find ALL 'Wait State' conditions and link these to the graphics standards developed for the original PLC logic.
- CONTRACTOR shall recreate all existing trends/trend groups to operate with the new SCADA System.
- CONTRACTOR shall stage, bench test, deploy and commission all SCADA System graphics approved through the area graphics submittals (including simulated testing), refer to Section 01810, Commissioning for more additional information.
- CONTRACTOR shall configure a complete a fully licensed read-only version of the SCADA system that is accessible to users on the business network. A minimum of 100 users shall be able to access the system concurrently.
- The CONTRACTOR shall access and harvest the existing archived historical record data sets from the Wonderware Enterprise Historian systems and import the data sets to the new SCADA System Historian. Data sets shall include but are not limited to process and lab data, manual inputs, reports, historical trends, logs, etc.
- The CONTRACTOR shall develop and configure the necessary software to enable the transfer of the existing data to the new SCADA System Historian.
- The data transfer process and activities shall be coordinated with the testing and commissioning activities of each phase and each process so that no existing data shall be lost. The Contractor shall develop and submit a plan that describes the process by which the data will be transferred with no data loss.
- CONTRACTOR shall provide interfaces to the following systems:
 - MAXIMO: Access to the work order history and ability to create work orders associated with a specific object on the right click of a button.

4.3 LICENSING

See Section 17440, Performance, Growth, and Licensing for the requirement.

4.4 TRAINING

See Section 1820, Training, for the specific training required as a part of this Task Order.

PART 5 – GENERAL REQUIREMENTS

5.1 SOFTWARE

5.1.1 General

The CONTRACTOR is expected to develop and provide the deliverables using the standard software currently approved for use by SANITATION DISTRICT. The standard SANITATION DISTRICT software includes, but is not limited to, the latest IT approved versions of the following software:

- Autodesk software (AutoCAD, AutoCAD Map3D or compatible dwg file format)
- Microsoft Office
- Maximo
- Bluebeam Revu eXtreme
- Primavera P6 for scheduling
- Database software as defined elsewhere in the project Scope of Work
- ProWorx NXT (PLC configuration software, only available on SANITATION DISTRICT machines)
- CRISP (HMI software, only available on SANITATION DISTRICT machines)

Any software that the CONTRACTOR needs to comply with these standards shall be purchased and maintained by the CONTRACTOR at no additional cost to the SANITATION DISTRICT. In the event SANITATION DISTRICT provides the CONTRACTOR with access to SANITATION DISTRICT software and hardware (as listed above) at a SANITATION DISTRICT facility in order to facilitate performance of their work, all software and hardware shall remain the property of SANITATION DISTRICT. Only software licensed to SANITATION DISTRICT shall be installed on SANITATION DISTRICT equipment. In addition, only SANITATION DISTRICT IT Department staff will perform the installation of this software, provide troubleshooting and maintenance support. SANITATION DISTRICT equipment, hardware, software and systems may only be taken off premises with prior SANITATION DISTRICT approval.

5.1.2 Submittal Review using Bluebeam

SANITATION DISTRICT has standardized on the use of Bluebeam Revu for reviewing and providing comments to PDF files. Prior to submitting electronic PDF files, format them as indicated below (underlined text refers to commands or functions within the Bluebeam software). See **Exhibit 17** and “SANITATION DISTRICT CAD Standards Manual” prior to submission.

PDF files will be hosted in a Bluebeam cloud-based studio session for review. See **Exhibit 18** for a detailed explanation on how Bluebeam will be used to provide, validate, and close submittal review comments.

CONTRACTOR is required to submit all submittals described in this SOW in Bluebeam. All other submittals required by the Task Order are to be submitted through the PCMS as described in

Section 01701.

- The purpose of the studio session is to provide review and collaboration. The session provides multiple attendees, despite location, the opportunity to review and comment on the same PDFs in real time. All review actions are tracked and recorded.
- SANITATION DISTRICT staff will create the Bluebeam studio session, invite attendees, configure, and manage the Studio session.
- Bluebeam provides reviewers with tools for annotating PDFs called a markup. SANITATION DISTRICT provides two toolboxes for annotating PDFs: "SANITATION DISTRICT Drawings Review" and "SANITATION DISTRICT Report Review."
- Markups are both graphical and tabular. When the graphic markup is placed, corresponding tabular data are created. The collection of tabular data is considered the markup list.
- The markup is automatically populated with various properties including author, sheet number, comment, markup type, etc. to make reviewing consistent. The tabular data within the markup list are hyperlinked to the graphical markup for back-and-forth viewing.
- The markup list may be sorted or filtered. For example, filtering markups by author makes that attendee's markups more prominent on the page by dimming everyone else's markups.
- Within a studio session, markups may only be modified by the markup author except for the Status data field using the "Set Status" command. SANITATION DISTRICT has customized this field for the reconciliation of comments and backcheck. Session attendees may "Reply" to the markup of other reviewers. Replying to a markup provides the responder the opportunity to explain how the markup will be incorporated.
- The comment reconciliation steps are summarized below:
 - Reply – respond to SANITATION DISTRICT provided review comment with: **Agree, Disagree, or Flag for Discussion.**
 - Direct – meet with SANITATION DISTRICT to reconcile the non-agrees with either an **Incorporate or Do Not Incorporate** response. SANITATION DISTRICT will work with CONTRACTOR to ensure clear direction is provided.
 - QC Check – CONTRACTOR tells SANITATION DISTRICT that the comment has been addressed in the next submittal by responding with **Incorporated or Not incorporated.**
 - Backcheck – reconciliation of open and incorporated comments by SANITATION DISTRICT with an **Open or Closed** response.
- A one-hour training session on the use of Bluebeam and custom status menu will be provided by SANITATION DISTRICT. All CONTRACTOR team members responsible for quality control and reconciliation of submittal comments shall attend.

5.1.3 Word Track Changes

Below are guidelines for the review and incorporation of MS-Word comments and revisions. Use MS-Word Track Changes to show edits to all project specifications, programming standards and other MS-Word files.

Submit the marked-up electronic files for SANITATION DISTRICT review, as required by the Scope of Work. SANITATION DISTRICT's review will consist of comments and (in-text) revisions. SANITATION DISTRICT comments and revisions shall remain visible in Track Changes throughout

design.

SANITATION DISTRICT will return the MS-Word files or host them in a central location.

- If the files are returned, CONTRACTOR will check the files back into their document management system (i.e., replace the old files with the returned files) and resume their design and review of SANITATION DISTRICT comments using the returned files. This insures that in-text revision by SANITATION DISTRICT are preserved.
- Hosting files in a central repository is preferred because it eliminates file transfer and the potential for multiple copies. Hosted files are also protected by version control.

SANITATION DISTRICT comments shall be addressed using MS-Word “Reply” and “Resolve.” The CONTRACTOR shall “Reply” to each SANITATION DISTRICT comment describing how the comment will be addressed and revise the specification, as needed, to address the comment.

“Resolve” will be used by the reviewer or designee to confirm their comment has been addressed. “Resolve” greys out the comment showing it is closed.

Revisions may be “Rejected” with the concurrence of the Engineer. Concurrence is necessary because once a revision is "rejected," it is removed from MS-Word Track Changes and no longer visible.

After final design, all MS-Word comments and revisions shall be Track Changes accepted, rejected, resolved, or deleted prior to bid. The MS-Word commands to “Accept All Changes” and “Delete All Comment in Document” shall be performed just prior to preparing the IFB set. No unaddressed comments or revisions shall remain in the Bid Documents.

EXHIBITS

- Exhibit 1 Sample Project Management Plan**
- Exhibit 2 Sample Risk Management Plan**
- Exhibit 3 Existing PLC Standards and Standards Reference Documentation**
- Exhibit 4 Existing HMI Standards**
- Exhibit 5 Sample PLC/Controller Standards Documentation**
- Exhibit 6 Sample HMI Standards Documentation**
- Exhibit 7 Specifications**
- Exhibit 8 Sample Bench Testing Documentation**
- Exhibit 9 J-120 Additional Scope Items**

APPENDIX – 1

- Appendix 1 – A: Not used
- Appendix 1 – B: CRISP HMI Graphics

- Appendix 1 – C: Not Used
- Appendix 1 – D: PLC & RIO Inventory Listing
- Appendix 1 – E: Not used
- Appendix 1 – F: Not used
- Appendix 1 – G: Not used
- Appendix 1 – H: Not used
- Appendix 1 – I: Not used
- Appendix 1 – J: Monthly Summary of Operations (MSO) Description
- Appendix 1 – K: Enterprise Reports Description
- Appendix 1 – L: Existing Enterprise Historian Tags
- Appendix 1 – M: Not Used
- Appendix 1 – N: PLC Replacement Logic and IO List
- Appendix 1 – O: Truck Loading System Description

NOTE: All exhibits and appendices are on file at the Clerk of Board Office.

Attachment "B"
Unit Price Schedule Project J-120 Buildup

J 120 Project - Unit Price Buildup

Unit Price Schedule 1: Hardware Systems & Components

Item Number	Description	Quantity Required Mobilization	Quantity Required - Enterprise Submittals	Quantity Required - Plant 1 (Programming, Testing and Commissioning and Installation)	Quantity Required - Plant 2 (Programming, Testing and Commissioning and Installation)	Quantity Required - Collections (Programming, Testing and Commissioning and Installation)	PLC Replacement/Interface & System Configuration and Programming Services	Quantity Required - Facility Historians	Quantity Required Demobilization	Quantity Required Additional Base Scope	Quantity Required Enterprise Historian	Quantity Required MSO Reports	Quantity Required MES Enhancement Reports	Quantity Required Cyber-Security	Quantity Required Control Room Solutions Study	Unit Price (From Unit Price Schedule 1)	Total Price
IO Devices & Controller Parts																	
1-001	Complete Controller assembly (includes controller, backplane, redundant ICS Ethernet communication modules, fiber optic RIO communication module, redundant power supply)			2												\$ 21,677	\$0 - See Note in Column "S". Note: ABB confirmed quantities and price is included in J-120 Buildup Price. Confirmed by ABB on Teams Meeting 07/29/2020.
1-002	Complete Redundant Controller assembly (includes redundant controllers, backplanes, redundant ICS Ethernet communication modules, fiber optic RIO communication modules, redundant power supplies)			5												\$ 25,866	\$0 - See Note in Column "S". Note: ABB confirmed quantities and price is included in J-120 Buildup Price. Confirmed by ABB on Teams Meeting 07/29/2020.
1-003	Controller rack, non-redundant controller			2												\$ 9,772	\$0 - See Note in Column "S". Note: ABB confirmed quantities and price is included in J-120 Buildup Price. Confirmed by ABB on Teams Meeting 07/29/2020.
1-004	Controller rack, redundant controller															\$ 13,433	\$ -
1-005	Controller power supply, redundant															\$ 794	\$ -
1-006	Controller power supply, non-redundant			2												\$ 562	\$0 - See Note in Column "S". Note: ABB confirmed quantities and price is included in J-120 Buildup Price. Confirmed by ABB on Teams Meeting 07/29/2020.
1-007	Complete Remote RIO rack (minimum 12 slot, includes backplanes, redundant ICS Ethernet communication modules, redundant power supplies)			1												\$ 11,169	\$0 - See Note in Column "S". Note: ABB confirmed quantities and price is included in J-120 Buildup Price. Confirmed by ABB on Teams Meeting 07/29/2020.
1-008	Complete Remote RIO rack (minimum 12 slot, includes backplanes, redundant ICS Fiber communication modules, redundant power supplies)															\$ 11,822	\$ -
1-009	12 slot RIO rack			2												\$ -	\$ -
1-010	RIO rack power supply, redundant															\$ 794	\$ -
1-011	RIO rack power supply, non-redundant			2												\$ 562	\$0 - See Note in Column "S". Note: ABB confirmed quantities and price is included in J-120 Buildup Price. Confirmed by ABB on Teams Meeting 07/29/2020.
1-012	Controller to I/O communications module (single mode fiber)															\$ 9,747	\$ -
1-013	Controller to I/O communications module (ethernet)															\$ 9,084	\$ -
1-014	Controller to ICS network communications module															\$ -	\$ -
1-015	RIO to controller communications module (single mode fiber)															\$ 3,971	\$ -
1-016	RIO to controller communications module (ethernet)															\$ 3,319	\$ -
1-017	Analog Input Card - 16 Channel, Isolated, with HART															\$ -	\$ -
1-018	Analog Input Card - 16 Channel, Isolated, without HART															\$ -	\$ -
1-019	Analog Input Card - 8 Channel, Isolated with HART			2												\$ 1,359	\$0 - See Note in Column "S". Note: ABB confirmed quantities and price is included in J-120 Buildup Price. Confirmed by ABB on Teams Meeting 07/29/2020.
1-020	Analog Input Card - 8 Channel, Isolated without HART			2												\$ 1,138	\$0 - See Note in Column "S". Note: ABB confirmed quantities and price is included in J-120 Buildup Price. Confirmed by ABB on Teams Meeting 07/29/2020.
1-021	Analog Output Card - 8 Channel, Isolated, with HART			2												\$ 1,705	\$0 - See Note in Column "S". Note: ABB confirmed quantities and price is included in J-120 Buildup Price. Confirmed by ABB on Teams Meeting 07/29/2020.
1-022	Analog Output Card - 8 Channel, Isolated, without HART															\$ 1,536	\$ -
1-023	Analog Output Card - 4 Channel, Isolated with HART															\$ -	\$ -
1-024	Analog Output Card - 4 Channel, Isolated without HART															\$ 1,966	\$ -
1-025	Discrete Input Card - 32 Channel															\$ 1,589	\$ -
1-026	Discrete Input Card - 16 Channel Isolated 120 VAC			2												\$ 794	\$0 - See Note in Column "S". Note: ABB confirmed quantities and price is included in J-120 Buildup Price. Confirmed by ABB on Teams Meeting 07/29/2020.
1-027	Discrete Output Card - 32 Channel Form C Relays minimum 3A per channel															\$ -	\$ -
1-028	Discrete Output Card - 16 Channel Form C Relays minimum 3A per channel			3												\$ 918	\$0 - See Note in Column "S". Note: ABB confirmed quantities and price is included in J-120 Buildup Price. Confirmed by ABB on Teams Meeting 07/29/2020.
1-029	Discrete Output Card - 8 Channel Form C Relays minimum 3A per channel															\$ 567	\$ -
1-030	Network module for interface with smart I/O devices															\$ 2,175	\$ -
1-031	Redundant CPU Module															\$ 4,253	\$ -
Peripherals & Networking																	
1-400	Vendor router required for interface with the existing ICS network															\$ -	\$ -
Licensing See Licensing Section from Agreement																	
1-600	Complete system license with all optional features as described in Specifications Section 17440 as the Base Requirement - through the completion of Project J-120		1													\$ 2,585,531	\$ 2,585,531
1-601	N/A															\$ 5,037,814	\$ -
1-602	N/A															\$ 4,102,587	\$ -
1-603	Complete system license for Enterprise Historian (MOM)									1						\$ 1,052,753	\$ 1,052,753
1-604	N/A															\$ 1,151,028	\$ -
1-605	N/A															\$ 902,631	\$ -
1-606	Complete system license for MSO Reports										1					\$ 158,555	\$ 158,555
1-607	N/A															\$ 45,764	\$ -
1-608	N/A															\$ 35,891	\$ -
1-609	Complete system license for Cyber Security software												1			\$ 258,171	\$ 258,171
1-610	N/A															\$ 296,771	\$ -
1-611	N/A															\$ 232,722	\$ -
1-612	N/A															\$ -	\$ -
Vendor Added Items																	
1-700	Feature No 3: Control room solutions: Control Room design, Extended Operator Workplace EOX-x Pricing from Fiona is included attachment.															\$ 129,081	\$ -
1-701	Feature No 4: ABB Ability™ System 800xA Electrical Control System: Pricing for Interface Modules CI - IEC 61850 and Software Licensing price. Included the all the key modules model numbers as attachment.			2												\$ 2,270	\$0 - See Note in Column "S". Note: ABB confirmed quantities and price is included in J-120 Buildup Price. Confirmed by ABB on Teams Meeting 07/29/2020.
1-702	Feature No 6: Fieldbus protocols & Field Information Manager: Pricing for All 800xa CI modules for communication protocols and field information manager system. Included the all the key modules model numbers as attachment.															\$ 71,122	\$ -
1-703	Feature No 7: Select IO - Included the all the key modules model numbers as attachment.															\$ 1,749	\$ -
1-704	24 VDC 16 point digital input card			2												\$ 511	\$0 - See Note in Column "S". Note: ABB confirmed quantities and price is included in J-120 Buildup Price. Confirmed by ABB on Teams Meeting 07/29/2020.
1-705	CI867 - Modbus TCP Interface															\$ 4,141	\$ -
1-706																\$ -	\$ -
1-707																\$ -	\$ -
1-708																\$ -	\$ -
1-709																\$ -	\$ -
1-710																\$ -	\$ -
1-711																\$ -	\$ -
1-712																\$ -	\$ -
1-713																\$ -	\$ -
1-714																\$ -	\$ -
1-715																\$ -	\$ -
1-716																\$ -	\$ -
1-717																\$ -	\$ -
1-718																\$ -	\$ -
1-719																\$ -	\$ -
																Unit Price Schedule 1: Components TOTAL:	\$ 4,055,013

Unit Price Schedule 3: Labor

Item Number	Description (Notes)	Quantity Required Mobilization	Quantity Required - Enterprise Submittals	Quantity Required - Plant 1 (Programming, Testing and Commissioning and Installation)	Quantity Required - Plant 2 (Programming, Testing and Commissioning and Installation)	Quantity Required - Collections (Programming, Testing and Commissioning and Installation)	Quantity Required - PLC Replacement/Interface & System Configuration and Programming Services	Quantity Required - Facility Historians	Quantity Required Demobilization	Quantity Required Additional Base Scope	Quantity Required Enterprise Historian	Quantity Required MSO Reports	Quantity Required MES Enhancement Reports	Quantity Required Cyber-Security	Quantity Required Control Room Solutions Study	Unit Price (From Unit Price Schedule 3)	Total Price
3-001	Project Manager, Hourly Rate	320	1330	1190	1020	560	8	24	120	80	120	240	120	72		\$ 212	\$ 1,104,849
3-002	Project Controls and Schedule Engineer, Hourly Rate	128	192	192	96	160		16			80	160	60	40		\$ 123	\$ 142,277
3-003	Support and Admin Staff, Hourly Rate															\$ -	\$ -
3-004	Senior Engineer, Hourly Rate	320	1330	1600	1600	560	80	80	100	632	480	1400				\$ 190	\$ 1,554,580
3-005	Engineer, Hourly Rate	160	1330	1500	1500	290	120	320			400	1350				\$ 138	\$ 963,692
3-006	Engineer Associate or Assistant, Hourly Rate	160	665	1200	1150			160								\$ 138	\$ 461,760
3-007	Staging Site Technician, Hourly Rate															\$ -	\$ -
3-008	Engineering Specialist, Hourly Rate												480	400		\$ 203	\$ 422,933
3-009	HMI Graphics Developer / Programmer, Hourly Rate		360	1600	1120	120										\$ 138	\$ 443,071
3-010	Junior HMI Graphics Developer / Programmer, Hourly Rate															\$ -	\$ -
3-011	Systems Integration Specialist, Hourly Rate	160	1330	1300	1300	280		24	120			900	730	600		\$ 231	\$ 1,556,308
3-012	Systems Architect Specialist, Hourly Rate															\$ -	\$ -
3-013	Testing and Simulation Specialist, Hourly Rate															\$ -	\$ -
3-014	Enterprise Historian (5 trips = \$ 2100/Trip)										1					\$ 10,500	\$ 10,500
3-015	MSO Reports (6 trips = \$ 2100/Trip)											1				\$ 12,600	\$ 12,600
3-016	Cyber Security (2 trips = \$ 2100/Trip)													1		\$ 4,200	\$ 4,200
3-017	Control Room Solutions Study														1	\$ 50,000	\$ 50,000
3-018																\$ -	\$ -
3-019																\$ -	\$ -
3-020																\$ -	\$ -
																Unit Price Schedule 3: Labor TOTAL:	\$ 6,726,786

Unit Price Schedule 4: Training

Item Number	Description (Notes)	Quantity Required - Mobilization	Quantity Required - Enterprise Submittals	Quantity Required - Plant 1 (Programming, Testing and Commissioning and Installation)	Quantity Required - Plant 2 (Programming, Testing and Commissioning and Installation)	Quantity Required - Collections (Programming, Testing and Commissioning and Installation)	Quantity Required - PLC Replacement/Interface & System Configuration and Programming Services	Quantity Required - Facility Historians	Quantity Required - Demobilization	Quantity Required - Additional Base Scope	Quantity Required - Enterprise Historian	Quantity Required - MSO Reports	Quantity Required - MES Enhancement Reports	Quantity Required - Cyber-Security	Quantity Required - Control Room Solutions Study	Unit Price (From Unit Price Schedule 4)	Total Price
Training and Training Systems																	
4-001	Classroom Training - 1 Week Users Training			12	12	8										\$ 6,517	\$ 208,544
4-002	Classroom Training - 3 Days Overview Training			2	2	1										\$ 4,070	\$ 20,351
4-003	Classroom Training - 1 Week Maintenance Training			3	1	1										\$ 6,517	\$ 32,585
4-004	Classroom Training - 3 Weeks Programmer Training			3	1	1										\$ 18,751	\$ 93,753
4-005	Classroom Training - 1 Week Advanced/Specialty Training			2	1	1										\$ 6,517	\$ 26,068
4-006	Classroom Training - 1 Day Management Overview			3	3	2										\$ 1,823	\$ 12,987
4-007																\$ -	\$ -
4-008																\$ -	\$ -
4-009																\$ -	\$ -
4-010																\$ -	\$ -
4-011	CBT System Development and Delivery															\$ -	\$ -
4-012	CBT Training - 3 Days Overview Training			1	1	1										\$ 3,500	\$ 10,500
4-013	CBT Training - 1 Week Maintenance Training			1	1	1										\$ 3,500	\$ 10,500
4-014	CBT Training - 3 Weeks Programmer Training			1	1	1										\$ 8,000	\$ 24,000
4-015	CBT Training - 1 Week Advanced/Specialty Training			1	1	1										\$ 3,500	\$ 10,500
4-016	CBT Training - 1 Week Users Training			1	1	1										\$ 3,500	\$ 10,500
4-017	CBT Training - Additional Topics per 1 week			1	1	1										\$ 3,500	\$ 10,500
4-018	CBT Content Updates (for 4-012 to 4-017)			1												\$ 25,440	\$ 25,440
4-019																\$ -	\$ -
4-020																\$ -	\$ -
4-021																\$ -	\$ -
4-022																\$ -	\$ -
Support and Other Costs																	
4-023	Support Services - 24-hour phone support (unlimited, direct access to the highest technical support level available) / email, unlimited access, through the completion of Project J-120		1													\$ -	\$ -
4-024	Support Services - Web Based access, unlimited access, through the completion of Project J-120		1													\$ -	\$ -
4-025	Mobilization		1													\$ -	\$ -
4-026	Project J-120 Office and staging area equipment and furniture		1													\$ 54,375	\$ 54,375
4-027	Bond costs through the completion of Project J-120		1													\$ 382,500	\$ 382,500
4-028	N/A															\$ -	\$ -
4-029	Escrow costs for Items 1-604, 1-607 and 1-610 in Unit Price Schedule 1: Hardware Systems & Components, through the completion of Project J-120 (Allowance)		1													\$ 103,576	\$ 103,576
4-030	N/A															\$ 119,822	\$ -
4-031	N/A															\$ 543,616	\$ -
4-032	Facility Historian System															\$ -	\$ -
4-033	N/A															\$ 1,234,434	\$ -
4-034	N/A															\$ 107,525	\$ -
4-035	N/A															\$ 97,750	\$ -
4-036	N/A															\$ -	\$ -
4-037	N/A															\$ -	\$ -
4-038	N/A															\$ 119,822	\$ -
4-044																\$ -	\$ -
																Unit Price Schedule 4: Training TOTAL:	\$ 1,036,681

Note: ABB confirmed that this includes both types of specialty training per Specifications Section 08120 and quantities to be delivered are actually double. Confirmed by ABB on Teams Meeting 07/29/2020.

Project J-120 TOTAL \$ 11,818,480

Attachment "C"
Project J-120 Performance and Payment Bonds

PERFORMANCE BOND

BOND NO. _____

PREMIUM: _____

KNOW ALL MEN BY THESE PRESENTS, THAT, WHEREAS, Orange County Sanitation District ("SANITATION DISTRICT") has awarded on July 28, 2021, to ABB Inc., hereinafter designated as the "Principal", an agreement, (the "Agreement"), which is incorporated by reference herein, for the Work described as follows:

**Task Order No. 1 - Project No. J-120
Process Control Systems Upgrades**

NOW, THEREFORE, We, the CONTRACTOR, as Principal and _____ as Surety, are held and firmly bound unto SANITATION DISTRICT in the penal sum of \$11,818,480 lawful money of the United States for the payment of which sum well and truly to be made, we bind ourselves, our heirs, successors, executors and administrators, jointly and severally firmly by these presents.

The condition of this obligation is such that if the above bound Principal, his or its heirs, executors, administrators, successors or assigns, shall in all things stand to and abide by, and well and truly keep and perform the undertakings, terms, covenants, conditions and provisions in the said Agreement and any alteration thereof made as therein provided, on his or their part, to be kept and perform and at the time and in the manner therein specified, and in all respects according to their true intent and meaning, and shall indemnify and save harmless SANITATION DISTRICT, its officers, agents and employees, as therein stipulated, then this obligation shall become null and void; otherwise it shall be and remain in full force and effect.

As part of the obligation secured hereby and in addition to the face amount specified herein, there shall be included costs and reasonable expenses and fees, including reasonable attorney's fees, incurred by SANITATION DISTRICT in successfully enforcing such obligation, all to be taxed as costs and included in any judgment rendered.

The surety hereby stipulates and agrees that no change, extension of time, alteration or addition to the terms of the Agreement or to the Work to be performed thereunder or the Specifications accompanying the same shall in any wise affect its obligations on this Bond, and it does hereby waive notice of any such change, extension of time, alteration or addition to the terms of the Agreement or to the Work or to the Specifications. Surety hereby expressly waives the provision of California Civil Code Section 2819. Surety further stipulates and agrees that the provisions of Section 2845 of the Civil Code and commencement of the Work are not conditions precedent to surety's obligations hereunder and are hereby waived by surety.

IN WITNESS WHEREOF, we have hereunto set our hands and seals this _____ day of _____, _____.

By _____ (Seal)
Principal (CONTRACTOR)

By: _____ (Seal)
Surety

By: _____
Attorney-In-Fact

PAYMENT BOND

BOND NO.: _____

KNOW ALL MEN BY THESE PRESENTS, THAT, WHEREAS, Orange County Sanitation District ("SANITATION DISTRICT") has awarded on July 28, 2021, to ABB Inc., hereinafter designated as the "Principal", an agreement (the "Agreement"), which is incorporated by reference herein, for the Work described as follows:

**Task Order No. 1 - Project No. J-120
Process Control Systems Upgrades**

That we, _____ as Principal, and _____, incorporated under the laws of the State of _____ and authorized to execute bonds and undertaken as sole surety, as Surety, are held and firmly bound unto any and all persons named in California Civil Code Section 9100 whose claim has not been paid by the CONTRACTOR, company or corporation, in the aggregate total of \$11,818,480 for the payment whereof, well and truly to be made, said Principal and Surety bind themselves, their heirs, administrators, successors and assigns, jointly and severally, firmly by these presents. Bonds must be issued by a Surety authorized by the State Insurance Commissioner to do business in California and must be maintained throughout the life of the Task Order and during the warranty period.

NOW, THEREFORE, if the above bounden Principal CONTRACTOR, person, company or corporation, or his or its Subcontractor, fails to pay any claimant named in Section 9100 of the Civil Code of the State of California, or amounts due under the Unemployment Insurance Code, with respect to Work or labor performed by any such claimant, that, the Surety on this Bond for value received will pay the same, in an amount not exceeding the aggregate sum specified in this Bond, and also in case suit is brought upon this Bond, a reasonable attorney's fee, which shall be awarded by the court to the prevailing party in said suit, said attorney's fee to be taxes as costs in said suit.

This Bond shall inure to the benefit of any person named in Section 9100 of the Civil Code of the State of California so as to give a right of action to them or their assignees in any suit brought upon this Bond.

The Surety, for value received, hereby stipulates and agrees that no change, extension of time, alteration or addition to the terms of the Agreement or to the Work to be performed thereunder or the Specifications accompanying the same shall in any wise affect its obligations on this Bond, and it does hereby waive notice of any such change, extension of time, alteration or addition to the terms of the Agreement or to the Work or to the Specifications.

Surety's obligations hereunder are independent of the obligations of another surety for the payment of claims of laborers, mechanics, material suppliers, and other persons in connection with the Agreement; and suit may be brought against Surety and other such sureties, jointly and severally, or against any one or more of them, or against less than all of them without impairing SANITATION DISTRICT's or Subcontractors' right against the others.

This Bond is executed and filed to comply with the provisions of the act of Legislature of the State of California as designated in Civil Code Sections 9550-9566 inclusive and all amendments thereto.

IN WITNESS WHEREOF, we have hereunto set our hands and seals this _____ day of _____, _____.

By _____ (Seal)
Principal (CONTRACTOR)

By: _____ (Seal)
Surety

By: _____
Attorney-In-Fact